EUROPEAN ECONOMY

The economics of EMU

Background studies
for *European Economy* No 44
'One market, one money'

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Abbreviations and symbols used

Countries

B	Belgium
DK	Denmark
D	Federal Republic of Germany
GR	Greece
E	Spain
F	France
IRL	Ireland
I	Italy
L	Luxembourg
NL	The Netherlands
P	Portugal
UK	United Kingdom
USA	United States of America
EUR 9	European Community excluding Greece, Spain and Portugal
EUR 10	European Community excluding Spain and Portugal
EUR 12	European Community, 12 Member States

Currencies

ECU	European currency unit
BFR	Belgian franc
DKR	Danish krone
DM	Deutschmark
DR	Greek drachma
ESC	Portuguese escudo
FF	French franc
HFL	Dutch guilder
IRL	Irish pound (punt)
LFR	Luxembourg franc
LIT	Italian lira
PTA	Spanish peseta
UKL	Pound sterling
USD	US dollar
SFR	Swiss franc
YEN	Japanese yen
CAD	Canadian dollar
ÖS	Austrian schilling
R	Russian rouble

Other abbreviations

ACP	African, Caribbean and Pacific countries having signed the Lomé Convention
ECSC	European Coal and Steel Community
EDF	European Development Fund
EIB	European Investment Bank
EMCF	European Monetary Cooperation Fund
EMS	European Monetary System
EMU	European monetary union
ERDF	European Regional Development Fund
Euratom	European Atomic Energy Community
Eurostat	Statistical Office of the European Communities
GDP (GNP)	Gross domestic (national) product
GFCF	Gross fixed capital formation
LDCs	Less-developed countries
Mio	Million
Mrd	1 000 million
NCI	New Community Instrument
OCTs	Overseas countries and territories
OECD	Organization for Economic Cooperation and Development
OPEC	Organization of Petroleum Exporting Countries
PPS	Purchasing power standard
SMEs	Small and medium-sized enterprises
SOEC	Statistical Office of the European Communities
toe	Tonne of oil equivalent
:	Not available

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Introduction

Jean Pisani-Ferry and Michael Emerson

The studies presented in this volume were prepared at the request of the Directorate-General for Economic and Financial Affairs as contributions from independent economists to the analysis of economic and monetary union (EMU) undertaken by the Commission of the European Communities. This research served as a contribution for the Commission's evaluation of the benefits and costs of EMU published under the title 'One market, one money' in *European Economy* No 44 in October 1990. Economists from the staff of the Commission had fruitful professional discussions with the panel of independent economists and benefited from their research, but the analyses and opinions presented in this volume do not engage the Commission's services in any way.

The main issues taken up in each of the contributions broadly belong to one or several of the five categories of effects identified in part B of 'One market, one money' as the main benefits and costs. Three studies mainly deal with the real economy integration effects of a monetary union, the associated efficiency gains, and their medium- and long-term impact on output growth: the first by Richard Baldwin attempts to synthesize the microeconomics of EMU and to quantify some of the associated gains, while the second, written with Richard Lyons, draws on recent models to discuss the possibility that expectations of faster growth raised by EMU could prove self-fulfilling; Robert Morsink and Willem Molle assess the empirical relation between the allocation of foreign direct investment and exchange rate variability. Two studies deal with the monetary aspects of EMU: Manfred Neumann's contribution is devoted to the constitution of the European central bank and its links with price stability; Alberto · Giovannini addresses the consequences for the exchange-rate mechanism (ERM) of the EMS of the removal of capital controls and of barriers to competition in the banking industry. Three contributions belong primarily to the fields of fiscal policy and public finance: Paul Van Rompuy, Filip Abraham and Dirk Heremans analyse in a fiscal federalism perspective the issue of subsidiarity in EMU, i.e. the optimal assignment of competences to various layers of government; Frederick van der Ploeg addresses the macroeconomics of EMU within a coordination framework; Charles Wyplosz discusses, in a medium-term perspective, the content of and the rationale for fiscal discipline. The two studies by David Begg and Axel Weber explore from two different standpoints the issue of shocks and adjustments in a monetary union: Weber draws on EMS empirical evidence to discuss the issue of asymmetries in EMU, while Begg tries to assess the effective-

ness of the exchange rate instrument and the cost of losing it. Finally, George Alogoskoufis and Richard Portes assess the international costs and benefits of EMU.

Economic integration, efficiency and growth

The standard rationale for forming a monetary union is to eliminate the microeconomic costs associated with monetary policy autonomy, i.e. exchange rate uncertainty and transaction costs. As in the case of the elimination of border controls this would, first, foster economic integration within the Community, and second, yield efficiency gains. These gains and indirect benefits from economic integration can, in turn, translate into greater output gains, and possibly into sustained increases in the growth rate. This nexus of effects is analysed in the three studies by R. Baldwin, W. Molle and R. Morsink, and R. Baldwin and R. Lyons.

The classical Mundellian discussion of optimum currency areas takes as granted the advantages of forming a monetary union, and concentrates on its possible costs. However, the microeconomic gains are not known with precision, nor even fully grasped in theory. As pointed out by Baldwin, this is probably because the issue of the gains from switching from multiple currencies to a single one is simply irrelevant under the standard assumptions of the classical microeconomic theory: full information, rationality of the agents and frictionless markets.

In order to fill the gap between microeconomics and monetary theory, Baldwin draws on recent research in macroeconomics and the microeconomics of imperfect markets. He finds seven different motives for expecting static efficiency gains from a disappearance of exchange-rate variability and uncertainty:

(i) the elimination of transaction and hedging costs;

(ii) the removal of exchange rate barriers to capital market integration;

(iii) the elimination of distortions in the allocation of capital;

(iv) the promotion of cross-border competition;

(v) the elimination of distortions in the pattern of international ownership;

(vi) welfare effects of enhancing price stability;

(vii) possible effects on trade.

Turning to empirical assessment, Baldwin only considers (i) and (iii) as identified sources of measurable static efficiency gains, and basically relies on the Commission's assessment

of EMU savings on transaction costs (see Chapter 3 of 'One market, one money'). But he discusses three different channels through which EMU could translate into higher output (these evaluations are, in turn, taken up in the Commission's study). First, static efficiency gains give rise to medium-term effects through higher capital accumulation; these effects, which are taken into account in a similar way as in Baldwin's (1989) economic policy paper on the dynamic effects of 1992, could approximately double the initial output gains. Second, endogenous growth models *à la* Romer (1986) provide an alternative framework for the assessment of medium-term growth effects: in these models, one-time efficiency gains gave a permanent effect on the growth rate of the economy. Under this alternative assumption, a 1% efficiency gain could give rise to a permanent increase in the growth rate by 0,1 percentage point. Finally, the elimination of exchange rate uncertainty, greater portfolio diversification and more stable prices would all reduce the equity risk premium, therefore leading over the medium term to capital accumulation and further output gains. A reduction in the equity premium by 0,5 percentage point could increase output by 5% in the long run.

R. Morsink and W. Molle focus on one of the issues raised in Baldwin's contribution: the empirical evaluation of the effect of exchange rate variability upon the international allocation of direct investment flows. This issue largely parallels that of the effects of exchange rate variability on trade. As discussed in Chapter 3 of 'One market, one money', most of the empirical research on the impact on trade has been unable to find a robust effect.

Morsink and Molle introduce real exchange rate variability as a friction factor in a gravity-type model of intra-Community direct investment, with unit labour costs and the R&D efforts of the home country as the main push (i.e. supply) factors, and trade intensity and tax differentials as the major stimulus factors. The model is estimated in cross-section form with cumulated investment flows as the left-hand side variable for both non-EMS (1975-79) and EMS (1980-84) periods, using a variety of specifications and estimation techniques.

Although the explanatory power of those equations is not high, R&D and trade intensity are identified as the main explanatory factors for the distribution of cross-European foreign direct investment. Exchange rate variability does affect investment intensity. However, its effect vanishes when the sample is restricted to non-zero flows, and refinements in the indicator of exchange rate variability aimed at introducing a measure of conditional variability fail to improve the results. Summing up their findings, the authors conclude that there exists weak evidence of the effects of exchange rate variability on foreign direct investment.

For the last couple of years, business surveys have been indicating a strong impact of the 1992 programme on the expectations of the enterprise sector. Indeed, the Euro-pessimism fad of the early 1980s has been progressively replaced by a pro-investment climate which probably contributed to the surge in capital accumulation of the late 1980s. To this extent the benefits of the single market programme have been front-loaded, and at least partially reaped before the actual implementation of the whole set of measures. Has it been only a front-loading of well-defined economic effects? R. Baldwin and R. Lyons suggest that in addition, Euro-optimism may be self-fulfilling, or to quote the authors, that 'European integration matters because people think it matters'.

For expectations to be self-fulfilling, there must be multiple stable equilibria, and expectations must be able to influence the selection of the equilibrium. Recent macroeconomic research has emphasized the possibility of multiple macroeconomic equilibria in the presence of externalities and/or increasing returns to scale: for example, models with endogenous innovation can exhibit both slow growth/low innovation and high growth/high innovation steady states. Hysteresis models of unemployment like that of Blanchard and Summers (1986), where the real wage depends on the behaviour of employed 'insiders', also exhibit multiple equilibria as the level of unemployment depends on the sequence of past shocks.

To illustrate the potential for self-fulfilling expectations in such a context, Baldwin and Lyons rely on a small two-sector model recently developed by Krugman (1989), in which workers switch sectors according to their expectations of future income. As one of the sectors (manufacturing) is characterized by increasing returns while the other (agriculture) operates under constant returns of scale, the only two stable states for the economy are zero and 100% employment in manufacturing. Starting from an (unstable) intermediate situation, depending on the worker's expectations, the economy can either move towards the agricultural or the manufacturing equilibrium.

In the last part of their study, Baldwin and Lyons attempt to review the stylized facts of European unemployment in the light of a hybrid model that builds on both Krugman's and Blanchard and Summer's insights. They focus on manufacturing versus non-manufacturing employment, with the idea that in both sectors wages are set in bargaining with the insiders, but that only manufacturing exhibits increasing returns. Therefore, expectations of manufacturing growth can be self-fulfilling and can reduce unemployment. While the authors emphasize the still speculative character of their research, they suggest that European integration could help

to reduce unemployment through the self-fulfilling expectations channel.

Monetary policy and price stability

The issues taken up in M. Neumann's and A. Giovannini's contributions are at the heart of the policy debate on EMU: how should the monetary constitution be designed? How should the transition to the final stage of EMU be managed in order to avoid risks of instability?

There is by now a wide consensus in European policy circles that the future European central bank (Eurofed) should (i) be committed to price stability, and (ii) enjoy a high degree of independence vis-à-vis national governments and other Community bodies. Neumann's contribution deals with these two provisions and their interlinkages.

Neumann first briefly surveys the economic literature as regards the welfare costs of anticipated and unanticipated inflation, the inflation/unemployment trade-off and the political business cycle. He concludes that price stability is welfare-improving, but that elected governments cannot maintain low inflation, first because of time-inconsistency (as policymakers devoted to the public's welfare face the temptation to exploit short-term inflation/unemployment trade-offs along the Phillips curve; this leads to inefficient inflationary outcomes), and second because the time horizon of politicians is shaped by the electoral cycle; hence, the case for an independent central bank committed to price stability.

Independence, however, has to be defined. Neumann's basic assumptions are the following two: first, that the central bank's price stability objective (meaning that it should aim at a zero expected permanent rate of inflation) has to be exclusive of any other target, and second, that absolute independence is both necessary and sufficient for this mandate to be fulfilled. He therefore stresses the associated conditions for the policy of the central bank, the personal independence of board and council members, and the constitutional ranking of its statutes. These are, as regards the policy mandate: (i) the prohibition of holding government debt in any form, (ii) the need for independence of instructions from governmental authorities and the absence of any obligation to support general economic policy, and (iii) complete sovereignty in exchange rate policy. Guarantees of personal independence of the executives should be: (i) long-term, irrevocable appointment, typically until retirement age, and (ii) high non-indexed wages. Finally, central bank statutes should have high constitutional ranking.

The final section of Neumann's study discusses central bank independence in the EMU context. He argues that since the policy of Eurofed should be devoted exclusively to price stability, it would not be involved in political trade-offs between conflicting objectives, and therefore that its accountability is not an issue. He also examines how convergence towards low inflation should be achieved, and argues that national central banks should be granted independence in the course of Stage I of EMU, and that they should initiate a credible path towards price stability as a precondition for the irrevocable locking of exchange rates.

A. Giovannini's contribution deals with a theme which had received considerable attention in the Padoa-Schioppa report (1987), namely the consequences for the ERM of the removal of capital controls and of barriers to competition in the banking sector. The issue is whether the coexistence of fixed exchange rates, free capital controls and competition in banking can be expected to give rise to instability.

Giovannini first asks whether Gresham's law, which states that 'bad' money drives out 'good' money, is of any relevance in the present context of fiat currencies. He points out that in the absence of an industrial market for the currencies, the 'good' or 'bad' quality of currencies is no longer measured by their industrial value (as was the case with bimetallic standards), but rather by their monetary value. A modern restatement of Gresham's law would therefore be that the 'good' currency drives out the 'bad' one, but the logic of the argument remains unchanged as fluctuations in the relative valuation of currencies affect their circulation. This, in turn, can jeopardize and eventually lead to the disruption of a system of fixed exchange rates and international capital mobility.

In order to evaluate better the potential for currency substitution, Giovannini goes back to the basic determinants of money demand: voluntary holdings of balances for private transaction purposes and the involuntary holdings resulting from government regulations (e.g. as regards reserve requirements or the use of the national currency in transactions with the government itself). As regards the overall demand for money, both determinants will be dramatically affected in the years ahead by technological changes and regulatory changes resulting from the completion of the internal market. More important, the relative demand for national currencies will also be affected as those currencies will become closer (though yet not perfect) substitutes for each other for transaction purposes. At the limit, the extension of present legal tender rules to other Community currencies would make national moneys perfect substitutes, leaving relative money demands indeterminate.

Giovannini sees this potential for currency substitution as a major threat to stability in the transition towards EMU, especially as long as realignments are still regarded as possible. This is why he is hostile to the introduction of parallel currencies. Moreover, he proposes that during the transition a high priority should be given to the coordinated management of foreign exchange reserves in order to deal with unforeseeable shifts in money demand and to enhance the credibility of the exchange rate commitments. He regards the establishment of such a reserve-financing arrangement as a precondition for monetary policy coordination. Only if the exchange rates are stable, and regarded as such, will the joint setting of monetary targets operate in a satisfactory fashion.

Macroeconomic policy and public finance

EMU raises several complicated and interlinked public finance and fiscal policy issues. First, should the move towards a single currency and a single central bank be accompanied by a parallel centralization of budgetary resources and functions? Second, should budgetary policies be coordinated in a short-term and medium-term perspective? Third, what are the implications for fiscal discipline of the sharing of a common currency? Fourth, does the loss of the exchange rate instrument call for an interregional redistribution scheme? The first issue is taken up in the study by Van Rompuy, Abraham and Heremans on the basis of the theory of fiscal federalism. The second is the focus of Van der Ploeg's contribution, though the two other studies also comment on the issue (D. Begg also discusses the rationale for fiscal autonomy). C. Wyplosz deals with the third issue. All three contributions address the fourth.

The contribution by P. Van Rompuy, F. Abraham and D. Heremans can be regarded as an application of the principle of subsidiarity in the field of public finance and regulation. The authors' main conclusion is that an EMU can be realized in decentralized budgetary systems, though there is a case for coordination and/or assignment of several functions to the federal level.

The theory of economic (or fiscal) federalism has been developed to analyse the optimal assignment of public functions in a multi-level system of government. The setting is that of an economy with a large number of jurisdictions which independently levy taxes, supply public goods and embark on redistribution or stabilization policies. Households are supposed to move freely from one jurisdiction to another in search of their preferred combination of public goods and taxes, but restrictions on their mobility can be taken into account. Only those functions which cannot be efficiently performed at the level of those jurisdictions are assigned to a higher ('federal') level.

Although highly simplified, this approach yields results. It first provides criteria for assigning functions to the federal level on efficiency grounds. The case for devolution is strong, but exceptions may stem from economies of scale and externalities, especially when decentralized bargains are not feasible and/or impossible to enforce. If this arises, there is a case for addressing risks of underprovision of public goods (a point emphasized by Van der Ploeg). Second, interpersonal redistribution raises similar issues of spill-over as it gives rise to migration flows, and in addition there can be altruistic motives for interregional redistribution. Finally, stabilization can be carried out at the lower level to the extent that coordination is effective, but the costs of coordination and/or enforcement problems can motivate its assignment to the federal level.

The authors examine whether stylized facts derived from the experience of federal States are consistent with the above theory. Existing federations display a great diversity not only as regards the share of the federal level in public expenditures, but also the system of taxation. Stabilization is generally carried out at the federal level, without interfering with subfederal fiscal policies. The evidence as regards interpersonal redistribution is diverse, and it is apparent that interregional redistribution is generally part of the federal contract.

The second part of the study specifically addresses EMU in the Community. The authors first discuss whether the responsibility for regulation should be shifted one step further towards the Community level, and come to the conclusion that there is no strong case for changing the present principles. In the case of labour market regulations, they conclude that (i) an extension of the scope of EC competition policy could be warranted in order to cover fiscal measures that reduce labour costs, and (ii) EC-wide quantitative standards should be set at levels close to the existing minimum conditions rather than to the average. As regards redistribution, which is their second main topic, they argue that priority should be given to the support of vital public functions in low-income regions, and that at some stage horizontal conditional transfers should also assist regions hit by specific shocks (an issue also discussed by Van der Ploeg and Wyplosz).

Van der Ploeg's contribution analyses how the move towards EMU will affect macroeconomic policy spill-overs and coordination. He draws on the recent literature to address a number of points in relation to the general issue of policy coordination.

The relative performance of exchange rate regimes can be discussed in terms of their ability to foster an adequate policy response when the Community as a whole or a specific Member State is hit by an adverse shock. EMU yields a benefit, argues Van der Ploeg, but also has a cost. It performs at its best in the presence of common shocks, because it rules out beggar-thy-neighbour monetary policies which seek to export the adverse consequences of the shock through exchange rate changes. But the reverse is true in the presence of country-specific shocks: here, EMU is a priori welfare-reducing because national monetary policy cannot be used to absorb the shock. In so far as labour mobility remains low, the standard flexibility argument in favour of a floating-rates regime applies. This is why Van der Ploeg stresses the need for a fiscal transfer scheme that would compensate for the lack of the exchange rate instrument through automatic tax-financed cross-country transfers. This would approximate the functioning of automatic stabilizers in federal States.

The second main issue taken up in the study regards the consequences for public finance of choosing a common, low inflation rate. The public finance literature has stressed that since taxes are distortionary, the choice of a welfare-maximizing inflation rate involves the selection of the appropriate mix between tax revenues and seigniorage revenues for a given level of permanent public spending. Van der Ploeg points out that without either coordination or an independent central bank, EMU would lead to excessive inflation as each Treasury would fail to internalize the welfare cost of higher inflation for the other Member States; he therefore argues in favour of appointing conservative central bankers to the Eurofed board, even at the risk of a too low inflation rate. Can this be an argument against participation in EMU for those Member States which rely on seigniorage to finance their budgets (see for example Dornbusch, 1988)? Van der Ploeg's point is that when this public finance argument is analysed in conjunction with time-inconsistency discussions, it loses much of its strength. In fact, high inflation countries are most frequently also characterized by a high public debt, so that their governments face the temptation of surprise inflation as a way of reducing the real value of public debt. Participation in the EMS or EMU eliminates the welfare cost associated with too high inflation (as a result of the public perception of this incentive), and may be welfare-improving even if it imposes too low an inflation rate.

A last point regards the relevance for EMU of arguments that stress the possible counterproductivity of macroeconomic policy coordination, either because it weakens discipline or because it could raise difficulties with the rest of the world. These arguments would also apply to EMU, but, as they can be countered, Van der Ploeg advocates a strengthening of the coordination of budgetary policies, both for stabilization purposes and to safeguard the size of the public sector in Europe.

While Van der Ploeg mainly deals with Keynesian spillovers à la Mundell-Fleming, C. Wyplosz takes a longer-term perspective and discusses the classical aspects of fiscal interdependence in a full employment, flexible price framework. The main issues are the impact of EMU on fiscal discipline and the channels of externality associated with departures from this discipline. Intertemporal considerations are therefore central to the analysis, though in the last section of his study Wyplosz also gives his views on the issue of EC-wide transfer schemes.

The two building blocks for Wyplosz's analysis are, first, a framework for the discussion of long-term channels of externalities and, second, a definition of fiscal discipline. Long-term externalities are dealt with in the framework of a two-period model based on recent work by Frenkel and Razin (1987): the focus is on the distinction between the present, which covers convergence towards goods and labour market equilibrium, and the future, where in addition all stock variables like wealth and debt converge towards the steady state. In such a setting, fiscal policy spill-overs do not affect income and employment, but rather interest rates and the terms of trade. According to Wyplosz, the main consequence of EMU in this framework is that fiscal policy effects can no longer be restricted to the originating country, but rather translate into changes in real interest rates across the union.

This framework leads to the second building block of the analysis, namely the definition of fiscal discipline. Wyplosz explains why deficits alone — even protracted ones — do not necessarily signal a violation of fiscal discipline, since there can be instances where deficits and debts are socially desirable. He then proposes two definitions of fiscal discipline: first, the respect of the intertemporal budget constraint and second, the absence of negative externalities on partner countries.

Both requirements are applicable to any monetary regime, but their effects are influenced by EMU. Wyplosz shows that EMU would make public solvency constraints tighter because the expectation of government default would not affect the present real interest rate through expected reductions in private wealth. He also shows that as interest rate externalities would be overlooked by national governments, there could be a tendency in EMU for budget deficits to be too large. The nature of the answer to those externalities is a matter of discussion, however. In the light of the suboptimality of rigid rules, Wyplosz advocates either flexible forms of coordination or a devolution of part of the public functions to a federal budget.

Wyplosz also draws on previous work to discuss some shorter-term aspects of fiscal policy in EMU. He makes two main points. First, he underlines the importance of terms of trade externalities arising from the sharing of a common exchange rate *vis-à-vis* the rest of the world. Second, he stresses the need for a Community-wide transfer scheme that would act like an insurance mechanism. Its main rationale would be to alleviate the cost of having lost the exchange rate instrument for a country hit by a shock, and therefore to eliminate circumstances in which a country would face an incentive to break away from the union. Since the option of leaving EMU would always exist, not only should the expected cost-benefit balance of EMU be favourable, but also the benefits of staying within the union should exceed those of a withdrawal at any time. Wyplosz suggests that a transfer scheme should be organized at the level of individuals (in order to avoid moral hazard problems for governments) and be financed through progressive taxation.

Shocks and adjustments in a monetary union

Because the main cost of forming a monetary union is the loss of monetary policy autonomy and of the exchange rate as an adjustment instrument, it is of primary importance to assess this cost. Since only intra-Community exchange rate changes will be eliminated, the size of the loss depends on both the extent of asymmetries among countries and the availability of alternative adjustment mechanisms, for example through wage and price flexibility or through fiscal policy. The two contributions by A. Weber and D. Begg deal with these two issues: Weber proposes an empirical assessment of symmetries on the basis of the EMS experience, while Begg develops a formal model to address the issues of adjustment in EMU.

In his evaluation, Weber considers both shocks to policy variables such as money supply, the interest rate and government expenditures, and to non-policy variables such as the real wage or the current account. Generally speaking, shocks are measured by the unconditional variability of the variable, because Weber argues that the theoretically more appropriate definition of shocks as conditional variability (i.e. unpredictable components of time-series regressions) does not yield significantly different results. A factorization technique is then applied to these variability statistics in order to separate the symmetrical from the asymmetrical component of the shocks. Two different periods are analysed, the first covering the years of the European exchange rate snake and free floating in the 1970s, while the second covers those of the EMS.

Weber finds evidence of predominantly symmetrical behaviour in shocks to nominal and real exchange rate, and to interest rates. His findings also support the view that the EMS has reduced nominal, and to a lesser extent real, exchange rate variability within the system, without increasing exchange rate variability *vis-à-vis* the rest of the world. However, shocks to the current account, although symmetrical, have increased in size in the EMS period.

Evidence of symmetry is also found in the behaviour of inflation rates as common supply and demand shocks tend to dominate the other determinants of nominal variables. Indeed, the variability of the asymmetrical component of domestic demand shocks and supply shocks has been on the decline with the increased synchronization of business cycles. This does not, however, rule out asymmetry in the shocks to the foreign demand component as exemplified by the case of Germany.

The main factors of asymmetry are found in the behaviour of the labour market (real wages and unemployment) and in shocks to the monetary aggregates. These are very different types of asymmetries. Labour market asymmetries presumably arise from differences in the agents' behaviour and can be a cause of concern in EMU. Since demand shocks tend to be symmetrical, the evidence suggests substantial differences in the response of real wages to restrictive demand policies. On the other hand, Weber argues that the existence of asymmetrical monetary shocks provides a rationale for monetary integration as this source of variability would be eliminated in EMU.

Begg's conclusions are entirely derived from a formal model. The issues he wants to address are, first, whether the loss of monetary policy autonomy in comparison to the EMS can override the benefits of EMU, and second, what should be the role of fiscal policy. To this end, he uses an *n*-country model with nominal rigidities as a result of overlapping wage contracts, but also forward-looking behaviour which is affected by the changes in the policy regime. The exchange rate regime is characterized by a parameter giving the degree of exchange rate accommodation of differences in price competitiveness, with complete real exchange rate stabilization and monetary union as two polar cases. Fiscal policy is also based on a fixed rule, with a variable degree of active stabilization in response to deviations from full employment. An important feature of the model is that a long-term equilibrium, characterized by both internal and external balance, is fully worked out.

Begg uses this model in several different ways. He first discusses the long-term equilibrium under EMU and EMS (the latter being characterized, as in the early EMS, as a

pure crawling peg with 100% exchange rate accommodation of inflation differentials). The main difference is that, as relative adjustment via real wealth effects is lost in EMU, permanent shocks to relative domestic demand will have to be offset by changes in relative fiscal policies. Hence, the case for fiscal autonomy.

A further step is to analyse the dynamics of the model, i.e. the speed of convergence towards a new long-term equilibrium when starting from an initial disequilibrium. Here, Begg's main points are, first, that aggregate wage and price behaviour is similar under EMU to that under EMS, but with faster convergence as a result of nominal anchoring, and second, that if the initial real wage level is inappropriate, active fiscal stabilization is counterproductive because it can only delay real adjustment.

Finally, the model is used to study the reaction of the economies to temporary shocks when starting from an initial equilibrium. Begg comes to the conclusion that fiscal stabilization is unattractive when shocks are temporary, but can yield benefits in the case of random permanent shocks as long as the system remains close to equilibrium. Indeed, as fiscal stabilization trades off the benefit of offsetting the adverse consequences of the shocks against the cost of slowing down the dynamics of wage and price adjustment, it is only warranted as long as speeding up the dynamics does not receive high priority.

From these results, Begg draws two main policy conclusions. He first stresses that in comparison to ERM membership, participation in EMU is not likely to impose major macroeconomic costs, and may even have benefits. Second, he advocates that in the absence of a federal fiscal system, national fiscal policies should be allowed to look after their own economies instead of being constrained by potentially dangerous strait-jackets at the European Community.

The international dimension

The analysis of the external impact of EMU by G. Alogoskoufis and R. Portes proceeds from the assumption that the structure of the international system will be affected, unlike the case when a few small countries join in an EMU. Thus, the small-country assumption cannot be applied to the European Community.

As European monetary policy will be put in the hands of a single institution, this is likely to affect the organization of policy coordination at the international level. Alogoskoufis and Portes therefore first examine the impact of EMU on international institutions like the G7 and the IMF. They find that the major impact should concern the meetings of G7 finance ministers and central bank governors. The bargaining power of the Community could be increased, although some difficult issues will have to be addressed as regards the representation of the Community in this forum.

The study then discusses the international role of the ecu. Alogoskoufis and Portes see the emergence of major international currencies as driven by fundamentals like the share of the issuing country in trade and investment flows, but they also stress the importance of hysteresis. As regards the means of payment and unit of account functions, they foresee a substitution of ecus for US dollars in official reserves, but are more agnostic as regards the private sector because of the hysteresis factors involved in the choice of a vehicle currency. As demonstrated by history, the emergence of a major international vehicle and reserve currency is a very slow process.

Alogoskoufis and Portes finally discuss the prospects for international coordination of macroeconomic policies. This concerns exchange market intervention, the impact of EMU on the international monetary system and the international coordination of fiscal policies. The authors' view is that fears of instability as a consequence of the loss of 'hegemony' in the international monetary system are unwarranted since the system is already fairly symmetrical. However, they see risks in the increased burden on monetary coordination that would follow from the difficulty of coordinating fiscal policies. Since the weakness of fiscal policy coordination is already a point of concern in the current monetary system, there is all the more reason to advocate fiscal coordination within EMU with a view to its external aspects.

References

Baldwin, R. (1989), 'The growth effects of 1992'. *Economic policy,* October, pp. 248-281.

Blanchard, O. and Summers, L. (1986), 'Hysteresis and the European unemployment problem', in: Fisher, S. (ed.), *NBER macroeconomics annual.* Cambridge, MIT Press.

Dornbusch, R. (1988), 'The EMS, the dollar and the yen', in: *The European Monetary System,* Giavazzi, F., Micossi, M. and Miller, M. (eds). Banca d'Italia/CEPR.

Frenkel, J. and Razin, A. (1987), *Fiscal policy and the world economy.* MIT Press.

Krugmann, P. (1989), 'History vs. expectations', NBER Working Paper No 297, May.

Padoa-Schioppa, T. *et al.* (1987), *Efficiency, stability, equity.* Oxford University Press.

Romer, P. (1986), 'Increasing returns and long-run growth', *Journal of political economy* No 94, October, pp. 1002-37.

Part I

Economic integration, efficiency and growth

1. On the microeconomics of the European monetary union

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1. Introduction

According to the traditional optimum currency area analysis the pros and cons of monetary union are simple. The possibility of effecting adjustment via exchange rate changes is sacrificed for the economic efficiency gains of a common currency. While the macroeconomics of this trade-off have been the subject of extensive literature, the microeconomics of the efficiency gains have been largely neglected in the recent academic debate. Nevertheless many think such gains to be important. For instance the original work by Robert Mundell (1961) and Ronald McKinnon (1963) discusses a wide range of microeconomic gains. More recently, *The Economist* magazine stated that 'fixed exchange rates provide large and undoubted benefits ... they will promote competition, the pursuit of comparative advantage, and an efficient flow of capital'.[1] Unfortunately these undoubted benefits have proved quite resistant to theoretical formalization, and almost completely impervious to quantification. This study attempts to explore the insights of Mundell, McKinnon and others by delineating a number of microeconomic channels by which the European monetary union (EMU) might affect Europe's real economic performance. An attempt is also made to roughly quantify several of these effects. The efforts are admittedly crude and exploratory for exactly the same reasons researchers find it difficult to measure the cost of inflation. The goal here is not to refine estimates of well-understood, well documented effects; rather it is to suggest that the true static and dynamic benefits of EMU on European resource allocation and accumulation might be quite large.

The final shape of the EMU is not known, so it is important to clarify assumptions. This study assumes that the EMU will take the form of a single currency and will engender a low, stable and common inflation rate. Of course this is not the only plausible scenario; the simple fact that Europe will have a single monetary policy is no guarantee that it will be a good monetary policy. Moreover, at least in principle it is possible that a low, stable and common inflation rate could be achieved without the EMU. However, the aim of this study is to look at the potential gains of a truly successful

EMU in order to have an idea of what sort of gains are at stake. Consequently this contribution should be thought of as an analysis of a particular scenario rather than a forecast. Much of the analysis relies on the assumption that the EMU would reduce relative price uncertainty. It is therefore important to be clear that the underlying source of uncertainty reduction is the assumption that the EMU monetary policy will be more stable and unified than the sum of the 12 independent monetary policies. It is important to note that the degree of exchange rate movements currently observed is not a good measure of exchange rate uncertainty. For many economic decisions, the possibility of a large exchange rate change sometime in the future is an important source of uncertainty. Indeed this so-called peso problem may explain part of the interest rate differentials on various European government securities.

The paper has six sections in addition to the introduction. Section 2 examines the static microeconomic effects of EMU. Section 3 studies the medium-term growth effects of these static efficiency gains. Section 4 studies the effects of reduced uncertainty on capital formation in the European Community. Section 5 looks at the long-term growth effects of EMU in the light of the recently developed endogenous growth literature. Section 6 attempts to roughly quantify the impact of these static and dynamic effects on European GDP. The last section contains a summary and concluding remarks.

2. Static real effects of moving to a single currency

Krugman (1989) points out that any discussion of the microeconomic effects of a monetary union must start with a proclamation of limitations: existing formal models provide only a limited understanding of the role of nominal money in the real economy (to say nothing of the role of multiple moneys). This limitation stems from the fact that tractability forces theorists to focus on situations involving only limited deviations from the neoclassical paradigm of rational, well-informed agents interacting in frictionless markets. The problem, of course, is that there is little or no use for money in a frictionless world. The key roles of money — medium of exchange, store of value and unit of account — can only be fully understood in models where markets are not frictionless and agents find it optimal to use rules of thumb based on nominal prices.

The best formal models of money in the real economy (the so-called cash-in-advance models) focus on money as a medium of exchange. However, difficulties are immediately encountered in trying to pin down what Robert Mundell

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[1] *The Economist* (1990), 6 January, p. 22.

calls 'the value of the monetary apparatus as a guide to rational calculation', in his seminal article on optimum currency areas (Mundell, 1961). Despite these modelling difficulties, this aspect of monetary unification has a central place in the informal thinking of many analysts and practical men as the quote from *The Economist* shows. Indeed Ronald McKinnon's famous essay on optimum currency areas focused on the effect that a common currency has on the liquidity properties of money. He asserted that 'any capitalist economy requires a stable-valued liquid currency to ensure efficient resource allocation' (McKinnon, 1963). Krugman (1989) argues that, 'a floating exchange rate will tend to degrade the unit of account function of both national currencies'.

This section attempts to catalogue the static real effects of EMU. We start with the simple and well-understood effects and move to less well-established models and effects.

2.1. Transaction and hedging costs

If a single currency replaces the 12 national moneys the resources currently devoted to money-changing can be re-allocated to producing goods or services that contribute directly to welfare. Additionally the elimination of multiple currencies and money-changing would free up resources firms devote to multi-currency accounting and other related in-firm operations. According to estimates of the EC Commission these transaction costs are approximately one half of one per cent of EC GDP. The redeployment of these resources should therefore provide a welfare gain of something like one half of one per cent of EC GDP.

Moving to a single currency is like providing free and perfect foreign exchange hedging to all. The presumption is that this would free up the resources previously devoted to hedging; however, this is not entirely clear. Some investors may have been buying foreign exchange hedging instruments as part of their overall diversification strategies. EMU will eliminate these risk-bearing assets. The released resources might be entirely absorbed by an increase in some other type of hedging designed to mimic the risk properties of the eliminated assets. Some hedging, however, is linked to intra-EC trade transactions. The resources devoted to such hedging would indeed be released by EMU. Clearly it is a difficult task to precisely divide the total amount of hedging into the two categories.

2.2. Efficiency gains from capital market integration: the portfolio choice

Price Waterhouse (1988) shows that the 12 national capital markets in the European Community are not integrated. For instance, actual portfolios are weighted more heavily in favour of national equity than is justified by differences in consumption baskets, and the correlation of stock market returns in different countries is low. Further evidence can be found in the fact that the price of financial services varies greatly. If the EC capital market were truly integrated, competition among financial institutions would have equalized the prices of financial services. Evidence presented by Feldstein and Horioka (1980) leads to a similar conclusion. They point out that financial intermediation separates the saving and investment decisions, so if capital markets are integrated there should be no systematic relationship between national savings and investment. Consequently, the fact that there is indeed a strong positive correlation between national savings and investment indicates that markets are not integrated. Clearly, part of this segmentation is due to various national regulations and information problems; however exchange rate uncertainty also contributes to this segmentation.

2.2.1. Exchange rate uncertainty and the portfolio choice problem

Financial economics tell us that geography and nationality *per se* should play no role in portfolio choice. Nevertheless, due to the possibility of nominal exchange rate changes the risk characteristics of a given stock or bond depend on an investor's nationality. Thus, the 12 separate currencies imply that EC investors are not as fully diversified as they could be. The fundamental source of this uncertainty is the existence of separate monetary authorities. For instance, although Scotland and England have different banknotes, they share a common monetary policy and a common money market; moreover, this commonality is widely viewed as completely irreversible. This suggests that a simple strengthening of the current EMS would not be sufficient to achieve complete capital market integration. With multiple currencies, investors must inevitably consider 12 different unanticipated nominal money demand and money supply shocks, as well as 12 sources of possibly aberrant monetary policy.

2.2.2. Asset pricing with transaction costs and uninsurable individual risk

In his famous essay on optimal currency areas, Ronald McKinnon (1963) argues that international capital flows are more important for small countries and that, 'contractual arrangements for such movements are greatly facilitated by a common currency'. Recent theoretical advances in macro- and financial economics suggest a way of formalizing this insight. Aiyagari and Gertler (1989), and Dumas and Luciano (1989) show that there is a subtle interplay between small transaction costs and uncertainty, which can have a very large effect on asset prices. While the issue that sparked

these theoretical advances is the so-called equity premium puzzle, we argue that these analyses have important ramifications for cross-currency portfolio choices.

The equity premium puzzle is that average real return on US Government bonds is less than one per cent while the average real return on US equity is about seven per cent. This is a puzzle, since in terms of standard intertemporal models of asset pricing (e.g. Lucas, 1978) the risk-free rate is too low and the equity return is too high. Aiyagari and Gertler (1989) show that differential transaction costs may help explain this equity premium puzzle. That is, they show that if bond trades are costless but stock trades involve a small transaction cost (in the order of two per cent), then investors may require a substantially higher return on stocks. To see this suppose for the sake of argument that the portfolio decision involves a once and for all choice. Clearly, the return on stocks must carry a premium to make it worthwhile for investors to incur the transaction costs. Yet if the investor is planning to hold the stocks forever, this premium need be only very small on an annual basis. However, if investors face uninsurable risk they may want to sell the stocks soon after they buy them. In anticipation of the possibility of such resales, rational investors might require a fairly substantial premium on equity. Dumas and Luciano (1989) provide an exact solution to the portfolio choice problem in this situation. Aiyagari and Gertler (1989) simulate the size of this premium using reasonable parameters, finding it to be something like three per cent on an annual basis.

As concerns the real effects of EMU, this result suggests that relatively small differences in transaction costs can have a significant effect on asset pricing and thereby on capital allocation. Specifically, viewing the costs of money-changing involved in international portfolio investments as differential transaction costs, Aiyagari and Gertler (1989) suggest that the existence of 12 separate currencies may have a significant impact on the prices of EC equity. For example, a German investor faces a different transaction cost on Spanish assets than on German assets. Consequently if the Aiyagari-Gertler reasoning is applicable, shifting to a single currency might, by removing differential transaction costs, have a significant impact on EC portfolios and asset prices.

The welfare implications of all this should be plain. Financial asset prices are distorted by differential transaction costs, so they do not correctly reflect the true risk and return on underlying physical assets. Since financial asset prices influence the allocation of the EC's real resources, the existence of 12 separate currencies prevents a socially efficient allocation of the EC's capital. A second source of welfare effects exists in the link between shareholders' portfolios and firms'

investment decisions. The next subsection lays out the logic in more detail, but basically the fact that EC shareholders are not diversified to the full extent of the market implies that firms acting in their benefit make socially non-optimal investment decisions.

2.3. Efficiency gains from capital market integration: investment choice

McKinnon (1963) argues that flexible exchange rates distort real investment decisions. Indeed he states that they might lead to, 'capital outflows from countries where the need for capital may be rather high and which arise from "monetary" rather than "real" considerations'. Modern industrial organization theory offers two basic approaches to the link between exchange rate uncertainty and the efficient allocation of physical capital in the European Community. Both approaches provide microeconomic foundations for the assertion that uncertainty can distort physical investment decisions and thereby lead to allocation inefficiencies.

The first approach provides solid microeconomic foundations for risk-averse behaviour by firms. The second maintains the traditional assumption that firms maximize expected profits, but shows that greater uncertainty leads firms to require a higher expected rate of return on investments if investments are costly to reverse (i.e. involve sunk costs). In both cases apparent or real risk aversion is the result, so a firm's investment decision is influenced by geography in addition to its true risk and return properties. In this sense, exchange rate uncertainty prevents the EC capital market from being a truly unified market and thus dampens efficiency gains from the capital market liberalization programme.

2.3.1. Rationally risk-averse firms

Casual observation suggests that firms are averse to risk. There are two standard approaches to account for this risk aversion. The first is based on the separation of ownership and control. Since managers who control the firm are not automatons, they are quite likely to have objectives that differ from those of stockholders. For instance, stockholders may want to maximize the value of their holdings, while managers may be interested in avoiding effort, or may have non-economic motives related to power and social status. Since it is costly for the stockholders to keep track of what the managers are doing, they usually link managers' pay packets or personal portfolios to the firm's current performance. Of course, with such an arrangement the firm may act risk-averse since the decision-makers (the managers) themselves are risk-averse.

The second approach is based on incompletely diversified stockholders. If shareholders' portfolios vary randomly, they are said to be incompletely diversified. Since it is not possible to diversify all types of risk, all shareholders in the real world are incompletely diversified. If firms are operated for the benefit of their shareholders, firms should act risk-averse since their shareholders are risk-averse and incompletely diversified. Of course, one must be careful about defining risk here. Shareholders would want the firms to be indifferent toward any risk against which they are not diversified.

If firms are risk-averse, for whatever reason, exchange rate uncertainty can distort the allocation of capital across EC nations. For example, without a single currency a French firm would view a project in Italy as inherently riskier than the same project located in France. In response to this, foreign direct investments are typically financed by borrowing in the relevant currency. The thrust of all this is that with risk-averse firms and exchange rate uncertainty, EC capital is inhibited from flowing to the most profitable investments regardless of national location. Therefore, the risk-adjusted rates of return on capital need not be equalized across EC countries even when all capital controls are removed. The welfare effect of this allocation distortion can be roughly measured, as Section 6 shows.

If firms are risk-averse because their stockholders are incompletely diversified, the removal of exchange rate uncertainty has an additional welfare gain. As discussed above, removing exchange rate uncertainty would lead EC stockholders to become better diversified as their portfolios lose their national bias. Thus, stockholders would tend to care less about the variability of any single investment. Thus, firms acting in the stockholders' interest would act less risk-averse. More precisely, more diversified stockholders would lead firms to view more risks as diversifiable as opposed to undiversifiable. Again this would lead to a more socially efficient allocation of EC capital.

2.3.2. *Exchange rate uncertainty and apparent risk aversion toward irreversible investment*

Recent theoretical work by A. Dixit (1989a, b) and G. Bertola (1987) shows that even if firms do not care directly about the variability of profits (namely, they maximize expected profits), they will act as if they are risk-averse toward investments that have an irreversible component. Consequently exchange rate uncertainty distorts the allocation of EC capital.

The formal analysis relies on a somewhat unintuitive approach to the investment decision; so, before applying the results to the effects of exchange rate uncertainty on EC

capital allocation, we study a sequence of examples. Start with the standard case: no irreversibility and no uncertainty. Namely, consider a profit-maximizing firm deciding whether to invest in a project whose rate of return is known with certainty and whose resale value exactly equals purchase value. For reasons that become clear below, we focus on the level of return that will trigger investment. By the usual marginalist reasoning, the level of return that triggers investment is where the firm is just indifferent between investing and not investing. The solution in this case is obvious. The firm should undertake the project in any period where the project yields a positive rate of return. Next consider the case of extreme irreversibility but no uncertainty. Namely, suppose the project has a zero resale value. In this case the investment trigger level is still simple to find: invest in the project when the present value of the return is positive. Lastly add some uncertainty but maintain the zero resale value assumption. In particular suppose that each period the expected discounted return on the project has a 50% chance of being USD 1 higher next period than this period and a 50% probability of being USD 1 lower next period. The conjunction of irreversibility and uncertainty brings the issue of timing to the forefront. The decision in any period is not really just to invest or not. It is to invest today or wait and see what the expected discounted return is in the next period. A natural (but incorrect) guess is that the old trigger level applies; the firm is indifferent to investment when the expected discounted return is zero. To see that the firm could do better, compare the value of the wait-and-see alternative with the invest-now choice. If the firm invests at the break-even trigger level its discounted value is zero. If it waits, there is a 50% chance the return will rise. If this happens and it invests, its expected value is positive. However, if instead the expected return falls it need not invest; so, under this realization of the uncertainty its expected profit is no less than zero. Weighting the two outcomes by the probability of their occurrence shows that the expected return to waiting is higher than the expected return to investing when the expected return on the project just equals costs. It should be obvious, therefore, that the firm will not be indifferent to investing when the expected return just equals the costs. It will be indifferent at a level of expected return that more than covers the cost of the project. This result can be shown to hold when at least part of the investment is irreversible.

The next important task is to show that greater uncertainty raises the trigger level, in other words that a profit-maximizing firm will require a higher expected return on riskier irreversible investment. To see this point, re-do the calculations involving the expected value of the wait-and-see alternative when the expected return is riskier. Specifically, suppose that in the next period there is a 50% chance the expected return will be USD 10 higher than this period, and a 50% chance that it will be USD 10 lower. Clearly the

expected value of the return in the next period still equals this period's return; however, the variability or riskiness has increased. Again let us start with the break-even return as a point of reference. If the firm invests at the break-even point its expected profit is zero. If it waits, the return increases and it invests; its expected profit in the next period will be positive USD 10. If it waits, the return falls and it does not invest; its expected profit will be no less than zero. Clearly uncertainty raises the value of the wait-and-see alternative. Consequently the trigger level rises with uncertainty.

Another way to understand this apparent risk aversion is to note that the wait-and-see alternative is quite a bit like owning a call option on the investment. Investment involves giving up the call option and getting the net expected return on the investment. Clearly investment is triggered at the point where the expected profit on the investment equals the value of the call option. Due to the uncertainty and cost of reversing the decision, the value of the call option is not zero, so firms will require positive expected profits in order to invest. Moreover, options are like insurance policies; they become more valuable as uncertainty increases. Thus, as uncertainty increases, the trigger point rises. This resembles risk aversion.

2.3.3. Welfare gains from eliminating exchange rate uncertainty

Now with all this laid out, we are ready to turn to the real effects of EMU. What we have shown is that exchange rate uncertainty discourages cross-border investments when part of the investment is irreversible, even if firms maximize expected profits. Thus, as before, EMU would lead to a more efficient allocation of capital. However, here we have the additional conclusion that exchange rate uncertainty tends to especially discourage investments which have large irreversible components (i.e. sunk costs). Since there is a large irreversible component in fixed business investments such as factories and equipment, we should expect EMU to especially encourage more long-term cross-border investments as opposed to short-term investments. Putting this differently, without EMU, firms will not operate on a truly EC-wide basis. Even with capital market liberalization, firms would continue to favour building productive facilities in their home country.

Lastly note that the arguments in this subsection and in the previous sections are complementary. That is, apparent risk aversion toward irreversible investments would be strengthened if in fact firms were directly concerned with the variability of profits.

2.4. The pro-competitive effect of a common currency

As the quote from *The Economist* indicates, some view a monetary union as a way of promoting cross-border competition. However, just as with the assertion that low and stable inflation promotes economic performance, the exact economic channel behind this belief is somewhat unclear. Here we explore how two approaches suggested by recent literature on 'pricing to market' might provide a formalization of the link between monetary union and competition.[2]

2.4.1. The sunk-cost hysteresis band

Above we showed that if an investment is costly to reverse and is subject to uncertainty, firms' investment strategies are marked by a range of inactivity. They invest only when they expect to earn 'pure' profits, but once an investment is made it will not be abandoned until it expects to earn pure losses. This range of expected profit in which there is no investment or disinvestment is called the hysteresis band. The discussion in Subsection 2.2.2 focuses on the link between exchange rate uncertainty and foreign direct investment. Here we examine the impact of the hysteresis band on cross-border competitive pressures.

For many types of products, sales require firm-specific investments in each new market. Photocopiers form an example of a product where such a 'beachhead' is necessary. Photocopiers cannot just be shipped to new markets. They require a distribution and after-sales service network located near the consumers. Since some of these market-entry costs will be unrecoverable, firms' decisions to enter a new market will be marked by a hysteresis band. Advertising aimed at establishing a brand name is similarly unrecoverable. Baldwin (1988) showed that such sunk costs would affect import pricing. In particular, the existence of the hysteresis band implies that the law of one price can be violated to a certain extent. Domestic prices can differ from foreign prices without inducing trade flows. Putting this differently, exchange rate uncertainty inhibits foreign firms from enforcing competition in the domestic market. Since a reduction in exchange rate uncertainty would narrow the band, EMU would promote cross-border competition. Dixit (1989a) shows that this band can be quite wide for reasonable parameters. Of course, simple risk aversion by firms would lead to qualitatively similar behaviour.

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2 Dornbusch (1985), Krugman (1989), Baldwin (1988), Froot and Klemperer (1987).

2.4.2. Exchange rate uncertainty and the slow adjustment of trade

Krugman (1989) and Baldwin and Lyons (1988) argue that volatile exchange rates lead to sluggish trade adjustment. Recent work on sticky price adjustment can be interpreted as supporting this view. The argument asserts that firms view market shares as an asset. That is, sales today are influenced not only by today's price but also by yesterday's market share.[3] This might be due to consumer loyalty, or costs consumers face in switching brands. In this case, the firm clearly has an incentive to avoid temporary price rises. Thus, an importer would tend not to raise local prices in response to cost changes which are viewed as temporary, but would change prices in response to permanent shifts. To see how exchange rate uncertainty could slow down the adjustment process, consider the effects of a permanent cost rise in a single industry in the producing country. It is clear that in the long run the local price of the good in the importing country should rise. However, if the importer is uncertain about the nominal exchange rate, he will delay the price change until he is reasonably sure that nominal exchange will not offset the production cost rise. Thus, exchange rate uncertainty may delay adjustment. In the mean time real prices are distorted and so resources are being misdirected. In so far as EMU would reduce exchange rate uncertainty, nominal trade prices would respond more rapidly to production cost changes. Thus, eliminating exchange rate uncertainty could reduce on average the extent to which trade prices are out of line with production costs. Of course, unless prices correctly reflect production costs, the market outcome will not be socially efficient. EMU may thus improve the allocation of European resources. Another way of expressing this idea is in terms of the signal extraction approach. Here exchange rate uncertainty is noise that makes it difficult for firms to discern the true cost 'signal' from the market.

2.5. Agency costs, retained earnings and the pattern of ownership

Practical analysts often suggest that exchange rate misalignments lead to a distortion of foreign direct investment. For instance, when a jump in foreign acquisitions accompanied the US dollar drop of the late 1980s, many reasoned that a weak US dollar made US companies look cheap to foreign firms holding foreign currency. While recent research shows that this 'fire-sale' idea may make sense, a simple counter-argument shows why careful reasoning is needed to establish it. For the sake of argument, suppose the fire-sale logic is correct and foreign currency holders can buy domestic assets

on the cheap. What then prevents domestic entrepreneurs from arranging a foreign currency loan and buying the domestic assets themselves? Until recently, this retort led many economists to dismiss any link between the real exchange rate and foreign acquisitions of domestic firms.

Froot and Stein (1989) and Graham and Krugman (1989) argue there may be something to the fire-sale argument after all. In the modern world a large fraction of investments are paid for by retained earnings rather than debt or equity issues. A common explanation for this is based on the fact that borrowers typically have more information about the specific investment than the lenders. Moreover the borrower has an incentive to exaggerate the merits of the investment to the lenders. After all, if the project turns out profitable the lender gets his money back but the borrower gets rich. If the project goes bankrupt, it is the lender that loses his capital. The importance of this asymmetry is that wise lenders will be reluctant to provide 100% financing. They will instead require the borrower to put up some of his own money as a sign of the borrower's own faith in the project. In fact the more money the borrower is willing to provide himself, the more likely it is that the project will pay off and so the lower will be the risk premium on the borrowed funds. Now consider what the impact of all this is on the price a firm is willing to pay for a given investment. If the firm has enough wealth to self-finance the investment for 100% then it would pay up to the present value of the expected return (ignore the irreversibility consideration to keep things simple). However, if it has only enough wealth to finance, say, 20% of the purchase price, then the firm would be willing to pay less for the investment since it knows that it must pay a hefty risk premium on the borrowed funds.

Finally we turn to the ramifications of this analysis for capital market efficiency and exchange rate uncertainty. Suppose a French firm and a German firm are bidding for a factory located in France. If the mark happens to be strong the German firm's ability to self-finance the French franc investment will be artificially high relative to the French firm's ability. Thus, the German firm can afford to offer a higher price and therefore is likely to actually prevail. Whether this outcome is good or bad is impossible to say without more specific details. However, the general point is that even spurious changes in the exchange rate can have real effects on the pattern of ownership. If the exchange rate movements do not reflect fundamentals, then the pattern of ownership may not reflect true fundamentals. That is, foreign direct investment may be prompted by spurious exchange rate movements rather than efficiency motives. To put it another way, the German firm may end up owning and operating the factory due to exchange rate movements,

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[3] See Froot and Klemperer (1987).

even though the French firm might have been a more efficient operator. Conversely, the factory may end up in French hands when in fact the German firm might have done a better job. In this way even spurious exchange rate fluctuations may have deleterious real effects.

2.6. The welfare costs of inflation

Economists of all persuasions assume that inflation has deleterious real effects. One of the most common mechanisms cited is the impact of inflation on the quality of the information carried by the price system (e.g. Mundell, 1961; Friedman, 1977; Krugman, 1989). Lucas (1973) formalized this idea with his 'island economies' paper; he assumes that firms are misinformed about the general price level and so may mistake nominal price rises of their own product for relative price rises. A recent paper, Neumann and Von Hagen (1989), employs this basic approach in order to quantify the impact of real price fluctuations on German output. Working with German data, they arrive at two conclusions. First, unanticipated fluctuations in domestic and foreign monetary aggregates induced unanticipated fluctuations in relative prices within Germany. Second these unanticipated fluctuations in relative prices reduced German output. It is widely asserted that the EMS did in fact promote aggregate price stability in Europe. To the extent that the EMU would further this goal we may use the Neumann-Von Hagen analysis to assert that the attendant reduction in relative price fluctuations would boost EC output.

2.7. Trade-inhibiting effects of exchange rate uncertainty

The general shift to flexible exchange rates in the early 1970s and the attendant increase in exchange rate volatility led many to speculate that such uncertainty would inhibit trade. This was a concern since such an effect would distort comparative advantage and lead to unnecessary resource shifts. A report by the research staff of the International Monetary Fund (IMF, 1984) in the mid-1980s established a number of facts but arrived at rather indefinite conclusions. The report shows that 'short-run and long-run variability increased sharply following the move to more flexible exchange rates'. Moreover it states that 'uncertainty inhibits economic activity: that much is clear'. Yet, despite this clarity it notes that only three of the numerous studies surveyed demonstrate a systematically significant link between measured exchange rate variability and the volume of international trade. Additionally it found little connection between volatility and business fixed investment.

The findings on investment are easily understood since, in fact, it is difficult to get even the most obvious factors to turn out significant in investment equations. As far as the lack of trade-inhibiting effects is concerned the report notes that 'the failure to establish a statistically significant link between exchange rate variability and trade does not, of course, prove that a causal link does not exist', and lists a number of explanations for the failures. For instance, it is worth noting that many economic relationships became unstable during the 1970s; the sample periods employed by the various surveyed studies must necessarily be dominated by two oil-price shocks, a sharp rise in world inflation, the Volker recession and GATT Round tariff reductions. Controlling for these various effects is certainly a daunting task. At a deeper level it may be futile to search for a stable relationship between exchange rate volatility and trade. Modern exchange rate theory views monetary uncertainty as the cause of exchange rate uncertainty, so the structural relationship should be between trade and monetary uncertainty.

3. Medium-term growth effects: induced capital formation

The previous section discusses a number of ways in which monetary union will lead to a one-time increase in the productivity of European capital and labour. This section shows that such changes will encourage capital formation, and thereby lead to output gains above and beyond the standard static gains. Since capital accumulation occurs over time, this induced capital formation effect can be thought of as raising the growth rate in the medium term. The analysis in this section is based heavily on Baldwin (1989a).

The induced capital formation effect stems from the fact that, in addition to raising per capita income directly, any one-time efficiency gain has the indirect effect of improving the investment climate. This leads to increased investment which in turn raises EC income by more than the original static efficiency gain. The key to quantifying the induced capital formation effect is to pin down the relationship between capital productivity and the steady state, or equilibrium quantity capital in the EC. Traditional growth theory provides the means. To start we describe how the steady-state capital stock is determined in the traditional growth model (also known as the neoclassical or Solow growth model). Suppose the economy-wide relationship between the

capital stock (K) and the labour force (L) and the output of goods per worker (GDP/L) is governed by the simple formula: (GDP/L) = $\beta K^\theta (K/L)^\alpha$. The number θ is a measure of aggregate scale economies. Below we shall consider the case where θ is positive; however, for the moment we stick with the traditional model's assumption that θ equals zero. The number α comes from the output elasticity of labour (which is 1 − α). The parameter β is a measure of overall efficiency which may be changed by things like the economic and monetary union as well as technological progress. To ease the exposition, ignore changes in the labour force (L is constant) and any exogenous technological progress. The relationship between K and GDP/L is plotted in Graph 1.1.

GRAPH 1.1: **The induced capital formation effect.**
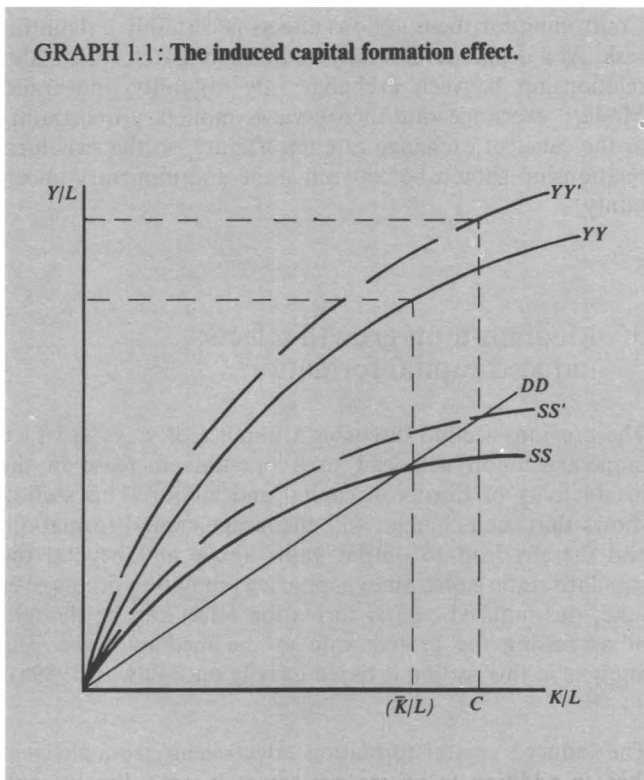
Again to keep things simple we assume that the economy saves and invests a constant fraction of GDP (call this fraction s). With this assumption, the supply of investment per worker varies with the capital labour ratio according to SS in Graph 1.1 (the curve SS is simply s times GDP/L). From the economy-wide perspective, this investment must go either to creating more capital, or to replacing the fraction of the existing capital stock that depreciates each year. If

there is any investment left over after making up for depreciation, the capital labour ratio rises. The steady-state capital labour ratio is that level where all investment is devoted to replacing last year's depreciation. The investment per worker required to replace depreciation is plotted as DD (this is simply $\delta K/L$ where δ is the rate of depreciation). The steady-state capital stock is $\bar{K}$; if K is less than this the supply of savings exceeds depreciation so K is rising; if K is higher, depreciation exceeds savings so K is falling.

With all this on the drawing board, consider the effects of any one-time efficiency gain on the steady-state capital labour ratio. The first step is simple. Due to the reasons outlined in Section 2, EMU will boost the overall efficiency with which the EC labour force and capital stock are combined to produce output (at the minimum, eliminating transaction costs will lead to higher output with the same inputs). This will lead to a once-off shift up in the YY and SS schedules (this corresponds to an increase of β in the GDP formula). We draw the new curves at YY' and SS'. With the higher SS curve, there is more investment left over after making up for depreciation. Consequently the capital stock rises to a new stable level shown as point C.

Clearly then the initial efficiency gain will be boosted by induced capital formation. Consequently EMU will raise per capita GDP by more than the static effect alone. Using calculations presented in Baldwin (1989a) this additional output effect can be measured roughly.

In the simple model of Graph 1.1 the growth comes from the fact that the liberalization directly boosts the amount of savings and investment in the economy. In an inter-temporal optimizing model we have the identical effect via an entirely different economic channel. The liberalization raises the marginal return on investment, so consumers find it optimal to invest more. As the capital labour ratio approaches point C, the marginal return on investment falls to its pre-liberalization level.

4. EMU, the riskiness of investment and induced capital formation

In his famous essay on optimum currency areas, Ronald McKinnon (1963) asserts that, 'the process of saving and capital accumulation in a capitalist system is greatly hampered unless a suitable *numéraire* and store of value exists'. By suitable he means a money whose value in terms of a representative bundle of economic goods remains stable. He argued that if a currency area's ratio of tradable to non-tradable goods is high, a fixed exchange rate is essential to

price stability. In this section we outline one approach to formalizing this link between currency unification and capital accumulation. The previous section argued that EMU would directly boost the return on EC capital and thereby induce additional capital formation. Here we point out that by reducing the riskiness of EC investments, the EMU can be thought of as boosting the risk-adjusted rate of return on EC capital. This in turn would induce additional capital formation. There are two major tasks involved in giving substance to this intuition. First, we must be specific about the link between uncertainty, the investment decision and the steady-state level of capital. Second, we must be specific about the link between EMU and the uncertainty of EC investments.

4.1. Uncertainty and the steady-state capital stock

Without uncertainty, the steady-state capital stock is defined by the point where the marginal benefit from increasing the capital stock just equals the cost of doing so (here we are using the inter-temporal optimization approach rather than the constant savings ratio approach). From a macro-perspective investment is forgone consumption, so the marginal costs of investment form the cost of postponing consumption. This cost is called the discount rate. The benefit of additional investment is simply the marginal product of capital. If the return on investment is uncertain, we must recognize that real investment involves trading a sure thing (consumption today) for a risky thing (consumption tomorrow). There are many ways of dealing with such trade-offs; however, in a wide class of models a risk premium can be used to find the certainty equivalent of the risk. That is, an investor views a risky investment as if it were a safe investment with a somewhat lower rate of return. For example, a very risky investment with an expected return of 20% is treated as an investment yielding 15% with certainty. The difference between the certainty equivalent, or risk-adjusted rate of return, and the full expected return is called the risk premium. Adopting this certainty equivalent approach, we have that the steady-state capital stock will be identified by the point where the risk-adjusted rate of return just equals the discount rate. To summarize

$$
\left[\text{Expected rate of return} \right] - \left[\text{Risk premium} \right] =
$$
$$
\left[\text{Discount rate} \right] \tag{1}
$$

This pins down the steady-state capital labour ratio since the expected marginal productivity of capital falls as the capital labour ratio rises.

If the risk-adjusted rate of return rises, investors will find that the benefit of investing an extra unit exceeds the cost of doing so. The result will be an increase in capital formation. Yet, the creation of more capital raises the capital labour ratio which, in turn, depresses the expected marginal productivity of capital. Thus, the initial boost to the risk-adjusted return leads to capital formation but the process eventually peters out. The important point, however, is that anything which boosts the risk-adjusted rate of return on capital will raise the capital stock.

4.2. EMU and the risk-adjusted rate of return on EC investment

The simple fixing of nominal exchange rates need not make Europe a safer place to invest. If nominal rates are fixed but monetary policies are not coordinated, or the coordinated monetary policy is erratic or irresponsible, Europe might well become a much riskier place to save and invest. Thus, it is important to be clear about our assumptions. For the purposes of this analysis, we assume that EMU will lead to a low, stable and common inflation rate in all EC nations. Clearly, then, this analysis should be thought of as working out a scenario rather than making a forecast.

4.2.1. Greater portfolio diversification reduces the risk premium

The simplest link between EMU and investment uncertainty is to work through the greater portfolio diversification channel discussed in Section 2. There we argued that a single currency would lead EC investors to hold a more diversified portfolio. This increased diversification would lead investors to reduce the risk premium they use to evaluate the investment-consumption trade-off. The consumption of an investor who has all his wealth in a single project varies directly with the project's return, so he would apply a hefty risk premium to the project. If he diversifies his wealth into many projects, the above-average performance of some will tend to cancel out the below-average performance of others. Thus he will apply a lower risk premium to the portfolio as a whole than to any single project. Moreover, the more diversified the portfolio, the lower the risk premium will be. Clearly then an increase in diversification will lower the risk premium in Equation (1), raising the risk-adjusted rate of return. This, in turn, would induce capital formation. As we show in Section 6, if we know the magnitude of the reduction in the risk premium, we can easily gauge the eventual output effect of EMU via this channel.

4.2.2. Greater real exchange-rate stability reduces aggregate risk

This subsection argues that EMU is likely to directly reduce the riskiness of EC investment. There are two distinct channels. The first comes from removing intra-EC real exchange-rate fluctuations; the second comes from our assumption that EMU will lead to overall price stability.

The very existence of 12 separate moneys implies the possibility of exchange rate changes. From the point of view of EC firms this is uncertainty; even if a given firm is not involved in intra-EC trade, real prices and costs, as well as sales, will in general fluctuate due to the exchange rate. As a result, we argue that part of the current variability in firms' profits is due to real exchange rate volatility. However, we must be careful here in concluding that removing exchange rate uncertainty will reduce risk. The point is that the risk stockholders are diversified against does not count as part of aggregate risk. Moreover, exchange rate risk is exactly the sort of risk that is *de jure* diversifiable. For instance if a French firm agrees today to pay FF 100 000 for an Italian product tomorrow, the Italian seller gains if the French franc appreciates but loses if it falls. Yet, if there is some Italian firm that must pay out FF 100 000 tomorrow, the two Italian firms could in principle get together (usual indirectly via financial market intermediation) to agree today on an Italian lira price for the French francs tomorrow. Basically since any exchange rate change hurts some but helps others, the two groups could agree beforehand on an exchange rate and thereby diversify the uncertainty.

Be this as it may, the fact is that most stockholders are not diversified against foreign exchange risk. The volume of outstanding futures, forward and options sales is quite small in Europe. Moreover, since national portfolios have a national bias and intra-EC trade is only about 15% of EC GDP, one cannot claim that stockholders are diversified against exchange rate risk via foreign equity ownership. Consequently, it seems reasonable to assume that reducing real intra-EC exchange rate fluctuations will reduce the riskiness of investing in Europe.

4.2.3. Greater price stability reduces aggregate risk

If the EMU works, the EC should enjoy a low, stable and common inflation rate. All three of these aspects affect the uncertainty of investing in Europe. First, high inflation rates are typically associated with a high degree of relative price changes which obviously make the return on investment more uncertain. Additionally, high inflation rates are associated with unstable inflation rates. Thus again high inflation increases the volatility of real prices within and between countries, and across time. Lastly, divergent national inflation rates are likely to increase the volatility of real exchange rates.

5. Long-term growth effects of European economic and monetary union

Analysts frequently assert that an efficient economic structure promotes long-term growth. For example, trade economists often informally argue that a liberal trading regime stimulates growth. However, as with the costs of inflation and microeconomic effects of a common currency, this informally received wisdom is difficult to formalize and quantify. The problem is that the traditional growth model makes assumptions which rule out a link between the level of economic efficiency and long-term growth. Recent research (Romer, 1983; Grossman and Helpman, 1989a; Krugman, 1988) has begun to theoretically explore the link between one-time changes in economic efficiency and long-term growth. An effort to gauge the empirical importance of these arguments has recently been made by Baldwin (1989a). This section briefly explains the logic and applicability of these recent theoretical advances.

5.1. Endogenous growth theory and traditional growth theory

In the traditional growth model adding capital to a given labour force raises total output; however, the size of the incremental output diminishes as the amount of capital per worker rises. Since investment requires consumption to be postponed, the capital labour ratio eventually reaches a point where the incremental output is insufficient to induce the requisite postponement of consumption. Per capita growth then grinds to a halt. The traditional model accounts for growth by assuming that technological progress keeps raising the marginal product of capital. While several notable efforts have been made to account for technological progress in an *ad hoc* fashion (e.g. Maddison, 1987), these empirical studies have not convincingly identified the sources of productivity advances. Consequently, traditional growth theorists typically take productivity growth to be a time trend.

By contrast, if the marginal product of capital (or whatever productive factor accumulates) is not diminishing, anything that boosts the level of investment leads to a permanent rise in the growth rate. This is the basic approach of the new growth theory (or, more descriptively, endogenous growth theory). Although there are a number of branches in the new growth literature, the common assumption is that the

accumulating factor — be it physical capital, human capital, knowledge, cost saving innovations, or the number of specialized inputs — does not face diminishing returns. In order to focus sharply on the difference between the new and old growth theory, we examine the simplest new growth theory.

The key to all of the endogenous growth models is the output elasticity of the accumulating factor of production. To fix ideas consider the Section 3 model where physical capital is the only factor that accumulates. Rearranging the per capita GDP formula we have that GDP $= \beta K^{\alpha+\theta}L^{1-\alpha}$. Simple mathematics show that capital faces diminishing return if the output elasticity (i.e. $\alpha+\theta$) is less than one. Thus a one-time efficiency gain can have long-term effects on growth only if $\alpha+\theta$ is greater than or equal to one. If scale effects are so large that $\alpha+\theta$ exceeds one, growth should accelerate. Since growth over the past century has shown no tendency to accelerate, we dismiss this case. However, if the scale economies are such that $\alpha+\theta$ exactly equals one then any one-time efficiency gain leads to permanently higher growth. (An important contribution of the new growth literature has been to provide microeconomic foundations for such scale economies; more on this below.) That is, if $\alpha+\theta$ does equal one then the marginal product of capital does not diminish as K/L rises, so the K/L ratio never reaches a stable level. Basically, an extra unit of capital raises output by an amount that is independent of the capital labour ratio. Specifically, an extra unit of capital adds $\beta L_t^{(1-\alpha)}$ to GDP regardless of K/L. To determine the long-term growth rate we only need to pin down the supply of savings to be invested. Returning to the constant saving rate assumption, this is $S_t = s\text{GDP}_t$. Using the GDP formula and allowing for depreciation, it is easy to see that next year's capital stock, K_{t+1}, must equal $K_t(1-\delta) + S_t$, i.e. $K_t(1-\delta) + s\beta K_t L_t^{(1-\alpha)}$. Plugging this back into the GDP formula with $\alpha+\theta = 1$, the long-term growth rate is.

$$(1 + \text{ Growth rate }) =$$

$$\left[1 - \left(\frac{\text{Depreciation}}{\text{rate}}\right) + \left(\frac{\text{Savings}}{\text{rate}}\right) \times (\beta\, L^{\,(1-\alpha)}) \right] \quad (2)$$

The salient feature of this formula is that the overall level of efficiency (as measured by β) affects the growth rate. In other words, anything that boosts the one-time efficiency with which resources are employed will lead to a rise in the permanent growth rate. This is in sharp contrast with the traditional growth framework which predicts that one-time changes in efficiency have no import on long-term growth.

Economies of scale are essential to all of the endogenous growth theories. One set of models attempts to endogenize the rate of technological innovation. Some of these models focus on process innovations (Shleifer, 1986; Krugman, 1988), others on product innovation (Romer, 1986, 1987; Grossman and Helpman, 1989a and b, 1990). In both cases an innovation requires an R&D investment but provides the innovator with an edge over competitors and thereby boosts profits. From the macro-perspective, growth is the result of these profit-motivated technological improvements. External economies of scale underlie Romer's model (1986). The benefit of knowledge developed for private gain spills over to boost the productivity of capital and labour. Romer assumes knowledge is embodied in physical capital.

5.2. Long-term growth effects of economic and monetary union

Section 2 outlines a number of ways in which economic and monetary union could boost the level of economic efficiency in the European Community. This increased efficiency should raise the return on all factors of production, including the accumulating factor. Section 3 shows that this would in turn raise the rate of investment. Since Section 3 assumes diminishing returns, the attendant rise in the capital labour ratio eventually choked off the faster growth, the end result being faster medium-term growth as the capital labour ratio rises to its new steady-state level. However, if the endogenous growth models are correct, the higher rate of investment could lead to permanently higher growth.

Taking the simplest Romer model and assuming a constant investment rate, anything that boosts the level of the EC's GDP also boosts the level of savings and investment. Since capital never faces diminishing returns, the one-time rise in the investment flow permanently raises the growth rate. Of course, this line of reasoning relies heavily on the *ad hoc* assumption of a constant investment rate. The same effect results when we allow savers to be forward-looking.

Similar reasoning applies to the other endogenous growth models. In each of these models the growth rate depends upon the return to the accumulating factor, be it capital (human or physical), innovations (in product or process), or knowledge. For instance, consider the Krugman (1988) model which focuses on labour-saving process innovations. In this model the growth rate depends upon the rate of innovation which, in turn, depends on the profitability of innovation. An innovation requires a fixed cost investment but provides the innovator with a temporary edge. The value of the edge depends upon the size of the economy. A rise in overall efficiency boosts GDP thus allowing innovators to spread R & D costs over greater sales. This makes innovation more profitable, and thereby quickens its pace.

6. Measuring the quantifiable effects

The aim of this section is to roughly quantify as many of the real effects of EMU as possible. Given our lack of understanding of the role of money in the real economy most of the effects discussed above cannot be quantified. Moreover, it is both theoretically and practically difficult to distinguish between the effects of the 1992 programme and the EMU. The methods used to quantify the simple statics of EMU are fairly well accepted, although of course the estimates could always be refined further. The methods employed to quantify the dynamic effects are necessarily more controversial. Until quite recently such dynamic effects were thought to be immeasurable, so the usual academic debate has not had time to settle on a consensus methodology or approach. Consequently all the numbers in this study should be thought of as rough, back-of-the-envelope guestimates rather than precise estimates. Indeed perhaps the only reasonable conclusion is that dynamic effects may not be unimportant.

6.1. Static effects

The static effects discussed in Section 3 include transaction costs, some hedging costs, capital market integration gains, a pro-competitive effect, a more efficient pattern of ownership and more rapid adjustment of trade prices. Of these we are able to put numbers only to the first three. Since there is a strong tendency to dismiss what we cannot measure, it is worth stressing the obvious. For exchange rate uncertainty as for inflation, the fact that the many costs cannot be quantified reflects the dismal state of the dismal science, rather than a lack of benefits from a common currency.

Transaction and hedging costs. The EC Commission has undertaken an extensive study of the transaction and hedging costs due to multiple EC currencies. The number they arrive at is quite close to 0,5% of GDP.

Capital market integration. Section 2 argues that EMU together with the capital market liberalization would allow a more efficient allocation of capital in the European Community via a number of channels. As with any removal of barriers, this takes the form of a convergence of the rates of return on EC capital in all national markets. The output gain from this increase in allocation efficiency is simple to quantify, taking h to be the persistent difference in the mean return on capital between two countries, and α to be the capital output elasticity. The dead weight loss is approximately $(1/2)h^2 (1/\alpha)$. Price Waterhouse (1988) calculates the sum of these triangles for Belgium-Luxembourg, Germany, Spain, France, Italy, the Netherlands and the UK (1986) as ECU 1,4 to 1,6 billion; this constitutes 0,042 to 0,048% of

the 1986 GDP of these countries. Clearly this is an upper bound estimate of the effects of EMU since part of the observed real return differences were due to capital market regulations.

The point of Section 2 is to argue that the economic impact of a common currency is far-reaching. Unfortunately, it seems quite likely that the effects that we can easily put numbers to are not the most important empirically. Emerson (1988) found that the pro-competitive effects of 1992 were vastly more important empirically than the traditional Harberger triangle gains from removing border controls. To argue by rough analogy, it is likely that the impact of EMU's pro-competitive effects will far outweigh the easily measurable transaction costs.

To stress the point that a successful EMU would boost EC GDP by much more than 0,55%, consider a thought experiment. If moving to a single currency boosts EC GDP by half of one per cent, then presumably the reverse move by the USA would knock only 0,5 % or so off the US GDP. In particular, there would be no impact on the allocation of capital and labour, no change in the rate of capital formation, innovation or growth. The ridiculousness of this conclusion highlights the fact that easily quantified effects of a common currency are far from the only (or even most important) economic effects.

6.2. Induced capital formation effects

Section 3 argues that a one-time change in economic efficiency, in addition to raising GDP directly, would induce capital formation. This extra capital formation would of course boost GDP. It is simple to quantify this effect for the cases of both inter-temporal optimization and constant investment approaches to the savings/investment problem. In so far as it raises the return on capital, an efficiency gain attracts additional investment thereby raising the capital/labour ratio to the point where the marginal product of capital is pushed back down to its steady-state level. To pin down the eventual impact on GDP, we must quantify the size of the induced capital formation as well as the effect that this additional capital will have on GDP. The latter depends only on the value of the capital output elasticity (i.e. $\alpha + \theta$) which is easily had from a number of empirical studies; the former depends upon the size of the initial rise in capital productivity and the extent to which capital faces diminishing returns. For the quite standard GDP formula adopted in Section 3, it turns out the degree of diminishing return to capital depends exclusively on the capital output elasticity ($\alpha + \theta$). The final item we need is the size of the initial rise in capital productivity. An implication of the Section 3 formula for GDP is that the rise in capital productivity due to an efficiency gain is proportional to the

total rise in GDP. As Baldwin (1989a, b) shows the thrust of this reasoning is that the eventual output effect of a one-time efficiency gain is:

$$\left[\ \%\ \text{total rise in GDP}\ \right] =$$

$$\left[\ 1 + (\frac{\alpha + \theta}{1 - \alpha + \theta})\ \right] \times \left[\ \begin{array}{c} \%\ \text{GDP rise due to} \\ \text{one-time efficiency gain} \end{array}\ \right] (3)$$

Note that this assumes no change in the EC labour force.

Most of the one-time effects of economic and monetary union are not readily measurable. The previous subsection argued that the easily measurable one-time effects of EMU would add something like 0,55% to the EC's GDP. Baldwin (1989a) examines a range of estimates of $\alpha + \theta$. The low side of the range takes an estimate of $\alpha + \theta$ which rules out scale economies by fiat. In this case the capital accumulation effect augments the one-time rise of 0,55% by 0,14%. The high side of the range takes an estimate of $\alpha + \theta$ derived from Caballero and Lyons (1990). The multiplier in this case is 1,4, so the total effect is 0,55% plus 0,77% of EC GDP.

Of course the induced capital formation would be spread over a considerable number of years. Baldwin (1989a) estimates a half-life in the order of 10 to 15 years. Obviously then the present discounted value of the induced capital formation effect will be smaller than the level effects.

6.2.1. Measuring the GDP impact of risk-reducing effects

The Section 4 analysis suggests that, in so far as economic and monetary union made the EC a safer place to invest, it would attract additional capital and thereby boost GDP. The quantification of this effect involves steps similar to the quantification of one-time efficiency gain. Section 4 informally argues that we could view the reduction in undiversified uncertainty as an increase in the risk-adjusted rate of return. In the traditional growth model, this rise will release with sudden intensity an increase in the capital labour ratio until the risk-adjusted rate of return falls back to its steady-state level. As before, we shall need only two numbers to quantify this effect: the initial rise in the risk-adjusted rate of return (due to the reduction in the risk premium), and $\alpha + \theta$.

Gauging the one-time effect on the risk premium is not an easy task since the determinants of the aggregate risk premium are not well understood. Indeed, the risk premium is currently the subject of a growing but largely inconclusive literature. One of the more successful attempts, Aiyagari and Gertler (1989), uses a simulation model to show that the combination of uninsurable risks and small transaction costs can significantly affect the risk premium on equity and in fact might be responsible for three percentage points of the six percentage point equity premium. In principle the effects of EMU might be gauged by such an approach. However, the simulation of even the fairly simple Aiyagari-Gertler model proved extremely difficult. Such an approach is therefore beyond the scope of this study. Instead, we make a number of guestimates to provide an upper and lower bound. Clearly a zero per cent reduction in the risk premium provides an uncontroversial lower bound. Similarly a one percentage point reduction in the equity premium would provide a reasonable upper bound estimate. A reasonable point estimate would probably be less than one percentage point, say one half of one percentage point.

Given these guestimates, we apply the same multipliers as for the induced capital formation effects to the implied increase in the risk-adjusted rate of return on EC capital. Taking the risk-adjusted discount rate in Equation (1) to be from 5 to 10%, and assuming that the risk premium falls between 0 and 1 percentage point, we have that the initial rise in the risk-adjusted rate of return would be between 0 and 20%. To provide a mid-point estimate, we assume a reduction in the risk premium of 50 basis points and a discount rate of 5%, we get that the risk-adjusted rate of return would rise 10%. Applying the range of multipliers discussed above (0,25 to 1,4), we get that induced capital formation would in the long run add between 0 and 28% to EC GDP. Recall again that such a change would take decades to fully accrue, so the present discounted value of the income rise would be much smaller.

6.3. Calibrating the long-term growth effects using new growth models

As yet there is little formal empirical work supporting the new growth theories. As such it is probably best to think of them as mathematical parables rather than realistic models of growth. Consequently, our efforts to squeeze empirical estimates out of these models are best thought of as empirical parables rather than realistic estimates of the long-term growth effects of EMU. Baldwin (1989c) shows in detail how the size of the long-term growth effect is calculated. As it turns out the multipliers for both Romer and a simplified version of Krugman's endogenous innovation models were about 0,1, so the 0,55 one-time rise in GDP would add 0,055 percentage point, added on to average long-term growth rate.

6.4. Adding up the total impact of economic and monetary union

It is probably incorrect to view the 1992 programme and the EMU as having separable economic effects. Indeed, their effects are likely to be mutually reinforcing. To take one example, capital market opening measures for 1992 will, on the one hand, boost factor mobility which reduces macro-economic adjustment problems by making the EC more like an optimal currency area; on the other hand, the monetary unification amplifies the efficiency gains from the capital market opening. At a deeper level, monetary unification would signal firms that the EC governments were irreversibly committed to a single market. After all, many investments in plant, equipment, training and R&D are made with an eye to a 15 to 25-year horizon. Given the history of Europe, it might appear rash for a private firm to view the 1992 measures as irreversible in themselves. Monetary unification, however, would be much more difficult to undo. Furthermore the complete capital market integration resulting from a single currency will probably force even greater harmonization of tax and regulatory policies. For instance, in the USA competition for industry leads to tax competition among municipalities and states that results in significant harmonization.

Estimates from the Cecchini report suggest that the static effects of 1992 will add between 2,5 and 6,5 % to EC GDP. Baldwin (1989a) roughly estimated that the induced capital formation effect of this static efficiency gain would eventually magnify this gain by anywhere between 30 and 136% implying a total GDP rise of between 3,3 and 15,4%. The only static effects of EMU that we were able to directly measure, transaction costs and capital allocation efficiency gains, added up to something like 0,55% of GDP. Including the capital formation that this should induce, the total output effect of these two effects should be between 0,8 and 1,3%. Considering the capital formation induced by the reduction in the risk premium posited above, we can add an extra 0 to 28 percentage points to the range. This yields a grand total effect of 0,7 to 29,3% of EC GDP with less than half of this accruing over the first 10 years.

Lastly, note that the new growth theories and the induced capital formation effects are not really consistent (especially the Romer model), so we deal with these separately. The effect of a change in the permanent growth rate on discounted income is calculated by multiplying the change by

$(\frac{1}{\rho-g})$ where ρ is the discount rate (say 5%) and g is the

initial long-term growth rate (say 2%). Thus, the total increase in discounted income due to EMU is the static effect of 0,55% plus 1,8% (0,55 × 0,1 × 33,33).

7. Summary and concluding remarks

Using models developed in industrial organization and macroeconomics, this study argues that a common European currency would promote static economic efficiency via five basic channels: elimination of money-changing transaction costs, improved allocation of EC capital, intensified cross-border competitive pressures, a more efficient pattern of corporate ownership, and greater output due to the resulting reduction and harmonization of inflation rates. Of the five, only the first is convincingly quantifiable. While the other four effects are much more subtle it seems likely that they are quantitatively much more important, especially the pro-competitive effect. This study also attempts to very roughly quantify the growth effects of EMU. Basically, we point out that anything which leads to a one-time rise of the risk-adjusted rate of return on EC capital will induce extra capital formation and thereby boost output growth. According to the traditional growth model the induced rise in the capital stock will eventually run into diminishing returns and so come to a halt. The so-called endogenous growth models (which suggest that this faster growth may not be self-extinguishing) imply that the EMU may boost the long-term growth rate in the European Community.

Our inability to quantify the impact of most of the effects discussed should not lead to their dismissal as irrelevant or unimportant. After all, the costs of anticipated inflation pose a similar conundrum. Simple models show anticipated inflation has no cost, yet practical men universally abhor it. When it comes to inflation, economists generally admit that inflation is 'bad' despite the fact that shortcomings in theory and empirics prevent measurement of its costs.

References

Aiyagari, R. and Gertler, M. (1989), *Asset pricing with transaction costs and uninsurable individual risk* (Mimeo), Columbia Business School.

Baldwin, R. (1988), 'Hysteresis in import prices: the beachhead effect', *American economic review*, 78 (4), pp. 773-85.

Baldwin (1989a), 'The growth effects of 1992', *Economic policy*, pp. 248-81.

Baldwin (1989b), 'Measurable dynamic gains from trade'. NBER Working Paper 3147.

Baldwin (1989c), 'On the growth effects of 1992', NBER Working Paper 3119.

Bénabou, R. (1989), 'Optimal price dynamics and speculation with a storable good', *Econometrica*, Vol. 57, No 1, pp. 41-80.

Bertola, G. (1987), 'Irreversible investment' (Ph.D. thesis). Cambridge, MA, MIT.

Caballero, R. and Lyons, R. (1990), 'Increasing returns and imperfect competition in European industry', *European economic review* (forthcoming).

Dixit, A. (1989a), 'Entry and exit decisions under uncertainty', *Journal of political economy*, 97 (30), pp. 620-38.

Dixit, A. (1989b), 'Analytic approximations in models of hysteresis' (Mimeo). Princeton.

Dornbusch, R. (1985), 'Exchange rates and prices', *American economic review*, 77, pp. 93-106.

Dumas, B. and Luciano, E. (1989), 'An exact solution to the portfolio choice problem under transaction costs' (Mimeo). Wharton Business School.

Economist, The (1990), 'A brief history of funny money', 6 January, pp. 21-24.

Emerson, M. *et al.* (1988), 'The economics of 1992', *European Economy*, No 35.

Feldstein, M. and Horioka, C. (1980), 'Domestic savings rates and international capital flows', *Economic journal*, Vol. 90.

Friedman, M. (1977), 'Nobel lecture: inflation and unemployment', *Journal of political economy*, 85, pp. 451-72.

Froot, K. and Klemperer, P. (1987), 'Exchange rate pass-through when market share matters' (Mimeo). MIT.

Froot, K. and Stein, J. (1989), 'Exchange rates and foreign direct investment: an imperfect capital markets approach'. NBER Working Paper 2914.

Graham, E. and Krugman, P. (1989), *Foreign direct investment in the United States*. Washington DC, Institute for International Economics.

Grossman, G. and Helpman, E. (1989a), 'Product development and international trade', *Journal of political economy*, Vol. 97, No 6, pp. 1261-1283.

Grossman, G. and Helpman, E. (1989b), 'Endogenous product cycles', Princeton University Discussion Paper on Economics, No 144.

Grossman, G. and Helpman, E. (1990), 'Comparative advantage and long-run growth', *American economic review*, Vol. 80, No 4, pp. 796-815.

International Monetary Fund (1984), 'Exchange rate volatility and world trade', Occasional Paper 28.

Krugman, P. (1988), 'Exchange rate instability', Lionel Robbins Memorial Lecture.

Krugman, P. (1989), 'Policy problems of a monetary union' (Mimeo), MIT.

Lucas, R. (1973), 'Some international evidence on output-inflation tradeoffs', *American economic review*, 63, pp. 326-34.

Lucas, R. (1978), 'Asset prices in an exchange economy', *Econometrica*, Vol. 66, pp. 1429-1445.

McKinnon, R. (1963), 'Optimum currency areas', *American economic review*, 53, pp. 717-25.

Maddison, A. (1987), 'Growth and slowdown in advanced capitalist economies', *Journal of economic literature*, Vol. 25, pp. 649-698.

Mundell, R. (1961), 'A theory of optimum currency areas', *American economic review*, 51, pp. 657-65.

Neumann, M. and von Hagen, J. (1989, 'Conditional relative prices covariance and its determinants: open economy evidence from Germany', *International economic review*, Vol. 32, No 1.

Price Waterhouse (1988), 'The cost of non-Europe in financial services', *Research on the cost of non-Europe*, Vol. 9. Brussels, Commission of the European Communities.

Romer, P. (1983), 'Dynamic competitive equilibria with externalities, increasing returns and unbounded growth' (Ph.D. dissertation). University of Chicago.

Romer, P. (1986), 'Increasing returns and long-run growth', *Journal of political economy*, 94 (5), pp. 1002-37.

Romer, P. (1987), 'Crazy explanations for the productivity slowdown', NBER Annual, Cambridge, MA.

Shleifer, A. (1986), 'Implementation cycles', *Journal of political economy*, Vol. 94, pp. 1161-1191.

2. Direct investments and monetary integration

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1. Introduction

In its historical trajectory the European Community now has come into a phase in which an economic and monetary union (EMU) needs to be established. The monetary union will bring exchange rate stability within the union area.

It is generally felt that exchange rate stability will stimulate economic growth. It improves the allocation of production factors through further specialization as neither trade nor migration nor capital flows will be negatively influenced by exchange rate risks.

However, a monetary union requires that the national governments within the union coordinate their policies to a great extent and might even have to give up their autonomy in certain areas of policy making. Before governments accept this, they want to be convinced of the net benefits. To that end several studies need to be made, as little is yet known about the impact of exchange rate variability.

The possible effect of exchange rate variability on trade, migration and capital flows has not yet been researched to a great extent. For trade, some research has been done indicating an adverse effect of exchange rate variability on trade flows (Perée and Steinherr, 1989). Research on the influence on migration and capital flows does not give a clear answer.

The relation between variation in exchange rates and direct investments has not been researched to a great extent either. In a recently presented paper (Molle and Morsink, 1989) a cross-section analysis of accumulated direct investment flows within the Community between 1975 and 1983 was shown. It was concluded that exchange rate risk discourages direct investment abroad. Consequently monetary integration is likely to stimulate foreign direct investment. It may even increase the momentarily very limited flows from the northern Member States to those in the south, as the great variability of exchange rates for the latter countries will be reduced. If these flows expand, this could make a significant contribution to a greater internal cohesion of the Community.

The objective of the study undertaken is to analyse the empirical relation between foreign direct investment within the European Community and the variability in exchange rates. In effect the following hypothesis is tested: monetary integration encourages foreign direct investment flows.

The methodology to analyse the relation between foreign direct investment and exchange rates will build on the one presented in a previous study. It contains a cross-section analysis of the foreign direct investment flows within the European Community using a model with several explanatory variables. The model is derived from traditional gravity-type models in which push, pull, stimulus and friction variables are distinguished.

It was necessary to make some amendments to the previously mentioned model. The most important amendment is that real variables are used instead of nominal. Furthermore, some variables have been eliminated as the study showed that they did not appear to be of significant importance. A new variable was included, which may test a stimulus for direct investment flows coming from differences in taxation between any two countries.

Section 2 of this study goes into the theoretical background of the model. Section 3 presents the data sets on direct investment flows for the periods 1975-79 and 1980-84. Section 4 deals with the empirical results in estimating the model. Finally, Section 5 summarizes the results from the analysis.

2. Theoretical background

The model used to analyse the hypothesis is based on previous gravity-type models in which push, pull, stimulus and friction factors do or do not allow for direct investment flows to occur. Push factors induce investment funds to leave the country. Pull factors attract foreign investment funds. Stimulus factors are considered factors that facilitate investment flows between countries. Friction factors constrain these flows.

In this section the theoretical background of the various factors and the model itself are dealt with. The theoretical background leads to expected relations between direct investment flows and the factor under consideration.

2.1. Push factors

An entrepreneurially competitive country is defined as a country with high entrepreneurial capacities.[1] These capacities relate to the quality of infrastructure, such as education

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[1] See also Sleuwaegen (1987).

and training facilities, skilled labour supply, technicians and managers, capital market functioning and the attitude of public authorities towards research and development and investments.

It is expected that entrepreneurs in such a country exploit their entrepreneurial capacities abroad. Consequently the country is expected to have large outward direct investment flows. Indicators for these countries are considered to be the average unit labour costs and an indicator for research and development. The average unit labour cost implies the level of education and human resources. The R&D indicator may indicate the level of available skills in a country.

The financial and monetary situation in a country also incites capital funds to go abroad. A surplus in net private financial resources may indicate that there is capital available to be invested in foreign markets.

In the model the following push factors are taken into consideration

$WAGE_i$: average unit labour cost (source: Eurostat)

$R\&D_i^s$: the following indicators have been used (source: OECD):

$R\&D_i^1$ = share of high-technology products in total exports

$R\&D_i^2$ = share of high-technology products in total industrial production

$R\&D_i^3$ = total business expenditure on research and development

$R\&D_i^4$ = total inland patent applications

NPL_i: net private resources (source: Eurostat)

2.2. Pull factors

A locationally attractive country is defined as a country that offers good opportunities for substantial returns on investment. For foreign investors who want to serve international markets, it will be beneficial to locate production units in such a country.

One indicator of locational attractiveness is market growth. A possible indicator can be real GDP growth. If real GDP growth is relatively high, a high level of incoming direct investment flows can be expected.

Another indicator for a locationally attractive country may be the real interest rate. A high real interest rate can indicate

high returns on investment. As foreign investment funds prefer profitable investment opportunities it is likely that a high real interest rate goes with substantial incoming direct investment flows.

However, one may question the relationship between this financial market indicator and direct investments. A decision for a direct investment is most often governed by other factors than the situation on the financial markets.

Finally, another indicator is considered as a pull factor. It is expected that if in a country a shortage of investment capital exists, it will invoke foreign investment funds to come to this country. Hence, a net private borrowing requirement[2] attracts foreign capital.

It has to be taken into consideration that a high real interest rate may be closely related to a net private borrowing requirement. A shortage on the national capital market will incur high interest rates. Consequently, an interrelation between both variables can be expected in the analysis.

The analysis will include the following pull factors

GDP_j: growth rate of gross domestic product (source: Eurostat)

$RENT_j$: real interest rate established by correcting the average yield on government bonds with the GDP deflator (source: Eurostat)

NPB_j: net private borrowing requirement (source: Eurostat)

2.3. Stimulus factors

Stimulus variables facilitate flows between pairs of countries. The theory of the multinational corporation suggests that there is a complementary relationship between direct investment flows and foreign trade. Intensive trade relations between two countries go together with a high level of direct investment flows between them.

On the other hand it can be argued that there will be substitution between trade and direct investment. This is in line with the Heckscher-Ohlin theory of international trade. In this theory, exports to an important market may be substituted by investing in a production unit in that market. Hence, exports are no longer necessary.

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2   The net private borrowing requirement is equal to the shortage in net private resources.

The indicator for trade used in the analysis shows the importance of a specific flow in intra-EC exports of a specific country plus the importance of that flow in intra-EC imports of the other country. It has been derived from statistics on intra-EC trade.

There is a possibility that trade and exchange rate variability are interrelated. Research by Perée and Steinherr (1989) reveals an adverse influence of exchange rate uncertainty and trade flows. Hence, including both variables in a model requires a test on multi-colinearity.

The difference in taxation between any two countries can be considered as another stimulus variable. A positive difference between taxation in one country and taxation in the other $(t_i - t_j)$ will lead to a flow of direct investment funds towards the other country. A negative difference will induce funds to flow from the other country to the first one.

Devereux and Pearson (1989) made a thorough analysis of differences in taxation between European countries. Their investigation has established an indicator which shows the gross return on investment a foreign investor has to seek in order to obtain a net 5% return. Hence, a high indicator is unfavourable for foreign investments.

Our analysis takes the following stimulus factors into consideration

$$\text{TRADE}_{ij} = \frac{E_{ij}}{E_i} + \frac{E_{ij}}{M_j} \qquad 0 = < \text{TRADE}_{ij} = < 2$$

in which

$$E_{ij} = \sum_{t = t_{\text{begin}}}^{t_{\text{end}}} E_{ij}(t) \text{ in which } E_{ij}(t) \text{ is the trade}$$

between countries i and j in year t in ecus

$$E_i = \sum_{i = 1}^{11} E_{ij} \text{ which is the total of intra-EC exports of}$$

country i from $t = t_{\text{begin}}$ to t_{end} in ecus

$$M_j = \sum_{j = 1}^{11} E_{ij} \text{ which is the total of intra-EC imports of}$$

country j from $t = t_{\text{begin}}$ to t_{end} in ecus

If $E_{ij} = 0$ then the indicator shows zero importance for both countries. If $E_{ij} = E_i = M_j$ then both countries have no further trade flows, which makes E_{ij} highly important. The indicator will be equal to 2 (source: Eurostat).

TAX$_{ij}$ = tax indicator measuring gross return on investment to be made by the foreign investor to obtain a net 5% return (source: Devereux and Pearson).[3]

2.4. Friction factors

Friction factors restrict direct investment flows. Possible friction factors are transport and communication costs. In general they impede trade and financial flows. In common practice these costs are proxied by the distance between two countries. Hence, a great distance between countries has a negative influence on direct investments to be made.

Another important friction factor may be cultural differences between countries. Hofstede (1984) made an elaborate comparative study of cultural differences between countries, distinguishing four dimensions for which he constructed indices. The index for power distance (PDI) measures hierarchical inequality in a country. The uncertainty avoidance index (UAI) refers to tolerance to future uncertainties. Individualism (IDV) shows the relation between the individual and the collectivity within a society. The fourth indicator, masculinity (MAS), indicates whether the people of a country tend to endorse goals usually more popular among men than among women.

It is expected that a wide cultural gap, measured by the difference of any of the four indicators for the two countries involved, raises high barriers to investment flows between them.

The following friction factors are included in the analysis

DIST$_{ij}$ = distance between the most important centrally located cities of countries i and j

CULT$_{ij}^s$ = CULT$_i^s$ − CULT$_j^s$
cultural differences proxied by the difference in any of the four indicators established by Hofstede (1984) for countries i and j.[4] The following indicators are used

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3 Devereux and Pearson based their analysis on the most recent information on taxation systems. Hence, the established indicators show the most recent information and do not give the picture for the periods under consideration in our analysis. Consequently it had to be assumed that the indicators established by Devereux and Pearson are valid for the past as well.

4 The indices specified by Hofstede are not period specific. Therefore it has been assumed that the indices remain valid over time.

$CULT^1_i$ = power distance index (PDI)

$CULT^2_i$ = uncertainty avoidance index (UAI)

$CULT^3_i$ = individualism index (IDV)

$CULT^4_i$ = masculinity index (MAS)

2.5. Direct investments and the exchange rate

2.5.1. Assumptions

The relation between direct investment flows and exchange rates is of a complex nature (Cushman, 1985). Several assumptions can be made.

Firstly it can be stated that investment capital looks for secure investment opportunities. Hence investment capital will try to avoid exchange rate uncertainties. In this view strong currencies will keep investment capital in a country and may attract foreign capital, whereas weak currencies tend to push investment funds out of a country. In the case of monetary integration the uncertainties for weak currencies will diminish. Consequently monetary integration may lead to a reduction of the outflow of domestic capital in countries with such currencies and may stimulate incoming direct investment flows.

Another assumption is that if a country's currency is appreciating, the flow of direct investments to this country will diminish. Foreign investors will prefer to export from their home base, as their (export) product will become cheaper in the export market.[5] Monetary integration will diminish exchange rate fluctuations. Hence, with the absence of appreciations producers may tend to base production facilities in the various markets. Consequently direct investment flows will rise.

The assumptions stated above can be combined for the analysis by considering the variability in exchange rates as a friction factor. Therefore it is hypothesized that a high variability in exchange rates will limit the direct investment flows between two countries.

2.5.2. Variability in exchange rates

A discussion on the use of variability measures in existing literature by Perée and Steinherr (1989) shows that various measures are used to indicate exchange rate variability. There is no ideal concept for a variability indicator as persuasive arguments for each concept can be found.

In our analysis a distinction is made between two categories of exchange rate variability. These are:

1. expected variability: the exchange rate follows expected tendencies. These can take various appearances, such as a trend line or seasonal pattern. Their consequences can easily be hedged on the futures markets for currencies;

2. unexpected variability: in general there is a difference between the actual exchange rate and the expected exchange rate. These differences are of an erratic nature. This type of variability cannot be hedged.

In the model various specifications of exchange rate variability have been tested. Some specifications are a proxy for both types of variability. These are the unconditional specifications which are established by calculating differences from a mean value.

The problem with unconditional specifications is that they do not take the non-stationary time paths into account, which exchange rates generally follow. Other specifications try to overcome this problem by using deviations from a trend line or standard deviations of percentage changes in the exchange rate. In general these can be considered as a proxy for unexpected variability. They will be referred to as the conditional specifications of exchange rate variability.[6]

2.5.3. Derivation of real bilateral exchange rates

The model tries to describe direct investment flows from an origin country (i) to a destination country (j). This requires that explanatory variables must be (ij)-relation specific. Hence it is necessary to use bilateral exchange rates.

In order to measure variability in exchange rates it would be best to have a data set of daily exchange rates. As two five-year periods will be analysed this would require an enormous data set. To limit the amount of exchange rate data variability has been based on average monthly exchange rates.

Average monthly exchange rates versus the US dollar are readily available from IMF statistics. These data allow easy calculation of bilateral exchange rates by dividing the exchange rate versus the US dollar of the currency in the origin country (i) by the rate of the currency in the destination country (j).

$$NEXCH_{ij} = \frac{NEXCH_{i\text{-US}}}{NEXCH_{j\text{-US}}}$$

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[5] This assumption is closely related to the Heckscher-Ohlin theorem.

[6] See also Weber (1990), p. 187 in this volume.

in which

NEXCH$_{ij}$ = average monthly nominal bilateral exchange rate

NEXCH$_{i\text{-}US}$ = average monthly nominal exchange rate of the currency of country i versus the US dollar

NEXCH$_{j\text{-}US}$ = average monthly nominal exchange rate of the currency of country j versus the US dollar

Derivation of real exchange rates has been established by using the GDP deflator for the relevant countries. Other deflators can also be used such as a trade-related price index (for exports and imports). However, it was taken into consideration that exchange rates do not only fluctuate due to trade, but also due to other factors.

$$REXCH_{ij} = NEXCH_{ij} * PGDP_j / PGDP_i$$

in which

REXCH$_{ij}$ = average monthly real bilateral exchange rate

NEXCH$_{ij}$ = average monthly nominal bilateral exchange rate

PGDP = monthly GDP deflator

2.5.4. Specifications

In total, five specifications will be tested in the analysis. The first two specifications are of the unconditional type. The remaining three specifications are conditional in nature.

The first specification is established by calculating the difference between the maximum and minimum value in the data set for the exchange rates during the period under consideration[7] and divide it by the appropriate mean value.

$$EXCH^1_{ij} = \frac{MAX\ (REXCH_{ij}) - MIN\ (REXCH_{ij})}{\mu\ (REXCH_{ij})}$$

in which

MAX (REXCH$_{ij}$) = maximum value of REXCH$_{ij}$ in the period

MIN (REXCH$_{ij}$) = minimum value of REXCH$_{ij}$ in the period

μ (REXCH$_{ij}$) = average value of REXCH$_{ij}$ in the period

EXCH$^1_{ij}$ = variability in REXCH$_{ij}$ measured by the difference between maximum and minimum value divided by the average value in the period

The second specification is similar to the previous one. Instead of the difference between maximum and minimum value the standard deviation of the exchange rate is used.

$$EXCH^2_{ij} = \frac{\sigma\ (REXCH_{ij})}{\mu\ (REXCH_{ij})}$$

in which

σ(REXCH$_{ij}$) = standard deviation of REXCH$_{ij}$ in the period

μ(REXCH$_{ij}$) = average value of REXCH$_{ij}$ in the period

EXCH$^2_{ij}$ = variability in REXCH$_{ij}$ measured by the standard deviation divided by the average value in the period

The third specification is calculated as the standard deviation of the deviations of the exchange rate from a trendline. The trendline is established by calculating the moving average.

$$TREXCH_{ij} = \sum_{m=m-5}^{m+6} REXCH_{ij}\ (m)/12$$

$$EXCH^3_{ij} = \sigma(REXCH_{ij} - TREXCH_{ij})$$

in which

TREXCH$_{ij}$ = trend value of REXCH$_{ij}$ (12-month moving average)

m = month

EXCH$^3_{ij}$ = variability in REXCH$_{ij}$ measured by the standard deviation of the deviation of REXCH$_{ij}$ from its trend value

For the fourth and fifth specifications the trend has been removed by using percentage changes in the exchange rates. The fourth specification indicates short-term variability: the percentage change of the exchange rate versus its value the month before was calculated.

$$PREXCH_{ij} = (\frac{REXCH_{ij}\ (m)}{REXCH_{ij}\ (m-1)} - 1) * 100$$

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[7] These are the periods 1975-79 and 1980-84, respectively.

$$\text{EXCH}^4_{ij} = \sigma(\text{PREXCH}_{ij})$$

in which

PREXCH_{ij} = short-term percentage change of REXCH_{ij}

m = month

EXCH^4_{ij} = variability in REXCH_{ij} measured by the standard deviation of the short-term percentage changes of REXCH_{ij}

The fifth specification can be interpreted as medium-term variability: the percentage change of the exchange rate versus its value in the same month one year earlier was calculated. The specification can be described in the following formulae:

$$\text{MREXCH}_{ij} = \left(\frac{\text{REXCH}_{ij}(m_t)}{\text{REXCH}_{ij}(m_{t-1})} - 1\right) * 100$$

$$\text{EXCH}^5_{ij} = \sigma(\text{MREXCH}_{ij})$$

in which

MREXCH_{ij} = medium-term percentage change of REXCH_{ij}

m = month

t = year

EXCH^5_{ij} = variability in REXCH_{ij} measured by the standard deviation of the medium-term percentage changes of REXCH_{ij}

In the model the five specifications will be tested separately. The specification can be recognized by the superscript s.

EXCH^s_{ij} $\qquad s = 1, 2, 3, 4,$ or 5

2.6. The model

In this subsection the features of the model to test the factors that explain the occurrence of direct investment flows are presented. The explanatory variables are in four categories: push, pull, stimulus and friction factors. The model consists of the following equation:

$\text{DI}_{ij} = F(\text{WAGE}_i, \text{R\&D}^s_i, \text{NPL}_i,$ push from i

$\qquad \text{GDP}_j, \text{RENT}_j, \text{NPB}_j,$ pull from j

$\qquad \text{TRADE}_{ij}, \text{TAX}_{ij},$ stimuli from i to j

$\qquad \text{DIST}_{ij}, \text{CULT}^s_{ij},$ frictions between i and j

$\qquad \text{EXCH}^s_{ij})$ friction from exchange rate variability between i and j

where

DI	= real direct investment flow	
WAGE	= average unit labour cost	$\frac{\delta\text{WAGE}}{\delta\text{DI}} > 0$
R&D	= research and development indicator	$\frac{\delta\text{R\&D}}{\delta\text{DI}} > 0$
NPL	= net private financial resources	$\frac{\delta\text{NPL}}{\delta\text{DI}} > 0$
GDP	= real growth of GDP	$\frac{\delta\text{GDP}}{\delta\text{DI}} > 0$
RENT	= real interest rate	$\frac{\delta\text{RENT}}{\delta\text{DI}} > 0$
NPB	= net private borrowing	$\frac{\delta\text{NPB}}{\delta\text{DI}} > 0$
TRADE	= trade indicator	$\frac{\delta\text{TRADE}}{\delta\text{DI}} > 0$
TAX	= tax indicator	$\frac{\delta\text{TAX}}{\delta\text{DI}} < 0$[8]
DIST	= distance between predominant cities	$\frac{\delta\text{DIST}}{\delta\text{DI}} < 0$
CULT	= cultural indicator	$\frac{\delta\text{CULT}}{\delta\text{DI}} < 0$
EXCH	= exchange rate variability	$\frac{\delta\text{EXCH}}{\delta\text{DI}} < 0$
i	= subscript for country of origin	
j	= subscript for country of destination	
s	= superscript for relevant specification of the variable	

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[8] As a stimulus factor, a positive sign would be expected. However, the expected negative sign of the tax parameter relates to the specification of the tax indicator.

3. European direct investment in Europe: the data set

In a previous study a new data set was presented for the accumulated direct investment flows within the European Community for the period 1975-83.[9] The data set was derived from an inventory of published sources on European direct investments. These sources were analysed and a reasonably coherent data set was obtained.

For the analysis as described in this study it was felt necessary to use more accurate data and to test the model for two periods. From the Commission of the European Communities more detailed information was obtained on origins and destinations of intra-EC direct investment flows during the period 1980-84. These data were gathered by Eurostat.

This information allowed a new data set to be made for the period 1980-84. Correction of the previous data set for 1975-83 established a second data set for 1975-79. Both data sets were deflated by the price index for gross fixed capital formation in the European Community. In this way we obtained, for both periods, the accumulated real direct investment flows within the Community.

In order to obtain a more succinct overall picture of the data sets the relative importance of incoming and outgoing direct investments is measured by using an indicator following Mucchielli (1985). This indicator is equal to

$$INVCRO_i = \frac{\sum\limits_{j=1}^{11} DI_{ij} - \sum\limits_{i=1}^{11} DI_{ij}}{\sum\limits_{j=1}^{11} DI_{ij} + \sum\limits_{i=1}^{11} DI_{ij}} \quad -1 <= INVCRO <= 1$$

where DI = real net direct investment flow

  i = country of origin

  j = country of destination

The Mucchielli indicator describes the relative importance of a country's foreign direct investment flows by dividing the difference in total outgoing and incoming flows by the sum of both. The index thus established identifies three types of countries. If INVCRO is above 0,33 the country is an investor country: the outgoing flows are substantially higher than the incoming flows. A recipient country has an index below − 0,33: the incoming flows are substantially higher than the outgoing flows. Crossroad countries do not have dominating incoming or outgoing flows and have an index between − 0,33 and 0,33.

In this section the characteristics of both data sets are described. First the 1975-79 data set will be dealt with. Then the characteristics of the 1980-84 data set will be presented.

3.1. Direct investment flows within the Community: 1975-79

In Table 2.1 the total of real net direct investment flows between 1975 and 1979 is presented.

Total intra-EC direct investment flows in this period amounted to ECU 22 billion in 1980 prices. This is on average ECU 4,4 billion annually. The Netherlands have the highest outgoing flow of investment capital. In total ECU 4,8 billion was invested in other EC countries, of which the FR of Germany, France, Belgium and Luxembourg and the United Kingdom were the most important.

The highest incoming flow of investment capital is found for France. In total ECU 5,3 billion was invested in this country by other EC countries. The biggest investor in France is the FR of Germany, which invested ECU 1,5 billion in 1980 prices during 1975-79. The Netherlands, Belgium/Luxembourg and the United Kingdom are also important.

From the table it also becomes clear that direct investment flows are concentrated in the core countries of the Community: the FR of Germany, France, The Netherlands, Belgium and Luxembourg and the United Kingdom. They establish ECU 15,3 billion of the ECU 22 billion, which is about 70%.

The Mucchielli indicator on the relative importance of incoming and outgoing direct investments is presented in Table 2.2.

The Netherlands is very clearly an investor country. The other core countries of the Community are considered crossroad countries including Denmark. The southern EC countries and Ireland appear to be recipient countries.

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9 Molle and Morsink (1989), Chapter 3.

Table 2.1.

Accumulated net direct investment flows 1975-79 in billion ECU (1980 prices)

From	To											EC
	D	F	I	NL	B/L	UK	DK	IRL	E	P	GR	
FR of Germany	0,0	1,5	0,1	0,0	1,0	0,8	0,1	0,1	0,5	0,1	0,0	4,4
France	0,7	0,0	0,1	0,1	0,6	0,8	0,0	0,0	0,8	0,1	0,0	3,3
Italy	0,0	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,6
Netherlands	1,1	1,0	0,1	0,0	1,1	1,0	0,0	0,1	0,4	0,0	−0,1	4,8
Belgium/Luxembourg	0,8	1,1	1,4	0,6	0,0	0,0	0,0	0,0	0,3	0,0	0,0	4,3
United Kingdom	0,8	1,1	0,0	0,6	0,6	0,0	0,2	0,5	0,1	0,0	0,1	4,0
Denmark	0,1	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,3
Ireland	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Spain	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,3
Portugal	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Greece	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
European Community	3,7	5,3	1,8	1,3	3,2	2,8	0,4	0,8	2,2	0,3	0,2	22,0

Sources: Eurostat and OECD data.

Table 2.2.

Relative importance of intra-EC net direct investment flows (1975-79)

Country	INVCRO	Country type
FR of Germany	0,09	Crossroad
France	−0,23	Crossroad
Italy	−0,50	Recipient
Netherlands	0,57	Investor
Belgium/Luxembourg	0,15	Crossroad
United Kingdom	0,18	Crossroad
Denmark	−0,14	Crossroad
Ireland	−1,00	Recipient
Spain	−0,76	Recipient
Portugal	−1,00	Recipient
Greece	−1,00	Recipient

3.2. Direct investment flows within the Community: 1980-84

The accumulated net direct investment flows between 1980 and 1984 are presented in Table 2.3.[10]

The total real net direct investment flows within the Community during 1980-84 amounted to ECU 23,1 billion, which is ECU 4,6 billion annually. The highest outgoing flow of direct investments is measured for the Netherlands: ECU 6,8 billion. The FR of Germany and the United Kingdom have also considerable outgoing flows.

For incoming flows the country with the highest value is the United Kingdom. France is in second position with ECU 4 billion mostly coming from the FR of Germany and the United Kingdom.

The core countries dominate intra-EC direct investment flows. ECU 15,8 billion is invested among the core countries of the Community, which is about 70% of the total.

Special attention needs to be paid to the net direct investment flow from The Netherlands to the United Kingdom. It appears that between 1980 and 1984 ECU 4,4 billion (in 1980 prices) was invested by Dutch investors in the United Kingdom. Further investigation showed that most of these investments (ECU 4 billion approximately) were made by the group of mining, oil and chemical industries.[11] Tentatively it could be argued that the very high oil prices in the beginning of the 1980s initiated very high investments by

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10 The 1980-84 direct investment flows in the table have been derived from data in millions of ecus. Given the uncertainties in establishing this data set the flows are presented in billions of ecus. This means that small direct investment flows are presented here as zero flows.

11 This has been derived from Van Nieuwkerk and Sparling (1985). Appendix E shows the stock of Dutch direct investments abroad, specified annually, sectorally and geographically.

Table 2.3.

Accumulated net direct investment flows 1980-84 in billion ECU (1980 prices)

From	To											EC
	D	F	I	NL	B/L	UK	DK	IRL	E	P	GR	
FR of Germany	0,0	1,1	0,7	0,3	1,0	0,8	0,1	0,1	0,5	0,1	0,1	4,6
France	0,5	0,0	0,6	0,3	0,5	0,5	0,0	0,0	0,7	0,1	0,0	3,3
Italy	0,2	0,4	0,0	0,4	0,5	0,2	0,0	0,0	0,1	0,0	0,0	1,7
Netherlands	−0,2	0,8	0,2	0,0	1,0	4,4	0,0	0,2	0,2	0,0	0,0	6,8
Belgium/Luxembourg	0,5	0,5	0,0	0,3	0,0	−0,1	0,0	0,0	0,1	0,0	0,0	1,3
United Kingdom	0,9	1,1	0,4	0,9	0,7	0,0	0,0	0,4	0,4	0,1	0,0	4,9
Denmark	0,0	0,1	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,3
Ireland	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,1
Spain	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1
Portugal	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Greece	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
European Community	1,9	4,0	1,9	2,2	3,8	6,0	0,2	0,7	2,0	0,3	0,2	23,1

Source: Eurostat data.

the Dutch oil industry in exploration and exploitation of oil wells in the British part of the North Sea.

During the analysis it was shown that this specific flow dominated the whole origin-destination matrix of direct investment flows. Therefore, the flow between The Netherlands and the United Kingdom was corrected by excluding oil investments ($DI_{NL\text{-}UK}$ = ECU 0,5 billion).

The Mucchielli indicator on the relative importance of incoming and outgoing direct investments has again been calculated and is presented in Table 2.4.

Both The Netherlands and the FR of Germany are identified as investor countries. Most southern EC Member States together with Belgium/Luxembourg and Ireland are qualified as recipient countries. The remaining core countries including Italy are given a crossroad qualification.

3.3. Developments in intra-EC direct investment

For both periods The Netherlands is qualified as the most important investor. During the second period Dutch investments were most probably dominated by those in the oil industry. France had to give up its position, to the United Kingdom, as the most important receiving country. The core countries continued to dominate intra-EC investment flows by taking a share of 70%. In real terms there has been an increase in foreign direct investment within the European Community by 5%.

Only for one particular flow was a fundamental change measured: during the second period heavy investments were made by the Dutch oil industry in the English North Sea. If these investments were eliminated from the matrix no fundamental changes in the geographical structure of direct investments within the European Community occur.[12]

Table 2.4.

Relative importance of intra-EC net direct investment flows (1980-84)

Country	INVCRO	Country type
FR of Germany	0,42	Investor
France	−0,10	Crossroad
Italy	−0,06	Crossroad
Netherlands	0,51	Investor
Belgium/Luxembourg	−0,49	Recipient
United Kingdom	−0,10	Crossroad
Denmark	0,20	Crossroad
Ireland	−0,75	Recipient
Spain	−0,90	Recipient
Portugal	−1,00	Recipient
Greece	−1,00	Recipient

[12] Correction for the NL-UK flow would reduce the position of both The Netherlands and the United Kingdom. However, for a proper comparison the NL-UK flow for the first period should also have been corrected.

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The Mucchielli indicator showed that The Netherlands remained the most dominant investor country. Most southern EC countries continued their recipient status. The FR of Germany changed from a crossroad country to an investor country, whereas Italy exchanged its recipient status to a crossroad type identification. Belgium/Luxembourg did the opposite exchange: they became recipient instead of being crossroad.

Similar conclusions were obtained from an analysis of detailed tables of the OECD (three sub-periods: 1970-74, 1974-78, 1978-83) and investigations in previous research.[13]

4. Empirical validity of the model

In this section the results of the empirical analysis are presented. The model has been tested in three estimation procedures. In the first procedure the absolute values for the direct investment flows were regressed with the corresponding absolute values of the various explanatory variables. This procedure includes the zero flows observed for direct investments. In the second estimation procedure absolute values were regressed excluding zero flows.

In the third estimation procedure the values of the direct investment flows, and where appropriate those of the explanatory variables, have been transformed into natural logarithms. This approach by definition excludes all zero and negative direct investment flows.

The estimations have been done by cross-section analysis using ordinary least squares. A multi-colinearity test was done by calculating mutual correlation coefficients (see Appendix).[14]

In Subsection 4.1 the results for the first estimation procedure are presented. Subsection 4.2 deals with the results for the second estimation procedure. The results for the third procedure are shown in Subsection 4.3. Each subsection consists of a discussion on the results for the 1975-79 and 1980-84 periods, respectively, and an inter-period comparison.

4.1. The model for the full matrix

This first estimation procedure tests the model for the full matrix including the relations for which zero direct invest-

ments were observed. The general idea behind this procedure is that the explanatory variables must also explain why in particular direct investment relations these zero flows occur.

4.1.1. Estimation results for 1975-79

The estimation results using the first procedure are presented in Table 2.5.

Four important factors have been identified. Research and development, average unit labour cost, mutual trade relations and the variability of the exchange rate have significant and theoretically acceptable parameters. The R&D indicator and the average unit labour cost as push factors testify the tendency to exploit entrepreneurial capacities abroad. These variables are substitutable in the model specification.

The trade index indicates a complementary relationship between trade and direct investment. It confirms trade relations to form a stimulus variable for foreign direct investment.

The variability of the exchange rate is clearly restrictive for direct investment flows to occur. It is in most equations of the unconditional type. A conditional type specification is found in Equation (5) ($s = 4$). Its t-value however shows disputable significance of the parameter.

Multi-colinearity has been checked by calculating mutual correlations of the variables in the regressions. These correlations did not give rise to fear for this phenomenon (see Appendix). The rate of explanation (R^2) is about 48%, which must be considered.

4.1.2. Estimation results for 1980-84

In Table 2.6 the regression results for the period 1980-84 are presented. The results relate to the model specification in absolute values for the full matrix.

The equations which were found for the second period show some more variety in the use of variables. Again research and development as a push factor, the importance of trade relations as a stimulus factor and exchange rate variability as a friction factor have significant and theoretically just parameters. In addition the real long-term interest rate as a pull factor, the tax indicator as an alternative stimulus and cultural differences as another friction factor obtained acceptable parameters in some model specifications.

For research and development, two indicators showed up. The share of high technology products in total exports and

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13 See OECD (1987), and Molle and Morsink (1989).
14 These are partial correlations. It would be better to test multi-colinearity by checking correlations with all variables in the equation.

Table 2.5.

Regression results for direct investment equations (N = 110; 1975-79)

Equation	R&D$_i^2$	WAGE$_i$	TRADE$_{ij}$	EXCH$_{ij}^{s,a}$	R^2
(1)	1,878 (3,136)	—	0,756 (4,591)	−0,094 (−1,916)	0,494
(2)	1,837 (3,079)	—	0,748 (4,547)	−0,268 (−1,807)	0,493
(3)	—	0,016 (2,686)	0,823 (5,109)	−0,140 (−2,308)	0,483
(4)	—	0,016 (2,607)	0,815 (5,039)	−0,405 (−2,200)	0,481
(5)	—	0,014 (2,221)	0,813 (4,971)	−0,028 (−1,624)	0,470

[a] $s = 1$ in Equations (1) and (3); $s = 2$ in Equations (2) and (4); $s = 4$ in Equation (5).
(*t*-values in parentheses.)

Table 2.6.

Regression results for direct investment equations (N = 110; 1980-84)

Equation	R&D$_i^{s,a}$	RENT$_j$	TRADE$_{ij}$	TAX$_{ij}$	CULT$_{ij}^1$	EXCH$_{ij}^{s,b}$	R^2
(1)	1,166 (3,209)	—	0,569 (4,188)	—	—	−0,077 (−2,343)	0,530
(2)	1,196 (3,182)	—	0,565 (4,145)	—	—	−0,264 (−2,310)	0,529
(3)	1,185 (2,953)	—	0,564 (4,063)	—	—	−0,027 (−2,039)	0,524
(4)	2,664 (6,653)	0,017 (2,312)	—	−0,023 (−2,389)	—	−0,078 (−2,171)	0,489
(5)	2,691 (6,659)	0,017 (2,268)	—	−0,022 (−2,359)	—	−0,270 (−2,151)	0,489
(6)	2,792 (6,749)	0,018 (2,459)	—	−0,024 (−2,562)	—	−0,033 (−2,335)	0,493
(7)	1,744 (4,243)	0,012 (1,904)	0,415 (3,164)	—	−0,002 (−2,583)	−0,040 (−1,733)	0,598
(8)	1,761 (4,265)	0,012 (1,924)	0,414 (3,163)	—	−0,002 (−2,635)	−0,137 (−1,770)	0,599
(9)	1,732 (4,168)	0,012 (1,906)	0,410 (3,123)	—	−0,002 (−2,635)	−0,013 (−1,511)	0,595

[a] $s = 1$ in Equations (1), (2), (3), (4), (5) and (6); $s = 2$ in Equations (7), (8) and (9).
[b] $s = 1$ in Equations (1), (4) and (7); $s = 2$ in Equations (2), (5) and (8); $s = 4$ in Equations (3), (6) and (9).
(*t*-values in parentheses.)

in total industrial production in the origin country obtained significant parameters. For cultural differences the difference in the power distance index of the countries under observation is of significant influence.

The variability in the exchange rate showed up in various specifications. In most equations the specifications were of the unconditional type ($s = 1$ and $s = 2$). Conditional variability appeared significant as the short-term percentage changes in the real bilateral exchange rate ($s = 4$).

Mutual correlations between variables in the regressions showed there to be no multi-colinearity in the identified equations. The rate of explanation (R^2) is between 49 and 60%.

4.1.3. Inter-period comparison

Comparison of the results between both periods shows that for the 1980-84 period more explanatory variables have been found. A pull factor represented by the long-term interest rate in the country of destination was identified. Also the tax indicator showed up as an alternative stimulus factor for trade. Cultural difference as an additional friction factor was found.

For the variables which were identified in both periods Table 2.7 compares the parameters found.

In general it can be seen that the parameters (in absolute terms) have diminished. Various reasons can underly this. Further investigations are required to find a proper explanation.

Most specifications of exchange rate variability are unconditional: the variability contains both expected and unexpected fluctuations of the exchange rate. As unconditional varia-

bility is identified as being of significant importance for direct investment flows this may exhibit inadequacy of hedging facilities. Apparently these facilities do not provide sufficient insurance against fluctuations in exchange rates.

The rate of explanation for the second period is on the whole higher than for the 1975-79 period.

4.2. The model for non-zero flows

The second estimation procedure excludes zero direct investment flows as observed in the data sets presented in Section 3. By comparing the regression results with those of the model for the full matrix of DI flows it is possible to evaluate the influence of zero flows on the model.

4.2.1. Estimation results for 1975-79

Table 2.8 describes the results for model specifications in the 1975-79 period.

Equations for the model excluding zero flows for this period contain the same variables as for the full matrix model. Research and development and average unit labour cost are again substitutable push factors. The trade indicator is again an important stimulus factor.

The variability of the exchange rate, however, did not show up as a significant variable. The best parameter was found in Equation (4) in which the parameter obtained a t-value of 1,5. This may be an indication that the variability of the exchange rate is important for the explanation of zero flows in the first estimation procedure.

Comparison of the level of the parameters in this estimation procedure with those of the first procedure revealed that the push factor parameters are higher than in the model for the full matrix. The parameters for the trade indicator are lower. Those for exchange rate variability are in the same order of magnitude.

Checking multi-colinearity showed that there is a danger for this phenomenon as the trade indicator and the variability indicators for the exchange rate showed some negative correlation. This possibility was already mentioned in Section 2 referring to research by Perée and Steinherr (1989).

The rate of explanation for the presented equations varies around 64%. This is considerably higher than for the first period using the full matrix.

Table 2.7.

Comparison of parameter ranges

Variable	Parameter range (1975-79) ($N = 110$)			Parameter range (1980-84) ($N = 110$)		
$R\&D_i^2$	1,837	to	1,878	1,196	to	2,691
$TRADE_{ij}$	0,748	to	0,823	0,410	to	0,569
$EXCH_{ij}^1$	−0,094	to	−0,140	−0,040	to	−0,078
$EXCH_{ij}^2$	−0,268	to	−0,405	−0,137	to	−0,270
$EXCH_{ij}^4$	−0,028			−0,013	to	−0,033
R^2	0,470	to	0,494	0,489	to	0,599

Table 2.8.

Regression results for direct investment equations ($N = 50$; 1975-79)

Equation	$R\&D_i^2$	$WAGE_i$	$TRADE_{ij}$	$EXCH_{ij}^{s\,a}$	R^2
(1)	3,299 (2,635)	—	0,658 (2,440)	−0,085 (−0,690)	0,631
(2)	3,244 (2,674)	—	0,658 (2,440)	−0,242 (−0,676)	0,631
(3)	—	0,040 (2,958)	0,504 (1,734)	−0,179 (−1,298)	0,643
(4)	—	0,042 (3,100)	0,470 (1,607)	−0,618 (−1,491)	0,647
(5)	—	0,034 (2,574)	0,553 (1,898)	−0,025 (−0,701)	0,634

[a] $s = 1$ in Equations (1) and (3); $s = 2$ in Equations (2) and (4); $s = 4$ in Equation (5).
(t-values in parentheses.)

4.2.2. Estimation results for 1980-84

The estimation results for model specification for the 1980-84 period are shown in Table 2.9.[15]

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[15] The estimation has been done by eliminating the very marginal direct investment flows: $|DI_{ij}| >$ ECU 10 million (see also footnote 10 on p. 43).

Use of the second estimation procedure for the 1980-84 period shows also some more variety in the use of variables. Research and development as a push factor and the importance of trade relations as a stimulus factor are again identified as significant variables. The trade variable can be substituted by the tax indicator. In addition the long-term interest variable as a pull factor and the cultural differences as an additional friction factor were identified.

Table 2.9.

Regression results for direct investment equations ($N = 69$; 1980-84)

Equation	$R\&D_i^{s\,a}$	$RENT_j$	$TRADE_{ij}$	TAX_{ij}	$CULT_{ij}^1$	$EXCH_{ij}^{s\,b}$	R^2
(1)	1,886 (3,082)	—	0,384 (1,997)	—	—	−0,108 (−1,627)	0,579
(2)	1,910 (3,037)	—	0,380 (1,962)	—	—	−0,357 (−1,604)	0,579
(3)	2,978 (4,765)	0,029 (2,266)	—	−0,028 (−1,882)	—	−0,085 (−1,250)	0,590
(4)	2,978 (4,723)	0,029 (2,234)	—	−0,028 (−1,855)	—	−0,277 (−1,205)	0,589
(5)	3,050 (4,765)	0,033 (2,695)	—	−0,031 (−2,197)	—	−0,029 (−1,346)	0,591
(6)	2,205 (3,374)	0,018 (1,701)	0,306 (1,750)	—	−0,003 (−2,377)	−0,060 (−1,259)	0,646
(7)	2,228 (3,398)	0,018 (1,712)	0,305 (1,749)	—	−0,003 (−2,430)	−0,205 (−1,305)	0,647

[a] $s = 1$ in Equations (1), (2), (3), (4) and (5); $s = 2$ in Equations (6) and (7).
[b] $s = 1$ in Equations (1), (3) and (6); $s = 2$ in Equations (2), (4) and (7); $s = 4$ in Equation (5).
(t-values in parentheses.)

The variability in the exchange rate does not appear significantly in the equations. The best parameters were obtained in Equations (1) and (2) in which specifications of the unconditional type obtained t-values of 1,6. Possibly the exchange rate variable was important in the full matrix estimation of the model to explain zero flows.

Comparing the results of the second estimation procedure with those of the first leads to the observation that the structure of the model remains valid. The R&D and interest rate variable get higher parameters than in the model for the full matrix. For the stimulus variables parameters have decreased. Frictions from cultural differences and exchange rate variability also obtain decreased parameters.

Calculation of the partial correlations between variables in the equations did not reveal possible multi-colinearity. The rate of explanation (R^2) varies from 58 to 65%.

4.2.3. Inter-period comparison

As for the model for the full matrix more explanatory variables have been found for the 1980-84 period. However, contradictory to the results of the first estimation procedure this procedure showed, for both periods, that the variability of the real bilateral exchange rate does not contribute to explain non-zero direct investment flows. This could mean that the exchange rate variable is mainly responsible for explaining zero flows in the model for the full matrix.

For the variables which were identified using the second estimation procedure in both periods Table 2.10 compares the parameters found.

Table 2.10.

Comparison of parameter ranges

Variable	Parameter range (1975-79) ($N = 50$)		Parameter range (1980-84) ($N = 69$)	
$R\&D_i^2$	3,244 to	3,299	2,205 to	2,228
$TRADE_{ij}$	0,470 to	0,658	0,305 to	0,384
$EXCH_{ij}^1$	$-0,085$ to	$-0,179$	$-0,060$ to	$-0,108$
$EXCH_{ij}^2$	$-0,242$ to	$-0,618$	$-0,205$ to	$-0,357$
$EXCH_{ij}^4$	$-0,025$		$-0,029$	
R^2	0,631 to	0,647	0,579 to	0,647

The table shows that the parameters in the second estimation procedure decline in time (in absolute terms). This was also concluded for the results of the model for the full matrix.

The rate of explanation (R^2) for the second period is on the whole equal to or lower than the one for the 1975-79 period. Regression results for the full matrix showed an increase in the rate of explanation over time.

4.3. The logarithmic model for non-zero flows

The third estimation procedure excludes both zero and negative direct investment flows as observed in the data sets presented in Section 3. In the model to be tested DI_{ij} is transformed by calculating its natural logarithm. Where appropriate, explanatory variables have also been transformed into natural logarithms.

4.3.1. Estimation results for 1975-79

Table 2.11 describes the results for equations of the model in the 1975-79 period.

The logarithmic estimation procedure for the 1975-79 period reveals research and development as a push factor and distance and exchange rate variability as friction factors. Significance of net private borrowing as a pull factor is not convincing as t-values are low. Net private borrowing and distance have not been transformed into natural logarithms. No stimulus factor could be identified in this model.

The variability in the exchange rate shows up significantly in various specifications in the equations. Unconditional specifications are most predominant. A conditional specification was identified in Equation (3).

The partial correlations between variables in the equations show a negative correlation between the logarithm of the R&D indicator and the distance. Hence, there is a possibility that Equations (6) and (7) contain some multi-colinearity. The rate of explanation (R^2) for the various equations ranges from 62 to 81%.

4.3.2. Estimation results for 1980-84

The estimation results for model specifications for the 1980-84 period are shown in Table 2.12. The estimations have been based on two data sets. The first data set contains all positive flows including marginal flows ($N = 89$; see also footnote 10 on p. 43); the second data set excludes marginal

Table 2.11.

Regression results for direct investment equations (logarithmic specification; $N = 50$; 1975-79)

Equation	$R\&D_i^2$	NPB_j	$DIST_{ij}$	$EXCH_{ij}^{s,a}$	R^2
(1)	0,700 (11,272)	—	—	−0,474 (−2,297)	0,752
(2)	0,788 (9,499)	—	—	−0,339 (−2,537)	0,758
(3)	11,715 (3,212)[b]	—	—	−1,145 (−7,454)	0,616
(4)	0,761 (11,055)	0,009 (1,866)[b]	—	−0,422 (−2,078)	0,769
(5)	0,824 (9,741)	0,008 (1,622)[b]	—	−0,288 (−2,133)	0,771
(6)	0,568 (5,408)	—	−0,559 (−3,046)[b]	−0,316 (−2,112)	0,798
(7)	0,609 (5,672)	0,007 (1,479)[b]	−0,535 (−2,939)[b]	−0,274 (−2,185)	0,807

[a] $s = 1$ in Equations (1) and (4); $s = 2$ in Equations (2), (5), (6) and (7); $s = 5$ in Equation (3).
[b] Variable not transformed to natural logarithm.
(t-values in parentheses.)

flows ($N = 66$). Differences in the results may indicate the relevance of some variables for marginal flows.

The logarithmic estimation of the model for the 1980-84 period shows considerable relevance of three variables for intra-EC direct investment flows: R & D, trade relations and variability in the exchange rate. In addition the distance was identified as another friction factor. In most equations R&D appeared significant without being transformed to the natural logarithm. For the exchange rate variable this was the case in Equations (2), (3), (8) and (9).

There are several equations in which conditional variability in the exchange rate obtains significant and theoretically acceptable parameters. Variability of the exchange rate versus its trend value ($s = 3$), and in terms of the medium-term change in the exchange rate ($s = 5$), are accepted in Equations (4) to (7) and (10) and (11).

Comparing the results for the two data sets ($N = 89$ and $N = 66$) it can be seen that the structure of the model does not change. R&D, trade and exchange rate variability are found in the results for both data sets. However, the parameters change considerably. This shows that the model could be highly sensitive for marginal direct investment flows.

The partial correlations between variables in the equations show that some multi-colinearity can be expected, when both the natural logarithm of the trade index and the distance variable are identified in an equation. Hence caution is required in interpreting Equations (4) and (11). The rate of explanation (R^2) ranges from 80 to 90 %, which is considerably high. This can be partially attributed to specifying the model in logarithmic terms.

4.3.3. Inter-period comparison

For the 1980-84 period the R&D indicator remains in general untransformed. Furthermore the net private borrowing requirement has been exchanged for the variable indicating the importance of trade. Also, conditional variability of exchange rates was identified significantly in the 1980-84 period. For 1975-79 this was only once the case.

Table 2.12.

Regression results for direct investment equations (logarithmic specification; 1980-84)

Equation	R&D$_i^{s\,a}$	TRADE$_{ij}$	DIST$_{ij}$	EXCH$_{ij}^{s\,b}$	R^2
			$N = 89$		
(1)	0,784 (3,397)	1,272 (7,257)	—	−0,478 (−2,501)	0,838
(2)	10,387 (4,416)[c]	1,735 (12,647)	—	−0,604 (−2,415)[c]	0,853
(3)	10,560 (4,437)[c]	1,740 (12,661)	—	−1,990 (−2,357)[c]	0,852
(4)	10,985 (5,482)[c]	1,248 (8,906)	−0,965 (−6,066)[c]	−0,139 (−2,613)	0,895
(5)	8,208 (3,535)[c]	1,891 (17,325)	—	−0,123 (−1,935)	0,849
(6)	10,209 (4,255)[c]	1,796 (13,458)	—	−0,037 (−1,900)	0,849
(7)	13,108 (5,082)[c]	1,550 (9,605)	—	−0,525 (−3,198)	0,859
			$N = 66$		
(8)	8,641 (3,511)[c]	1,486 (9,397)	—	−0,477 (−1,809)[c]	0,795
(9)	8,915 (3,611)[c]	1,476 (9,431)	—	−1,707 (−2,415)[c]	0,797
(10)	10,802 (4,140)[c]	1,286 (7,078)	—	−0,447 (−2,765)	0,808
(11)	12,799 (5,856)[c]	0,190 (5,518)	−0,818 (−5,506)[c]	−0,330 (−2,446)	0,871

[a] $s = 1$ in Equation (1); $s = 2$ in Equations (2) to (11).
[b] $s = 1$ in Equations (2) and (8); $s = 2$ in Equations (1), (3) and (9); $s = 3$ in Equations (4) and (5); $s = 5$ in Equations (6), (7), (10) and (11).
[c] Variable not transformed to natural logarithm.
(t-values in parentheses.)

For the variables which were identified using the third estimation procedure in both periods Table 2.13 compares the parameters found.

For distance there is a dramatic change in the parameters value. This may be due to the signalled multi-colinearity. Also for the parameters of exchange rate variability no stability could be obtained.

The rate of explanation for the second period is on the whole higher than the one for the 1975-79 period.

Table 2.13.

Comparison of parameter ranges

Variable	Parameter range (1975-79) ($N = 50$)	Parameter range (1980-84) ($N = 89$ or 66)
DIST$_{ij}$	−0,559	−0,818 to −0,965
EXCH$_{ij}^2$	−0,274 to −0,339	−0,478
EXCH$_{ij}^5$	−1,145	−0,037 to −0,525
R^2	0,616 to 0,807	0,795 to 0,895

5. Conclusions

The objective of this study is to analyse the empirical relation between foreign direct investment within the European Community and the variability of exchange rates. It is hypothesized that monetary integration encourages foreign direct investment.

For the analysis, a model is used that takes up as explanatory variables a number of push, pull, stimulus and friction factors. The exchange rate variability is among the last group. The empirical validity of the model was tested in three estimation procedures. Firstly, absolute values were used allowing to find explanatory variables for the full matrix including zero flows. Secondly, the same model was tested excluding the zero flows. Finally, a logarithmic specification of the model was tested.

Two data sets for accumulated net real direct investment flows within the European Community have been derived from Eurostat and OECD information. The first data set contains direct investment flows during 1975-79. The second data set provides flows for 1980-84. The model has been analysed using both data sets.

The results of the estimation procedures for both periods showed consistently a high relevance of three variables for explaining direct investment flows:

Research and development in the country of origin was identified as the most important push factor. For 1975-79 average unit labour cost appeared to be a substitute for R&D.

A significant complementary relation between the importance of trade and direct investments was found. Hence trade is an important stimulus for direct investments. The tax indicator was identified as an alternative stimulus factor for the 1980-84 data set.

The variability in the average monthly real bilateral exchange rates appeared to be the most dominant friction factor. Distance and cultural differences showed up as additional frictions.

Pull factors were not identified consistently. The net private borrowing requirement and the long-term interest rate in the destination country were identified occasionally.

Exchange rate variability has been identified in various specifications. However, estimating the model in the second procedure (excluding zero flows) revealed that exchange rate variability did not contribute convincingly in explaining non-zero flows. This could indicate exchange rate variability to be a friction factor specifically for zero flows.

Further, it became clear that unconditional type specifications of exchange rate variability dominate in the results. Conditional specifications did not show up in a consistent way. This may be an indication that hedging facilities to overcome expected exchange rate fluctuations are not sufficient. Direct investments continue to be restricted despite hedging.

Taking the above into account we are inclined to conclude that the stated hypothesis is confirmed. Variability in exchange rates is of significant importance for direct investment flows. Hence monetary integration will stimulate direct investment flows between the countries of the European Community.

During the analyses various concerns have emerged about the validity of the results. Improvements need to be made on the following aspects of the research:

the theoretical background of the model needs further substantiation;

the direct investment flows have not been corrected for a scaling factor. Such a factor should correct for the magnitude of countries as origin and destination;

in estimating the model semi-logarithmic specification could be tested in which DI_{ij} is a function of logarithmic transformations of explanatory variables. Also it is necessary to estimate the model by using a pooled data set: a combination of both periods;

the correlation between exchange rate uncertainty and trade flows asks for further investigations with respect to direct investments. There seems to be a triangle relationship among trade, direct investment and exchange rate variability.

Appendix

Table 2.A1.

Correlations of variables in the regression 7579 ($N = 110$)

Correlations	$R\&D_{ij}^2$	$WAGE_i$	$TRADE_{ij}$	$EXCH_{ij}^1$	$EXCH_{ij}^2$	$EXCH_{ij}^4$
$R\&D_{ij}^2$	—	0,551	0,452	−0,105	−0,106	−0,231
$WAGE_i$	0,551	—	0,249	−0,283	−0,223	−0,444
$TRADE_{ij}$	0,452	0,249	—	−0,285	−0,279	−0,463
$EXCH_{ij}^1$	−0,105	−0,283	−0,285	—	0,978	0,469
$EXCH_{ij}^2$	−0,106	−0,223	−0,279	0,978	—	0,449
$EXCH_{ij}^4$	−0,231	−0,444	−0,463	0,469	0,449	—

Table 2.A2.

Correlations of variables in the regression 8084 ($N = 110$)

Correlations	$R\&D_{ij}^1$	$R\&D_{ij}^2$	$RENT_j$	$TRADE_{ij}$	TAX_{ij}	$CULT_{ij}^1$	$EXCH_{ij}^1$	$EXCH_{ij}^2$	$EXCH_{ij}^4$
$R\&D_{ij}^1$	—	0,605	−0,032	0,314	−0,054	−0,388	0,114	0,156	0,198
$R\&D_{ij}^2$	0,605	—	−0,043	0,457	−0,121	−0,103	−0,201	−0,176	−0,193
$RENT_j$	−0,032	−0,043	—	0,149	0,226	0,335	−0,224	−0,234	−0,186
$TRADE_{ij}$	0,314	0,457	0,149	—	0,113	−0,016	−0,315	−0,310	−0,336
TAX_{ij}	−0,054	−0,121	0,226	0,113	—	0,110	−0,178	−0,145	−0,293
$CULT_{ij}^1$	−0,388	−0,103	0,335	−0,016	0,110	—	0,068	0,026	0,032
$EXCH_{ij}^1$	0,114	−0,201	−0,224	−0,315	−0,178	0,068	—	0,990	0,773
$EXCH_{ij}^2$	0,156	−0,176	−0,234	−0,310	−0,145	0,026	0,990	—	0,730
$EXCH_{ij}^4$	0,198	−0,193	−0,186	−0,336	−0,293	0,032	0,773	0,730	—

Table 2.A3.

Correlations of variables in the regression 7579 ($N = 50$)

Correlations	$R\&D_{ij}^2$	$WAGE_i$	$TRADE_{ij}$	$EXCH_{ij}^1$	$EXCH_{ij}^2$	$EXCH_{ij}^4$
$R\&D_{ij}^2$	—	0,443	0,283	0,005	−0,051	−0,213
$WAGE_i$	0,443	—	0,217	−0,131	−0,079	−0,430
$TRADE_{ij}$	0,283	0,217	—	−0,546	−0,545	−0,706
$EXCH_{ij}^1$	0,005	−0,131	−0,546	—	0,980	0,610
$EXCH_{ij}^2$	−0,051	−0,079	−0,545	0,980	—	0,568
$EXCH_{ij}^4$	−0,213	−0,430	−0,706	0,610	0,568	—

Table 2.A4.

Correlations of variables in the regression 8084 ($N = 69$)

Correlations	$R\&D^1_{ij}$	$R\&D^2_{ij}$	$RENT_j$	$TRADE_{ij}$	TAX_{ij}	$CULT^1_{ij}$	$EXCH^1_{ij}$	$EXCH^2_{ij}$	$EXCH^4_{ij}$
$R\&D^1_{ij}$	—	0,616	−0,095	0,169	−0,157	−0,357	0,358	0,383	0,364
$R\&D^2_{ij}$	0,616	—	−0,070	0,198	−0,113	−0,073	0,082	0,091	0,032
$RENT_j$	−0,095	−0,070	—	0,189	0,237	0,205	−0,410	−0,413	−0,262
$TRADE_{ij}$	0,169	0,198	0,189	—	0,215	0,040	−0,324	−0,326	−0,305
TAX_{ij}	−0,157	−0,113	0,237	0,215	—	0,141	−0,166	−0,119	−0,348
$CULT^1_{ij}$	−0,357	−0,073	0,205	0,040	0,141	—	−0,062	−0,111	0,057
$EXCH^1_{ij}$	0,358	0,082	−0,410	−0,324	−0,166	−0,062	—	0,987	0,829
$EXCH^2_{ij}$	0,383	0,091	−0,413	−0,326	−0,119	−0,111	0,987	—	0,765
$EXCH^4_{ij}$	0,364	0,032	−0,262	−0,305	−0,348	0,057	0,829	0,765	—

Table 2.A5.

Correlations of variables in the logarithmic regression 7579 ($N = 50$; L = logarithmic transformation of variable)

Correlations	$R\&D^2_{ij}$	$LR\&D^2_{ij}$	$LNPB_j$	$DIST_{ij}$	$LEXCH^1_{ij}$	$LEXCH^2_{ij}$	$LEXCH^5_{ij}$
$R\&D^2_{ij}$	—	0,919	−0,060	−0,616	−0,179	−0,166	−0,234
$LR\&D^2_{ij}$	0,919	—	−0,032	−0,758	−0,280	−0,261	−0,270
$LNPB_j$	−0,060	−0,032	—	−0,017	0,091	0,101	−0,148
$DIST_{ij}$	−0,616	−0,758	−0,017	—	0,399	0,380	0,312
$LEXCH^1_{ij}$	−0,179	−0,280	0,091	0,399	—	0,991	0,724
$LEXCH^2_{ij}$	−0,166	−0,261	0,101	0,380	0,991	—	0,706
$LEXCH^5_{ij}$	−0,234	−0,270	−0,148	0,312	0,724	0,706	—

Table 2.A6.

Correlations of variables in the logarithmic regression 8084 ($N = 89$; L = logarithmic transformation of variable)

Correlations	$LR\&D^1_{ij}$	$R\&D^2_{ij}$	$LTRADE_{ij}$	$DIST_{ij}$	$EXCH^1_{ij}$	$LEXCH^2_{ij}$	$EXCH^2_{ij}$	$LEXCH^3_{ij}$	$LEXCH^5_{ij}$
$LR\&D^1_{ij}$	—	0,604	0,336	−0,445	0,025	0,033	0,063	−0,277	−0,003
$R\&D^2_{ij}$	0,604	—	0,531	−0,421	−0,201	−0,152	−0,176	−0,233	−0,250
$LTRADE_{ij}$	0,336	0,531	—	−0,644	−0,296	−0,252	−0,277	−0,121	−0,278
$DIST_{ij}$	−0,445	−0,421	−0,644	—	0,297	0,288	0,302	0,063	0,131
$EXCH^1_{ij}$	0,025	−0,201	−0,296	0,297	—	0,880	0,990	0,290	0,766
$LEXCH^2_{ij}$	0,033	−0,152	−0,252	0,288	0,880	—	0,898	0,216	0,741
$EXCH^2_{ij}$	0,063	−0,176	−0,277	0,302	0,990	0,898	—	0,243	0,741
$LEXCH^3_{ij}$	−0,277	−0,233	−0,121	0,063	0,290	0,216	0,243	—	0,330
$LEXCH^5_{ij}$	−0,003	−0,250	−0,278	0,131	0,766	0,741	0,741	0,330	—

References

Cushman, D.O. (1985), 'Real exchange rate risk, expectations and the level of direct investment', *Review of economics and statistics*, Vol. 87, pp. 297-308.

Devereux, M. and Pearson, M. (1989), *Corporate tax harmonization and economic efficiency*, Report Series No 35. London, The Institute for Fiscal Studies.

Hofstede, G. (1984), *Culture's consequences, international differences in work-related values*, Cross-cultural research and methodology series, Vol. 5. Sage Publications.

Molle, W.T.M. and Morsink, R.L.A. (1989), 'European direct investment in Europe', to be published in Mucchielli, J.-L. (ed.), *Multinational firms and European integration*. Geneva.

Mucchielli, J.-L. (1985), 'Les firmes multinationales: mutations et nouvelles perspectives', *Economica*, Paris.

Nieuwkerk, M. van and Sparling, R.P. (1985), 'De internationale investeringspositie van Nederland', *Monetaire monografieën*, No 4. Deventer, De Nederlandsche Bank NV/ Kluwer.

OECD (1987), *Recent trends in international direct investment*. Paris.

Perée, E. and Steinherr, A. (1989), 'Exchange rate uncertainty and foreign trade', *European economic review*, Vol. 33, pp. 1241-1264.

Sleuwaegen, L. (1987), 'Multinationals, the European Community and Belgium, recent developments', *Journal of common market studies*, Vol. 26 (2), pp. 255-272.

Weber, A. (1990), 'EMU and asymmetries and adjustment problems in the EMS — Some empirical evidence', in this volume.

3. External economies and European integration: the potential for self-fulfilling expectations

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1. Introduction

It is often suggested that European integration matters because people think it matters. That is, the highly optimistic predictions of the European business community may prove to be self-fulfilling prophecies.[1] Nevertheless, this aspect of the integration is ignored or dismissed by many economists, since the logic underlying this view is typically quite vague and the notion of self-fulfilling expectations does not make sense in many standard economic models. Yet recent theoretical work has shown that more rigorous underpinnings for self-fulfilling expectations do exist. This study is an exploratory attempt to use these new tools to bring some formalism to the assertion that highly optimistic expectations about European economic and monetary integration may be self-fulfilling.

Standard economic analysis links economic outcomes (production, prices, employment, etc.) to economic fundamentals (tastes, technology and government policy). Typically, assumptions are made to ensure that the link is stable in the sense that small changes in fundamentals lead to only small changes in the outcome. Nevertheless, it has long been recognized that a number of different equilibrium outcomes could result from the same economic fundamentals in many, quite common situations. An important implication of the existence of multiple equilibrium outcomes is that seemingly small changes in fundamentals may lead to changes by shifting the economy from one equilibrium to another. While this possibility is well known, it is usually assumed away since it is difficult to decide *a priori* at which equilibrium the economy will end up. In contrast, the recent theoretical work on self-fulfilling expectations makes a virtue of this indeterminacy. It shows that peoples' expectations about which equilibrium the economy is headed toward may actually determine the equilibrium that the economy eventually ends up at. There are two basic conditions for self-fulfilling expectations of this type: there must be multiple equilibria, and expectations must be able to influence the selection of equilibrium. If such conditions exist, a general shift from Euro-pessimism to Euro-optimism could have an independent effect on the shape of the European economy.

As yet the formal work on self-fulfilling expectations is quite theoretical. This study relies heavily on the work by Krugman (1989) and Matsuyama (1989). These papers deal with a highly stylized economy consisting of two sectors (manufacturing and non-manufacturing). Due to external economies in manufacturing there are two stable employment and production patterns: one with high manufacturing employment and one with low manufacturing employment. Under certain conditions the question of which equilibrium the economy ends up at is answered by peoples' expectations about where the economy is heading. To see this, note that external economies implies that the productivity and profitability of a given unit of resources in the manufacturing sector depends upon the overall size of the sector. If the business community expects the sector to expand, factories will be built, technologies and products will be developed and workers will be hired in anticipation of high productivity. If the external economies are great enough this expansion may make the expansion profitable, thereby turning the initial optimism into an accurate forecast. Likewise, if the business community is pessimistic about the future of industry, investment and hiring will not occur. Productivity will not rise, and the initial pessimism will be validated. We choose the Krugman-Matsuyama approach for several reasons. First, work by Caballero and Lyons (1989, 1990a, 1990b) finds empirical evidence of external economies in both Europe and the United States of America. Second, while we shall argue that self-fulfilling expectations make sense in a wide variety of models, the Krugman-Matsuyama analysis permits us to explicitly detail the role of expectations in equilibrium selection.

The possibility that self-fulfilling expectations might encourage a substantial expansion of EC industry is in itself quite interesting. However, we should like to go beyond this, and tentatively suggest that the expansion of EC industry might reduce EC unemployment instead of causing a contraction of the non-manufacturing sector as must be the case with constant aggregate unemployment. This raises the even more enticing prospect that the shift from Euro-pessimism to Euro-euphoria might in, and of, itself help ameliorate the European unemployment problem. To this end we present a suggestive model that can be thought of as a hybrid of the Blanchard and Summers (1986) and Krugman (1989) models. It is a highly stylized model intended to highlight the role of self-fulfilling expectation, rather than to make an independent contribution to the literature on the causes of persistence in European unemployment.

The study is organized as follows: Section 2 presents the logic of the Krugman-Matsuyama work on self-fulfilling expectations; Section 3 surveys a number of other models displaying multiple equilibria; Section 4 broaches the issue

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[1] See, for example, the survey cited in the Cecchini report and the EC study on EMU.

of European unemployment and presents our suggestive model. Finally, Section 5 presents our conclusions together with consideration of the applicability of our stylized modelling procedures.

2. The logic of self-fulfilling expectations

As a backbone for our investigation, we rely on recent analysis by Krugman (1989) and Matsuyama (1989). For the sake of clarity, we focus our exposition on Krugman's paper since it involves a simple linear model. The gain in clarity comes at a cost in that the linear model gives rise to equilibria that are unrealistically extreme.[2] Solution of the Matsuyama model involves a rather obscure branch of mathematics; however, it is marked by equilibria and dynamics that are much more realistic and appealing. In what follows we attempt to explain the logic of self-fulfilling expectations without reference to technical terms or arguments. A more formal discussion can be found in Appendix 1.

Before turning to the Krugman-Matsuyama approach, note that situations in which expectations may be self-fulfilling are extremely common in economics. To take one well known example consider a new market where there is only room for one firm to operate profitably due to scale economies; yet, there are two potential entrants (call them home and foreign). If both firms believe that the home firm will prevail, the home firm enters and since it has entered the foreign firm does not. Of course since the foreign firm does not enter, the home firm is happy to continue operation. Likewise if both firms believe the foreign firm will prevail, it actually will. Clearly there are two stable equilibria and expectations about the eventual outcome will influence the selection of equilibrium. Thus, expectations may be said to be self-fulfilling. The problem with such simple examples is that it is hard to say anything beyond the fact that expectations *per se* might matter. The contribution of the Krugman-Matsuyama approach is to provide a framework which allows us to explicitly derive the dynamics of adjustment and its dependency on expectations.

Krugman (1989) presents a highly stylized economy in which more than one equilibrium is possible. Namely he studies a small open economy with two sectors each operating under perfect competition. Labour is the only factor of production.

One sector is marked by external economies of scale (henceforth manufacturing) and one by constant returns to scale (henceforth non-manufacturing). All workers are assumed to be identical, so in equilibrium all workers must earn the same wage. The relative price of the two goods is tied down by international trade. This economy can be analysed with the help of Graph 3.1. Employment in manufacturing, L_m, is on the horizontal axis (L_m ranges between zero and the total labour force, $\bar{L}$). The MPL_m schedule shows how the marginal product of labour in manufacturing increases with L_m due to external economies. Due to perfect competition, workers are paid their marginal product, so MPL_m also gives us the relationship between manufacturing employment and the wage. Labour productivity and wages in non-manufacturing are unaffected by the level of employment in the sector due to constant returns. We set the non-manufacturing wage equal to unity for convenience.

There are two stable equilibria: one with all labour employed in manufacturing and one with all labour in non-manufacturing. The first equilibrium, E_m, is stable since if all workers are employed in manufacturing, manufacturing productivity and hence wages will be higher than non-manufacturing due to the existence of external economies of scale. The high manufacturing wage implies that all workers would indeed be happy working in manufacturing. The non-manufacturing equilibrium, E_{nm}, is stable since if no one is employed in the sector, manufacturing productivity and wages will be low. Consequently, no one will want to work in the sector. Since the economies of scale are external to the firm, no single firm would find it profitable to set up in manufacturing when everyone else was in non-manufacturing (more precisely such a firm could not afford to pay the going wage). Lastly, as in almost every model with multiple equilibria, there is an unstable equilibrium between every two stable equilibria. In this model it is at point E_u where manufacturing employment is at L_m^u. It is an equilibrium since the wage in both sectors is exactly equal to 1.

As a first step, consider what might be thought of as standard informal dynamics. Suppose the economy starts off at a point like L_m'. At this level of manufacturing employment, the marginal product of labour in manufacturing is lower than one, so the wage in manufacturing will be lower than in the other sector. If workers are myopic and make their choice between sectors based only on the current wage differential, the level of employment in manufacturing will tend to fall from L_m' toward zero. Assuming that labour adjusts slowly across sectors, the informal adjustment process would be indicated by the arrows on the X-axis of Graph 3.1. Similarly, if the economy started off to the right of L_m^u, the informal dynamics would push the economy to E_m as shown by the arrows.

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2   Of course, with sector-specific factors or non-linearities in the marginal product of labour, the model could easily be set up such that one equilibrium has but slightly more labour allocated to manufacturing than the other.

GRAPH 3.1: **Marginal product of labour and employment in manufacturing (Krugman's model)**
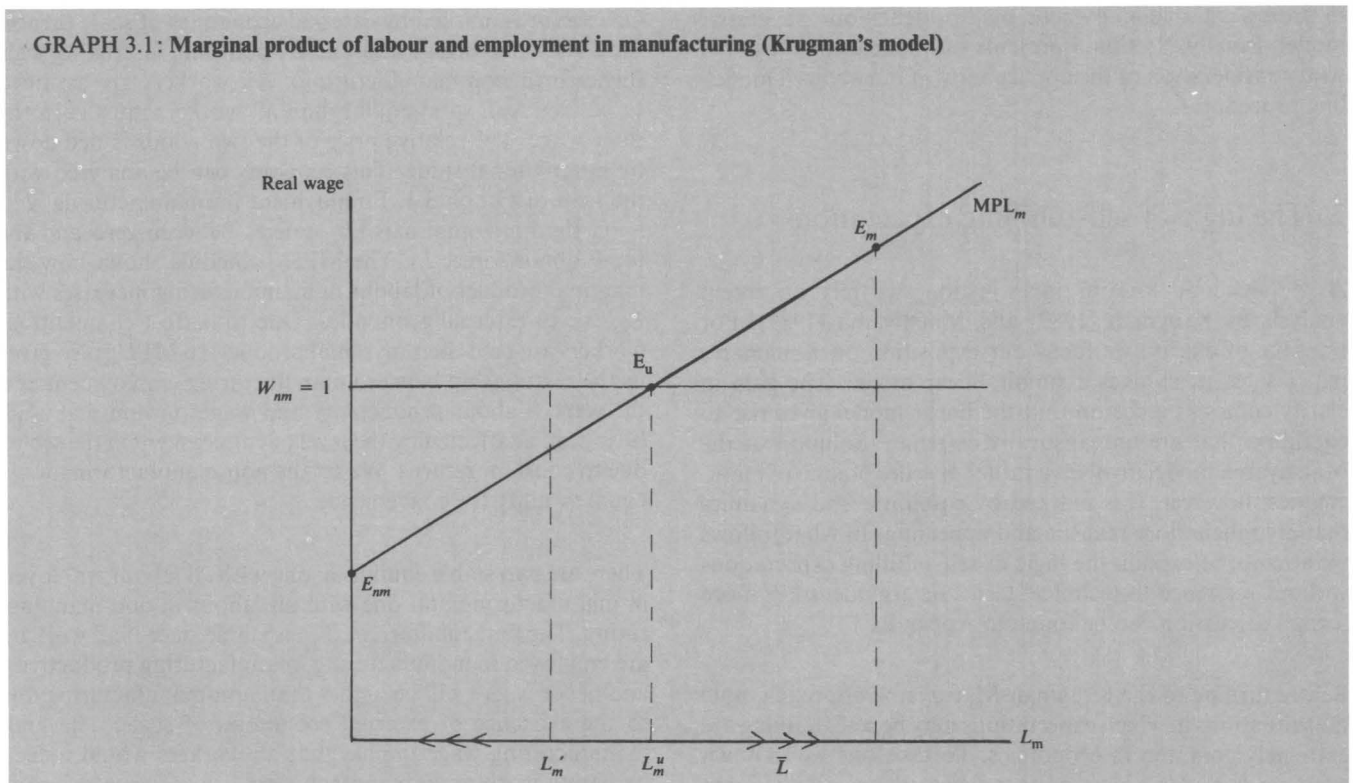
The problem with this informal analysis of the adjustment is that it ignores the interaction between the slow adjustment and the decision of workers. In a fully worked-out framework, the justification behind the slow adjustment would involve a cost of changing sectors. However once we realize that the decision to change sectors is costly then we must also realize that any decision is costly to reverse. Consequently the decision to switch sectors is like an investment decision: the adjustment costs are paid today, benefits accrue in the future. A smart worker will therefore be concerned about future wage differentials as well as the current wage differential. This second factor is the way in which expectations will matter. That is, a typical worker's decision of which sector to work in will depend in part on expectations of the future state of the economy. This opens up the possibility that expectation *per se* will play a role. Starting at L'_m the economy may move to E_{nm}; however, it is possible that expectations about the future wage gap may 'overpower' the current negative wage gap, in the sense that workers may move to the sector which currently is offering the lower wage rate in anticipation of future positive wage differentials. Thus, there may be two perfectly rational adjustment paths from a position like L'_m.

The interaction between the worker's decision, the current wage gap and expectations of the future wage gap is fairly subtle. We therefore directly examine the decision of a typical worker when the economy is at L'_m. To start with, note that current wage differential at L_m is negative. If workers were myopic and focused exclusively on the current wage differential they would exit manufacturing. However, suppose workers are forward-looking (due to our assumption of perfect competition we could just as well have framed the decision in terms of firms' hiring and firing decisions). In this case the worker's decision will depend in part upon his or her beliefs about other workers' decisions (since the future wage differential depends upon the anticipated future employment pattern due to external economies). Thus, if a typical worker believes that all other workers will eventually shift into manufacturing, he or she knows that the wage difference will eventually become quite positive. Consequently he or she may shift into manufacturing despite the current negative wage differential. Of course all non-manufacturing workers face an analogous problem, so if they hold similar beliefs they will all eventually shift into manufacturing and the economy will end up at E_m. In the Krugman-Matsuyama framework, adjustment costs rise steeply with the number

of workers switching sectors. This makes its non-optimal for workers to want to adjust all at the same time.

The use of a model with only two sectors is a convenient device in the investigation of equilibrium selection. However, our purpose here is to suggest its usefulness in the European context, so a fuller justification of its application is in order. It is easy to establish that multiple equilibria may arise in any model with external economies regardless of the number of sectors. Recent work by Caballero and Lyons (1989, 1990a, 1990b) finds empirical evidence in support of the widespread relevance of both external economies and economy-wide (social) increasing returns to scale, in Europe as well as the United States of America. Their equations isolate intra-country positive externalities in the manufacturing sectors of each of the four EC nations for which the requisite data are available (Germany, France, the UK and Belgium). Thus, the basic structure of the multiple equilibrium setting used in our analysis is not without empirical support. Of course, the model remains highly stylized; we feel it is more appropriately viewed as a suggestive specification of the economy.

3. A selective survey of models with multiple equilibria

There are two basic requirements for self-fulfilling expectations to operate in the Krugman-Matsuyama fashion. The economy must be marked by multiple steady-state equilibria, and expectations about the future must influence the selection of which steady state the economy ends up at. Working out the formal dynamics of the influence of expectations on equilibrium selection is so difficult that it has been accomplished only for models as simple as the one discussed in the previous section. These problems, however, should not be allowed to cloud the fact that expectations do influence the course of the economy. In other words the difficulty lies in pinning down the exact dependency, not showing that some dependency exists. By contrast, it is quite straightforward to show that a model has multiple steady states. Indeed, a wide variety of well-known models are marked by multiple equilibria. In order to highlight the fact that this requirement for self-fulfilling expectations is in no way unlikely, we briefly review some of the work in the area.

3.1. Multiple equilibria in full employment models

The first point is that multiple equilibria may arise in almost any model, even in the absence of externalities or market imperfections. Indeed in the perfect world of the Arrow-Debru model uniqueness of equilibrium requires strong re-

strictions on tastes and/or technology. However, the possibility of multiple equilibria in the perfectly competitive model is generally viewed as an anomaly, so the assumption of uniqueness is thought of as an innocuous regularity condition. Recent work in macroeconomics, however, has explored the possibility and implications of multiple equilibria. This literature focuses on three sources of multiplicity: external economies of scale, firm-level scale economies and counter-cyclical profit margins (see the review in Hammour, 1989).

The previous section details the manner in which external economies created multiple equilibria in the Krugman-Matsuyama model. At the macro level, a notable example of a model with external economies is Diamond's (1982) model of thick market externalities. Using a search-theoretic framework, he formalizes the notion that when the activity level is high, matching between economic agents (e.g. firms and customers) is more likely. This reduces transaction costs, boosts output and thereby supports the high level of activity. Similarly, a low level of activity may be self-perpetuating. In this case the externality stems from the fact that an individual's expenditure on search costs improves the efficiency of search by all others. Putting it differently, search technology displays external economies of scale.[3]

A second source of multiplicity is internal increasing returns to scale in production together with imperfect competition. Recent examples are models by Shleifer (1986), Kiyotaki (1988) and Murphy et al. (1989). Again the ultimate source of multiplicity in these models is an externality. Essentially, the externality stems from the fact that imperfectly competitive firms do not fully internalize the impact of their output expansion on the output decisions of other firms. In almost any model of imperfect competition, firms will choose to produce more output when faced with a higher aggregate level of demand. Aggregate demand, in turn, depends on aggregate income in a closed economy. In a simple model with labour as the only factor of production, aggregate income depends on the labour endowment and average productivity. Lastly, if some firms face scale economies the average level of productivity depends in part on the decisions of imperfectly competitive firms. To see that multiple equilibria may arise consider two possible equilibria. In the low

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3 Hammour (1989) makes the point that multiple equilibria do not necessarily arise in the presence of external effects. He shows within a representative agent economy that a necessary condition for multiple equilibria is social increasing returns, which he defines to be the condition that the marginal return on effort, for a typical agent, should rise if all agents expand their activity level simultaneously. In short, it is necessary that the aggregate level, at which any externalities are internalized, be characterized by increasing returns to scale.

output equilibrium, imperfectly competitive firms operate at a low level of output, and so at a high average cost, since overall demand is low. This high-cost production implies a low average productivity level which, in turn, results in low overall income and demand. At the high output equilibrium imperfectly competitive firms will operate further down their average cost curves implying higher economy-wide productivity and income. Essentially, the fact that imperfectly competitive firms do not coordinate directly and are not completely coordinated by the price mechanism allows for multiple equilibrium.

The economics of the Shleifer (1986) paper are simple and intuitive, so we describe how it might be modified to formalize the notion of self-fulfilling expectations in Europe. Consider an economy where individual firms choose between developing a cost-saving technology at a fixed labour cost and using existing technology. Moreover, suppose innovation gives the innovator a temporary edge over the competition boosting their profits until the patent expires. Finally, suppose that the value of the temporary advantage from the innovation increases with aggregate income. In such a set-up it is likely that there is a slow-growth, low-innovation equilibrium as well as a high-growth, high-innovation equilibrium. Again the basic externality stems from the fact that individual firms do not internalize the impact of their own innovation on the innovation decision of other firms via the impact on aggregate income. In the context of Europe, if EC firms believe income is to grow quickly due to the integration (see Baldwin, 1989), they may raise their spending on productivity-enhancing innovations. This faster productivity growth might validate their beliefs. On the other hand in the 1970s, widespread pessimism may have discouraged productivity-boosting investment, thereby fulfilling the pessimistic growth forecasts.

The third source of multiple equilibria is countercyclical mark-ups (see Heller, 1986; Stiglitz, 1984; and Rotemberg and Saloner, 1987). If mark-ups fall with aggregate output then firms will have more incentive to produce when aggregate output is high. Combining this incentive with scale economies can yield multiple equilibria.

3.2. Multiple equilibria in models with unemployment

Of all macro-aggregates, unemployment in Europe is the easiest to make an empirical case for the existence of multiple equilibria. Moreover there exist a number of interesting models which display multiplicity of equilibria in the level of unemployment. Perhaps the most well known is the model of hysteresis in unemployment advanced by Blanchard and Summers (1986) and Gottfries and Horn (1987). The econ-

omics of this model are based on the distinction between 'insider' and 'outsider' workers, developed in a series of contributions by Lindbeck (see, for example, Lindbeck and Snower, 1985) and used in a paper by Gregory (1986) to explain the behaviour of the Australian economy.

Briefly in this model equilibrium employment and wages result from bargaining between a group of workers (the insiders) and firms. Unemployment is an unintentional by-product of this bargaining. In the simplest set-up, the insider group faces a labour demand curve which is subject to random demand shocks. Insiders choose this period's real wage (i.e. they sign a wage contract) before they know the outcome of this period's random shock. The firms choose employment given the real wage. In choosing the wage, insiders balance higher real wages against the possibility that some insiders may become unemployed if demand turns out to be lower than expected. Note that the presence of the unemployed plays no role in real wage setting. Given this arrangement any adverse shock that reduces employment, reduces the size of the insider group as newly fired workers switch from insiders' to outsiders' status. Since the new group of insiders is smaller it can demand a higher real wage for any level of per-worker job security. Consequently, employment and unemployment show no tendency to return to their pre-shock levels.

Graph 3.2 presents a simple diagrammatic exposition of this model. The curve DD in the top part of the figure represents the labour demand curve faced by insiders. Negative demand or productivity shocks shift the curve down; positive shocks shift it up. The curve PP in the bottom part of the graph represents the insiders' trade-off between higher real wages and the probability of any insider being employed. Its shape reflects the fact that the higher the wage the more likely it is that some insiders will be laid off. Furthermore, the position of PP depends on the size of the insider group (call this L_0). For instance if the size of the group contracts then PP shifts down since with fewer insiders the probability that any given member is employed is higher at any given wage. Lastly, insiders' preferences over wages and the probability of employment are depicted by the indifference curve IC. As usual the optimal real wage choice by insiders occurs at the tangency of IC and PP. The resulting real wage is W_0. The expected employment level, L_0, is determined from DD. Blanchard and Summers show that if the parameters and functional forms are just right, the optimal choice of W will be such that the expected level of employment, L_0, always equals the current level of membership, L_0.

Consider how temporary demand shocks can lead to persistent unemployment. If an unexpected shock leads to a shift down of the labour demand curve to DD', firms will lay off

GRAPH 3.2: **Hysteresis in unemployment**

A second model which displays multiple equilibria in unemployment has recently been presented by Saint-Paul (1990). In this model firms face non-trivial firing costs and random demand shocks which are firm-specific. The firing costs and random demand shocks interact to make firms reluctant to hire workers if it is likely that they may have to fire many workers (as opposed to having them leave voluntarily) during firm-specific downturns. That is, firms know that there is a chance they will have to reduce their labour force sometime in the future. They also know that unless a sufficient number of workers are willing to leave voluntarily (changing jobs or retiring), they will have to pay firing costs. (Keep in mind that the downturns are firm-specific, so it is plausible that some workers would quit during a downturn.) In a sense, forward-looking firms view the possibility of having to pay firing costs as a 'tax' on hiring. The expected value of this 'hiring tax' depends upon the magnitude of the firing costs and the likelihood that they must be paid.

Workers face two sources of random incentives to quit. The first is retirement and the second represents all other outside reasons to leave a job (such as marriage, births, family relocations, personality conflicts, etc.). Saint-Paul refers to these as disamenity shocks. Retirement cannot be resisted; however, workers may choose to put up with a disamenity shock if the prospect of quitting is dismal enough. The aggregate level of unemployment is an important determinant of employees' evaluations of the quitting alternative. If unemployment is high the probability of finding a job is low so the prospect of quitting is unfavourable. If there is full employment job-leavers find new jobs immediately, so the prospect of quitting to avoid a disamenity is favourable.

This model may have two stable unemployment equilibria. In the low unemployment equilibrium the aggregate quit rate is high since workers do not fear long bouts of unemployment. And since the quit rate is high, firms on average view the 'hiring tax' as rather low, and so firms will actually hire many workers, validating the full employment condition. Likewise there is a high unemployment equilibrium where workers are reluctant to quit since they believe that unemployment will stay high. Since they only infrequently leave their jobs voluntarily, firms view the 'hiring tax' as quite high. Consequently they hire few workers and thereby validate workers' beliefs about unemployment. In between the two stable equilibria there is an unstable equilibrium.

workers so that some of the insiders become unemployed. In particular suppose employment falls to L'. If the newly unemployed insiders lose their status as insiders, the remaining insiders each face a higher probability of employment for any given real wage; that is, the PP curve will shift down to PP'. Consequently next period's optimally chosen real wage will rise to W'. If the parameters obey the restrictions derived in the Blanchard and Summers paper, the expected level of employment will be L' which is just equal to the new lower level of insiders' membership. What all this goes to say is that if next period's demand is restored to its pre-shock level, employment (and therefore unemployment) will fail to return to its pre-shock level. This is hysteresis. Note that under the strong assumptions needed to produce hysteresis, this model has a continuum of steady states. The restrictions on the parameters necessary to produce this pure hysteresis are quite strong. Yet, even if the optimal wage W' did not lead to an expected employment of exactly L', the employment of insiders would still display some persistence. Specifically, the Blanchard and Summers paper shows that, in general, employment follows a random walk with drift.

Lastly, Drazen (1987, 1988) discusses two models of multiple equilibria in unemployment. One is based on joint production (i.e. external economies of scale) and one is based on demand spill-overs (i.e. internal economies of scale as in the Shleifer model).

4. Self-fulfilling expectations in unemployment: an illustrative model

To enrich our investigation of the potential role of self-fulfilling expectations, we delve into what is perhaps Europe's most vexing problem: high and persistent unemployment. Before starting it is important to note that we do not propose to add anything substantial to the debate on the causes of European unemployment and its persistence. This has been covered by an extensive and highly sophisticated literature (see Layard *et al.*, 1984; Blanchard and Diamond, 1989, provide an analytic survey). Our intention here is to use the lessons of the self-fulfilling expectations' literature in order to promote understanding of how optimistic expectations may influence the dynamics of shifting between equilibria. That is, we ask: Is it possible that European economic integration will contribute to a reduction of the level of structural unemployment by engendering more optimistic expectations on the part of market participants?

At first blush the response to the above query might appear blindingly obvious. To the extent that the integration represents a positive real shock to the European economies, standard analysis suggests that labour demand will be driven up, thereby reducing unemployment, other things being equal. Of course, there are myriad channels through which the labour market might be affected. However, our objective in considering unemployment is more focused and quite a bit less ambitious than an attempt to capture the full integration effect on the labour market. Our central concern limits our attention to the potential role of expectations *per se*.

The Krugman-Matsuyama analyses look at multiple equilibria in the sectorial composition of an economy at full employment, whereas our concern here is with aggregate unemployment. Consequently, we cannot apply the Krugman-Matsuyama analysis directly. Below we propose a simple model (based on the Blanchard-Summers formalization of the insider/outsider idea) which focuses on the role of expectations in equilibrium selection. Before describing the model, however, we briefly review the causes of European unemployment and its persistence. Then we highlight a number of prominent facts that set the stage for our modelling strategy. In particular, we wish to provide rough justification for two stylized facts: (1) there is a link between the employment in manufacturing and aggregate unemployment; and (2) employment in non-manufacturing does not appear to be influenced by employment in industry.

4.1. Causes of European unemployment and its persistence

There is no mystery in what caused European unemployment to rise in the 1980s: lower than expected productivity growth,

oil price increases, increases in the employment tax wedge, and contractionary aggregate demand policies (see Dornbusch *et al.*, 1983; Buiter, 1985; Sachs, 1979, 1983; Bruno and Sachs, 1985; and Layard *et al.*, 1984; among many others). The difficulty lies in explaining how these shocks can have such a sustained effect on unemployment. According to the standard theories of the late 1970s and early 1980s, a high unemployment rate should have moderated real wage rises and thereby resulted in a gradual return of unemployment to the normal level of 2 or 3%. As reviewed by Blanchard and Summers (1986) there are three main hypotheses that might explain what appears to be higher equilibrium unemployment: (1) insufficient physical capital, (2) insufficient human capital among those unemployed, and (3) the insider/outsider distinctions. We consider each in turn.

With respect to the insufficient capital story, Blanchard and Summers present two reasons for scepticism. First, reductions in the capital stock affect labour demand much the same way as a supply shock, and as long as some degree of factor substitutability exists there is no reason why a persistent increase in unemployment should result. Second, historical examples run counter to the predictions of this explanation: substantial disinvestment in the 1930s did not preclude the rapid recovery of employment associated with re-armament; and the substantial reduction in the civilian capital stock during the War did not prevent the attainment of full employment after the War in many countries. In the end, they find little appeal in this explanation.

The insufficient human capital explanation is more firmly ingrained in the literature. Persuasive statements of the potentially important effects of unemployment on human capital accumulation and subsequent labour supply may be found in Phelps (1972) and Hargraves-Heap (1980). Clark and Summers (1982) present some suggestive empirical evidence along these lines. Essentially, this hypothesis maintains that the skills of the unemployed are not updated, and in fact they might atrophy rendering the unemployed unemployable. While there is undoubtedly some truth to this notion Blanchard and Diamond (1986) state that direct and indirect evidence just does not support the idea that the skill deterioration associated with unemployment is so strong as to make many of the long-term unemployed unemployable.

More recently, this notion of skill loss has been used in a subtle way to account for the lack of real wage response to high unemployment (see Layard and Nickell, 1987). Suppose firms rank job candidates on the basis of length of unemployment, or search effort by the unemployed diminishes with the duration of unemployment. In either case, workers who have been unemployed for a long time are very unlikely to

be at the front of a queue of job applicants. Therefore, in some sense even if firms bargain over wages with job seekers, the long-term unemployed do not matter.

The basic logic of the insider/outsider approach as formalized by Blanchard and Summers (1986) has been highly influential in the debate. However, it is by now well established that real wages are influenced to some extent by the level of unemployment (see for instance Alogoskoufis and Manning, 1988). This point should be interpreted as showing that the wage-setting assumption in the Blanchard-Summers model was too extreme to fully account for the facts. Indeed the ranking approach discussed above can be thought of as a modification of the insider/outsider model. Here we define outsiders as the group of unemployed workers who have little or no influence on the equilibrium wage. Thus instead of becoming outsiders immediately upon job loss, an unemployed worker becomes more like an outsider the longer he is unemployed. This allows us to reconcile the structure of bargaining in European labour markets with the fact that the influence of the level of unemployment on wages has diminished during the 1980s as the average duration of unemployment has risen (see Blanchard and Diamond, 1989, on this point).

4.2. Some facts about European employment and unemployment

A straightforward application of the Krugman-Matsuyama model would not be uninteresting. After all, the possibility that self-fulfilling expectations might encourage EC industry is in itself quite interesting. However, we should like to go beyond this, and suggest that the expansion of EC industry might reduce EC unemployment as opposed to coming at the expense of a contraction of the non-manufacturing sector. Our model can be thought of as a hybrid of the Blanchard and Summers (1986) and Krugman (1989) models. It is intended to highlight the role of self-fulfilling expectations. It is not intended as an independent contribution to the work on the causes of persistence in European unemployment. Indeed, as noted above, the Blanchard-Summers bargaining assumption has been shown to be too extreme; nevertheless it allows a simple stylized model of the insider/outsider dynamics. The purpose of reviewing some data here is simply to motivate two aspects of our model. First we shall be using a modified version of the Blanchard-Summers model, so we wish to make a *prima-facie* case that aggregate unemployment is negatively related to industrial employment. Second, we shall assume that the equilibrium wages and employment in the non-manufacturing sector are not influenced by the level of employment in the manufacturing sector.

Graph 3.3 shows that the aggregate unemployment rate appears to ratchet up in the 1970s and 1980s. The first rise in unemployment came with the first oil-price shock and attendant recession; the second rise came with the second oil-price shock and the Volcker recession. Moreover, Graph 3.3.1 provides some weak *prima-facie* evidence that the EC unemployment rate is subject to pure hysteresis, i.e. instead of displaying a tendency to revert to some natural level, it appears that any change in the rate persists even after the cause of the change is removed.

Graph 3.4 presents the evolution of the sectorial composition of EC employment. Clearly employment in the service sector has risen steadily while employment in agriculture has fallen steadily. Graph 3.5 spotlights the evolution of employment in industry. A striking aspect of industry employment is that it appears to ratchet down in a pattern which is the mirror image of the unemployment rate, namely, the first oil-price shock recession sharply pushes down industry employment. A gentle decline occurs from 1976 to 1980 at which point the second oil-price shock and Volcker recession pushes down employment until 1985. Since 1985 the decline in industry employment and the rise in unemployment have both levelled out. It is important to note that this correlation between industry employment and aggregate unemployment is not predicted by the natural rate approach. That is, the natural rate approach to unemployment predicts that the unemployment rate would rise during the two oil-price shock recessions but would fall during the 1976-80 period. In other words, the natural rate approach does not explain why unemployed industry workers were not re-employed in other sectors. By contrast, this correlation is consistent with the insider/outsider approach provided that there is a rough connection between the size of the insider group and industrial employment.

Further *prima-facie* evidence can be found for the insider/outsider explanation in Graph 3.6. Recall, this approach asserts that shocks to employment of insiders tend to persist. Thus, if this approach is correct we should observe persistence in the level of employment as well as the level of unemployement. The graph shows that EC employment during the 1973-85 period varied quite a bit but did not display a positive or negative trend. This relative stability, however, seems to have ended in 1984. Aggregate employment has expanded at a robust pace since then. Graph 3.7 breaks down aggregate EC employment into male and female employment. Here we see that male employment appears very clearly to be subject to hysteresis. Female employment, on the other hand, appears to have expanded at a fairly steady rate. Lastly, note that male employment is the mirror image of the aggregate unemployment rate.

GRAPH 3.3: EC unemployment rate
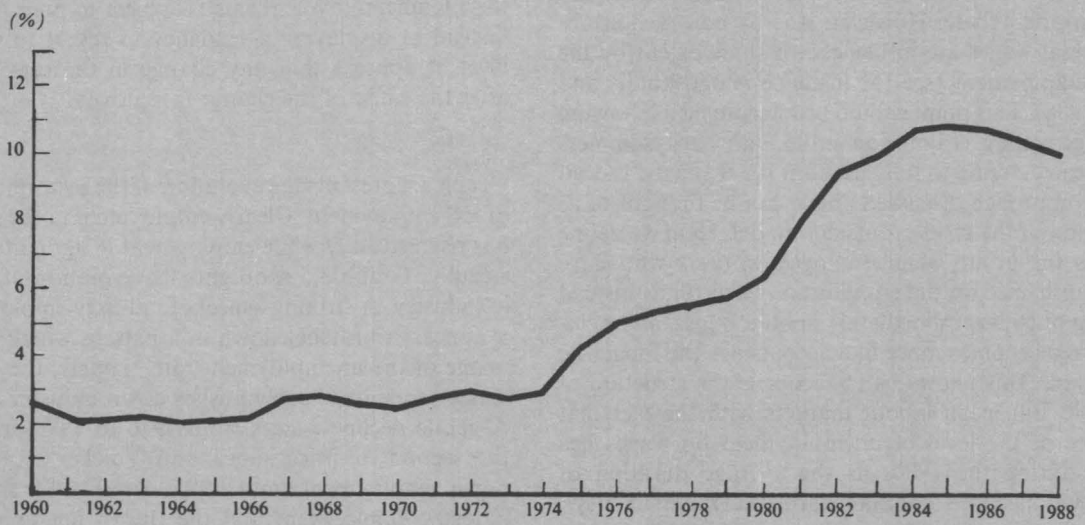
GRAPH 3.4: Evolution of employment by sector

(1970 = 100)

— Industry   — Agriculture   --- Services
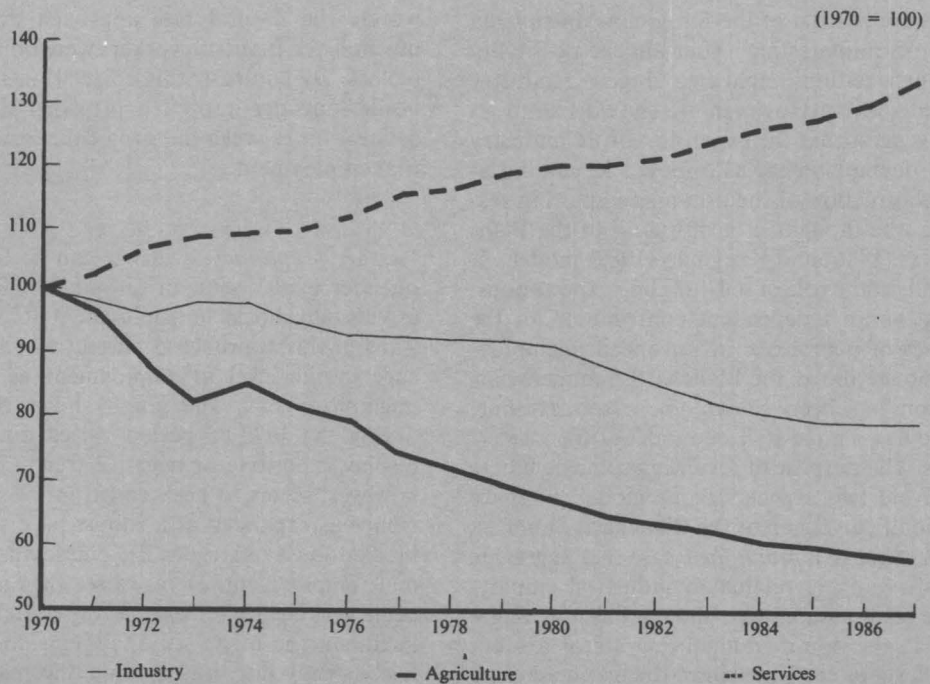
GRAPH 3.5: EC employment in industry

(in millions)
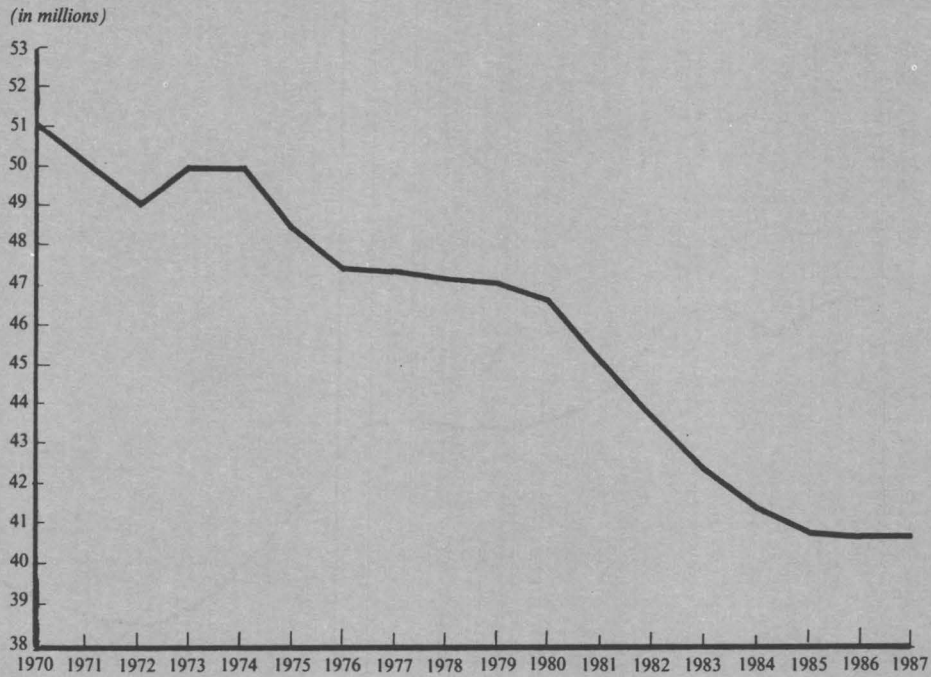
GRAPH 3.6: EC employment and unemployment

— Employment   — Labour force
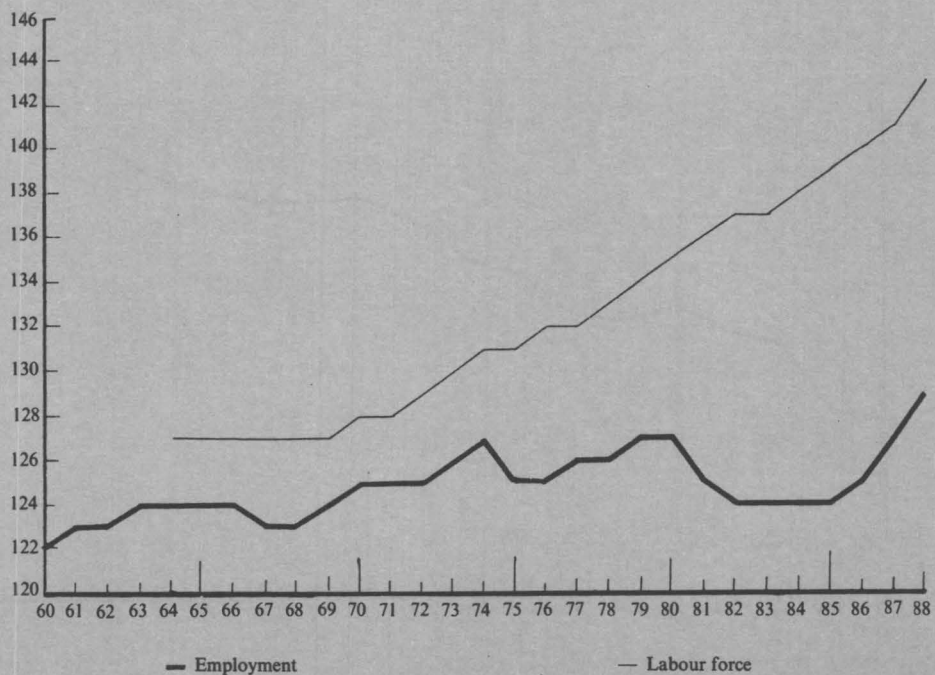
GRAPH 3.7: **Male and female employment**

(in millions)

Male employment

(in millions)

Female employment

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987
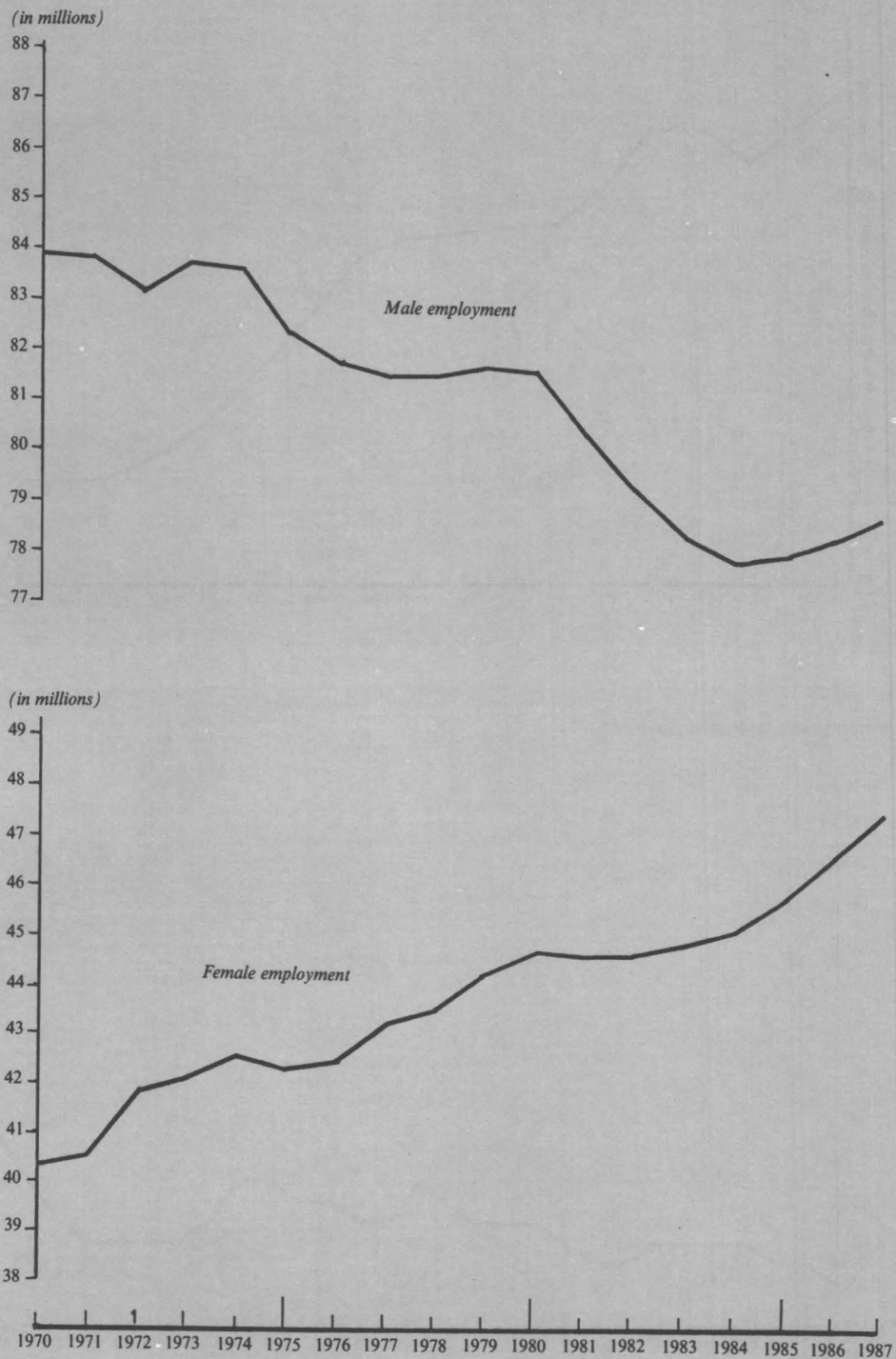
Graphs 3.8 and 3.9 examine the correlation between sectorial employment and aggregate unemployment in the four largest EC Member States. As Graphs 3.8a and b demonstrate that German and British industry employment declined in the early 1980s but flattened out around 1984. Graphs 3.8c and d show that German and British registered unemployment is roughly the mirror of industry employment. The contrast between the German-British and French-Italian cases provide further weak evidence for the link. Graphs 3.9a and b show that, unlike the German and British cases, the decline of French and Italian employment in industry during the early 1980s has continued unabated in the mid- and late 1980s. Graphs 3.9c and d show that the rise in French and Italian registered unemployment in the early 1980s also continued into the late 1980s. Data from the other EC Member States evince this same pattern. In summary, a look at individual country data provides some evidence that there is a negative correlation between industry employment and aggregate unemployment.

Lastly, note that in all four countries the evolution of non-manufacturing employment suggests it is not influenced by the level of manufacturing employment.

4.3. An illustrative model of the dynamics of unemployment hysteresis

Consider now a set-up with two sectors as in the Krugman-Matsuyama model. However, we now suppose that the real wage in each sector is set by sector-specific insider groups. The technology in the non-manufacturing sector is time-invariant and therefore the employment dynamics look the same as in the original Blanchard-Summers model, i.e. a random walk with drift. The technology in the other sector is not fixed out of steady state, however, due to the role of external economies, i.e. a rise in industry employment will raise the sector's labour productivity. This changes the trade-off faced by the sector's insider groups, permitting a higher probability of employment for any real wage, or a higher real wage for any given probability of employment. Furthermore, we maintain the many firms, many unions (i.e. insider groups) setting discussed in Blanchard and Summers. Thus, each union and firm in industry takes the current period industry employment and therefore productivity level as given. In other words, the industry insider groups do not internalize the externality.

Blanchard and Summers assume a stochastically inelastic labour supply. That is, they make assumptions that ensure an anticipated increase in productivity is entirely reflected in real wages, leaving unchanged expected employment and therefore the probability of insider employment. They make the point that this assumption of a stochastically inelastic labour supply is the opposite of that used by McDonald and Solow (1981), who impose a rigid real wage so that the labour supply curve is perfectly elastic. In our model we assume that this elasticity is somewhere between the two polar cases. With this assumption, an increase in productivity is not wholly absorbed in higher real wage demands. Rather, insiders divide any productivity gain between a somewhat higher probability of employment and a higher real wage. The importance of this assumption is it allows the level of employment to rise with productivity. Since the insider-chosen real wage rise does not entirely absorb the productivity gain, firms will hire more workers in response to an anticipated productivity gain. Of course, external economies implies that industry productivity rises with industry employment. Thus, we have established a formal link between expected and actual changes in employment in manufacturing (Appendix 2 works out this link in detail).

With all this on the drawing board we are ready to address the interaction of expectations about the future of EC manufacturing and aggregate unemployment. The non-manufacturing sector is a 'pure' Blanchard-Summers sector; aggregate unemployment does not concern non-manufacturing insiders and so does not affect the real wage. Consequently non-manufacturing employment evolves according to a random walk with drift. Employment in manufacturing, however, is affected positively by expected productivity gains. Due to external economies, expected productivity changes depend upon total employment in the sector. This is where expectations can become self-fulfilling. If industry insiders and firms believe that the EC industry will expand, they expect productivity to rise. In reaction they choose a real wage which only partially absorbs the gain, leading firms to hire more workers and thereby validate the initial beliefs about employment expansion and productivity gains. On the other hand, if they expect industry employment and thereby productivity to fall, they set real wages at a level that does not fully offset the loss, so employment and productivity actually do fall. What we have not done is work on the explicit dynamics of the interaction between insiders' expectations of productivity gains, and the resulting real wage setting and employment.

Putting these two pieces together implies that employment in industry will move as the mirror image of aggregate unemployment. Employment in non-manufacturing evolves without regard to industry employment or aggregate unemployment. Any change in manufacturing employment is therefore directly reflected in the aggregate unemployment rate. We argued that due to external economies, manufacturing employment could be affected by expectations about the future course of the manufacturing employment. Indeed, if the conditions of the Krugman-Matsuyama framework are met, expectations could be self-fulfilling.

GRAPH 3.8a: **Employment by sector in the FR of Germany**

(1980 = 100)

124
122
120
118
116
114
112
110
108
106
104
102
100
98
96
94
92
90

1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987

□ Agriculture   + Industry   ◇ Services
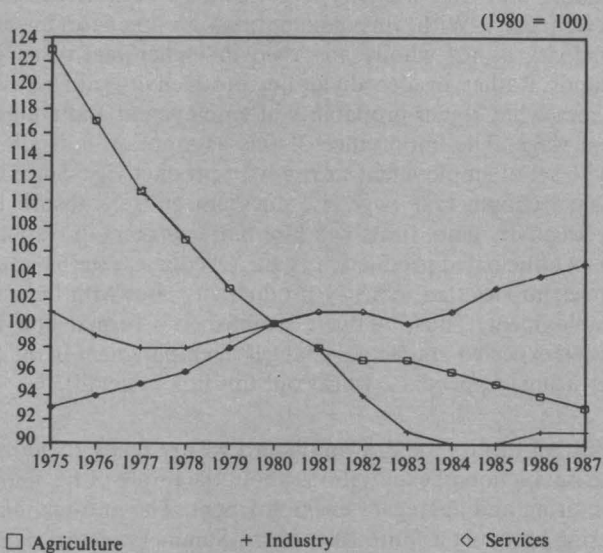
GRAPH 3.8b: **Employment by sector in the United Kingdom**

(1980 = 100)

112
110
108
106
104
102
100
98
96
94
92
90
88
86
84
82
80
78

1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987

□ Agriculture   + Industry   ◇ Services
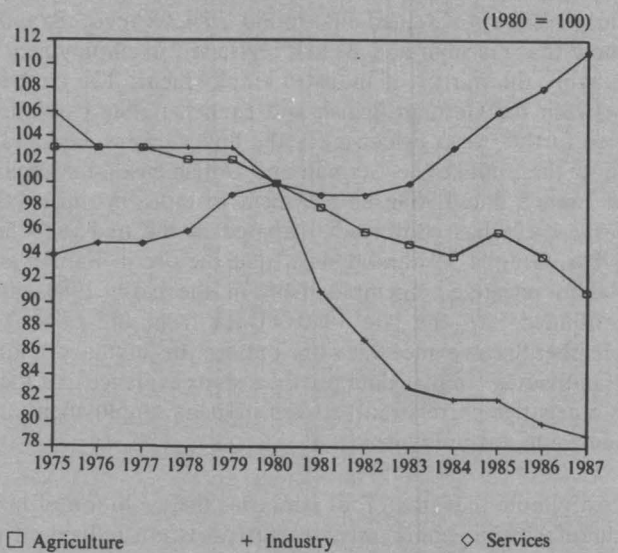
GRAPH 3.8c: **Registered unemployment in the FR of Germany**

(1980 = 100)

300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90

1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988

□ Male   + Female
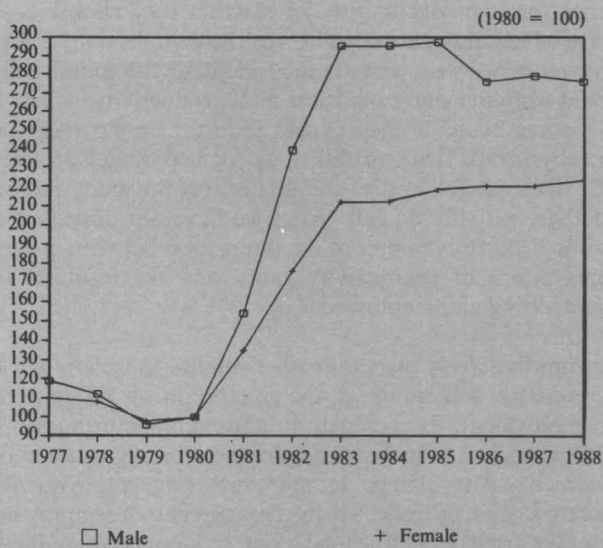
GRAPH 3.8d: **Registered unemployment in the United Kingdom**

(1980 = 100)

220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70

1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988

□ Male   + Female
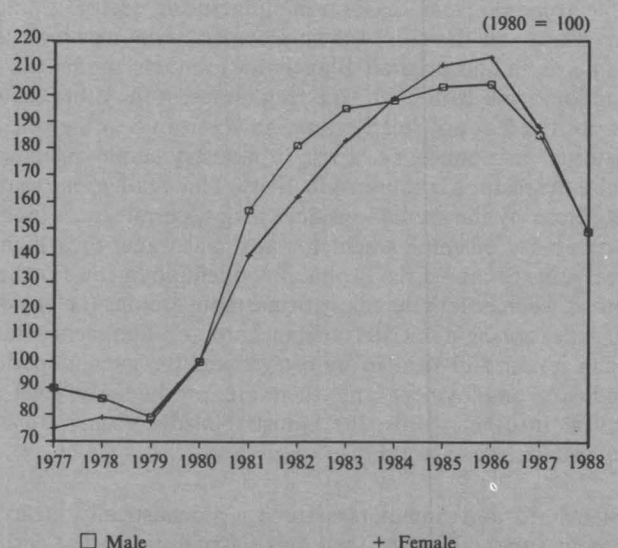
GRAPH 3.9a: **Employment by sector in France**

(1980 = 100)

□ Agriculture   + Industry   ◇ Services
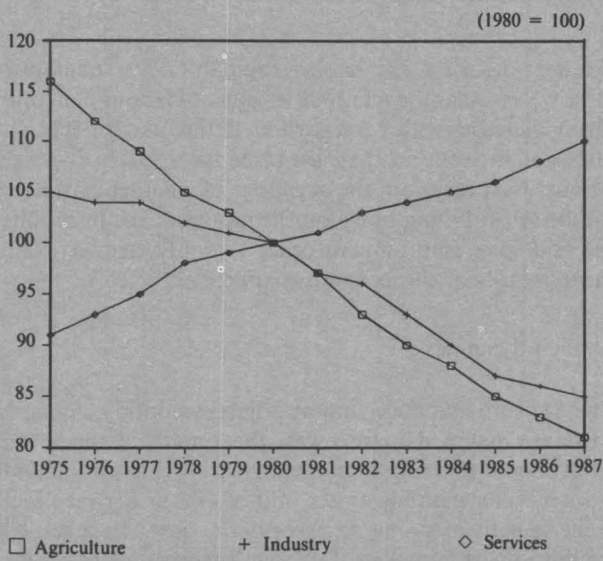
GRAPH 3.9b: **Employment by sector in Italy**

(1980 = 100)

□ Agriculture   + Industry   ◇ Services
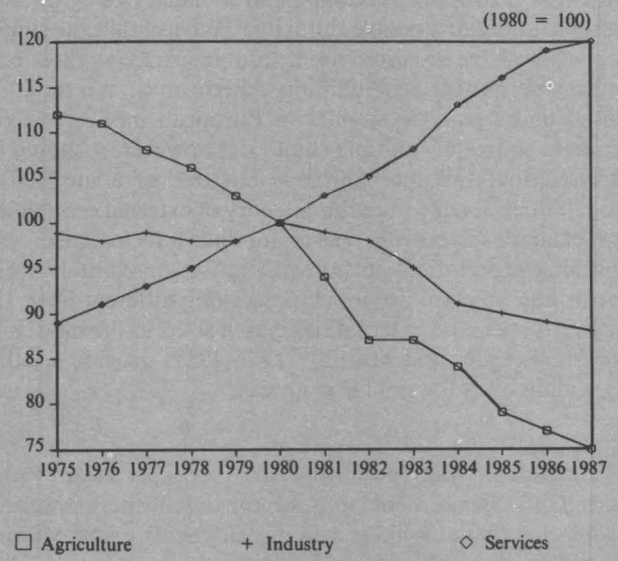
GRAPH 3.9c: **Registered unemployment in France**

(1980 = 100)

□ Male   + Female
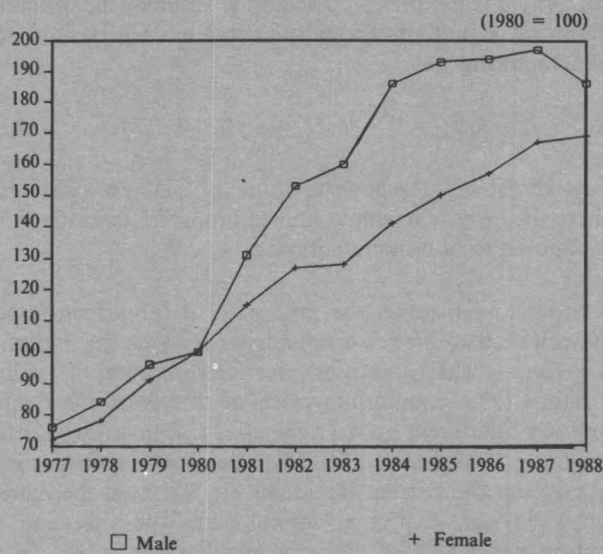
GRAPH 3.9d: **Registered unemployment in Italy**

(1980 = 100)

□ Male   + Female
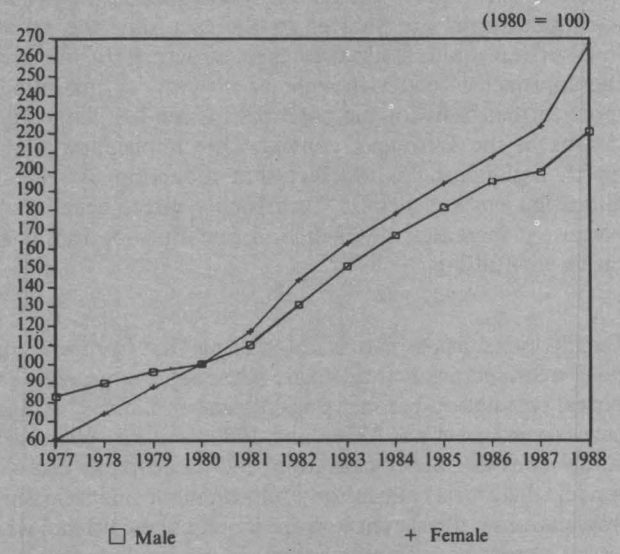
5. Conclusions

Our objective has been to bring some formalism to the idea that 'European economic and monetary integration is important because people think it is'. We feel that the simple models we have discussed are helpful in clarifying the mechanisms permitting self-fulfilling expectations. We have focused on external economies in European industry as the primary source of multiple equilibria; however, it should be stressed that this mechanism is but one of a number of possibilities. Even within the category of external economies, for example, it may be easier for many to visualize self-fulfilling expectations in terms of return on capital investment than on employment choice. Along different lines, the aggregate demand externalities emphasized in the models of Kiyotaki (1988) and Murphy et al. (1989) provide another appealing basis for similar analysis.

While the conditions admitting a role for expectations within Krugman's linear model may appear unrealistic, we want to emphasize that non-linear systems tell a similar story without imposing the less attractive feature that stable equilibria are at the extremes (corners). Perhaps more important, the interval of sectorial allocations within which expectations matter can extend beyond both of the two stable equilibria, providing an independent role for expectations through a much wider and more realistic set of circumstances.

It would surely be going too far to attempt to draw strong policy implications of the above hybrid approach. Any policy implications are subject to the fact that the models involved are quite stylized in their structure. In our view, the approach is better thought of in terms of providing a more formal basis for the potential for self-fulfilling expectations in the European context. One implication that is worth highlighting is the fact that reduction of sectorial allocation costs is helpful both for its direct benefits and because it increases the likelihood that Euro-optimism will prove self-fulfilling.

Finally, our purpose here is not to argue that Europe should push manufacturing at all costs. Although the negative empirical correlation between employment in industry and unemployment over the 1970s and 1980s is clear, association surely does not imply causation. Suffice it to say that our model of sectorial allocation and attendant unemployment implications is consistent with the empirical record and while recent papers have found evidence of external economies in industry, this does not imply that they do not exist in services, or non-manufacturing more generally. Further work remains to be done before these questions can be fully answered.

Appendix 1

A simple exposition of Krugman's model

The text describes the basic Krugman (1989) assumptions. Here we add that the marginal product of labour in manufacturing increases with L_m according to the function $\pi(L_m)$. As discussed in Section 2 there are three steady-state divisions of labour. As it turns out the questions of whether expectations can be self-fulfilling hinge on the nature of the instability of the middle equilibrium. In order to study this we examine the dynamics of this economy explicitly.

Explicit dynamics

These ensure that the economy adjusts smoothly, adjustment costs are assumed to rise with the square of the speed of adjustment, and are parameterized by λ. An individual worker will switch his or her unit of labour between sectors if the benefit of doing so exceeds the cost. As a result the equilibrium movement of labour between sectors will be such that the marginal cost of moving labour (this equals λL_m) equals the marginal benefit of having another unit of labour in the manufacturing sector versus the non-manufacturing sector (this equals q). This condition yields the first of two linear differential equations

$$\lambda \dot{L}_m = q \qquad (A1.1)$$

Formally q is the present discounted value of the difference of having a unit of labour in manufacturing versus non-manufacturing

$$q(t) = \int_t^\infty (\pi(L_m(\tau))-1)e^{-r(\tau-t)}d\tau \qquad (A1.2)$$

However, it is instructive to think of q as an asset price, where the asset is having a unit of labour in manufacturing as opposed to non-manufacturing.

In order to pin down the time path of labour movement between sectors, we must be able to describe the evolution of q. Here is where the asset price interpretation of q comes in handy. The equilibrium price of this asset must make everyone indifferent between the asset and investing at r (see Krugman, 1989, for details). The rate of return on this asset depends on the current 'dividend' (in this case the current $\pi(L_m) - 1$) and expected 'capital gains' (in this case the change in q which of course depends on expected future $\pi(L_m) - 1$). Thus

$$rq = (\pi(L_m)-1 + \dot{q} \qquad (A1.3)$$

Using a first order Taylor expansion of $\pi(L_m)$ around L_m^u where we define β as the derivative of π evaluated at L_m^u (A1.3), yields the second linear differential equation. (A1.1) and (A1.3) jointly describe the evolution of the two state variables q and L_m.

Oscillating and non-oscillating instability

Standard techniques allow us to establish the nature of the local dynamics around the unstable steady state. The eigenvalues of the dynamic system are given by

$$(r \pm (r^2 - 4\beta/\lambda)^{1/2})/2 \qquad \text{(A1.4)}$$

If $(r^2 - 4\beta/\lambda)$ is positive there are two positive real roots, so the steady state is unstable in the manner depicted in Graph 3.A1. By contrast, if $(r^2 - 4\beta/\lambda)$ is negative we get two complex roots with positive real parts, so the system is unstable in the manner depicted in Graph 3.A2. Here the system oscillates as it diverges from the unstable middle steady state. Consider first the case shown in Graph 3.A1 in which expectations cannot be self-fulfilling. Here there is only one possible trajectory corresponding to each current state of the economy (as captured by L_m). Consequently the future course of the economy depends wholly on the current level of manufacturing employment.

Consider next the instability shown in Graph 3.A2. In this case there is a range of L_m over which there is not one, but two possible trajectories corresponding to each L_m. Krugman calls this region the overlap (A to B in Graph 3.A2). For manufacturing employment levels in the overlap region, such as L_m', there is a fundamental indeterminacy in the economy. That is, an individual worker's choice between sectors depends upon his or her valuation of q. This, in turn, depends upon the current and forecast wage differential. Clearly he or she will arrive at different valuations of q using T_m and T_{nm}. A rational worker should use T_m to calculate q if he or she thinks the economy is headed to E_m; he or she should use T_{nm} if he or she thinks it is headed to E_{nm}. Since workers are assumed to be identical, if one uses T_m all will. The result being that the economy will actually follow T_m to the manufacturing equilibrium. This is the crux of self-fulfilling expectations in this model so it bares re-statement. If a worker believes that the economy will end up specialized in manufacturing, he or she should calculate the shadow value of moving into manufacturing (i.e. q) using the solution of equations (A1.1) and (A1.3) that correspond to the path T_m. With homogeneous workers, if one believes the economy will end up at E_m all workers will. Consequently, the collective result of their individual actions will carry the economy along T_m to E_m. These are self-fulfilling expectations.

GRAPH 3.A1: **Krugman's model — Case 1: no role for expectations**
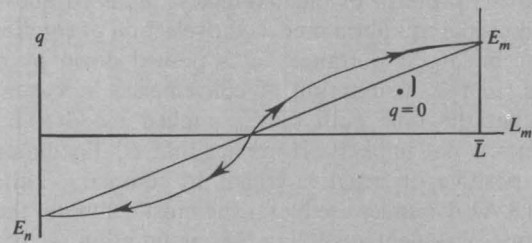
GRAPH 3.A2: **Krugman's model — Case 2: potential role for expectations**
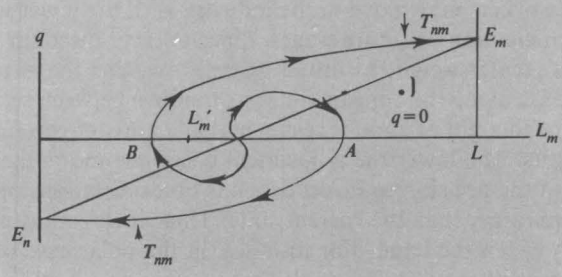
The implications of this are obvious and quite radical. If the economy starts off inside the overlap then even a very small change may alter expectations in a way that drastically alters the structure of the economy. Traditionally, a system only changes due to shifts in the equilibria and adjustment paths caused by a change in the 'fundamentals'. Here a change in expectations could lead to a jump between adjustment paths, even with no change in the fundamentals. Of course there is nothing intellectually novel in the concept of self-fulfilling expectations. What is new here is its crystallization into a formal framework.

This sort of spiral dynamics is not often seen in economics. Nevertheless there is nothing strange or unlikely about it. Most formal models with multiple equilibria either assume that the instability is of the Graph 3.A1 type, or more commonly, focus exclusively on the area around one of the stable equilibria. It is important to note that justification for such an assumption is not based on some well established

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empirical result or some overriding logical argument. *A priori* it is not possible to say whether one is more likely than the other. It is an assumption of convenience. Having assumed away oscillating instability the analyst need not address the problem of indeterminacy discussed above. In many multiple equilibria models the selection of equilibrium is of secondary importance, or is pinned down by other factors, so this assumption of convenience is reasonable. Note that the time path of L_m implied by Graph 3.A2 dynamics is not unlikely. It implies that L_m fluctuates but has a positive or negative trend. In summary, although Graph 3.A1 dynamics are by far the most common, there is no strong argument justifying this assumption — beyond the fact that it is very convenient.

In the simple Krugman model, self-fulfilling expectations are only a possibility if the current L_m lies in the overlap region. The size of the overlap is therefore an important issue. Moreover, intuition for the economics of the problem is boosted by considering the factors that determine the size of the overlap in the Krugman model. The overlap requires that workers may move to the industry with the lower wage in anticipation of future wages. Since a lower discount rate gives greater weight to future wages, it widens the overlap region. Paying the adjustment costs to move between sectors can be thought of as an investment made now to reap future benefits. The lower the adjustment costs, the more likely it is that the decision to invest depends on expectations of the future rather than the current state. Thus, lower adjustment costs widen the band. For instance, in the polar case of no adjustment costs, it is possible that the economy could jump between equilibria due to a change in expectations, i.e. suppose we were at the non-manufacturing equilibrium if workers suddenly expected the economy to move to the manufacturing equilibrium, they will all want to be in manufacturing. If there are no adjustment costs, this could take place instantaneously. Thus, the overlap region is the whole line. Lastly, greater external economies widen the band since again they increase the importance of expectations about the future relative to the current state.

The simplistic dynamics illustrated in Graphs 3.A1 and 3.A2 stem from the linearity of Krugman's model. More particularly, the necessary conditions for the overlap together with its extent might be interpreted as militating against the possibility that expectations do in fact matter. However, the dynamics in Matsuyama's non-linear set-up are much more supportive of a role for expectations. In his model the two equilibria may be less extreme so they are referred to as the low and high manufacturing employment equilibria. Matsuyama shows that for relatively weak external economies of scale, the economy may jump between trajectories even when the initial employment in manufactur-

ing is less than that in the low manufacturing equilibrium. Moreover, no matter how high initial manufacturing employment is, the economy may de-industrialize due to self-fulfilling pessimism. Thus, roughly translating this into the terms of Graph 3.A2, the overlap region in Matsuyama's non-linear set-up covers the entire range of L_m.

Appendix 2

Unemployment hysteresis

In the Blanchard and Summers model, labour demand faced by insiders is described by

$$L = -cw + \varepsilon \qquad (A2.1)$$

where L and w are in logs, and ε is a uniformly distributed shock to labour demand with support $(E\varepsilon - a, E\varepsilon + a)$ that is realized after the union determines the preferred wage level. Given this, a linear approximation of the probability of an insider being employed (or $1 - L_0 + L$), as a function of L_0 and w, is given by

$$p = 1 - \left[\frac{1}{4a} \right](L_0 + cw - E\varepsilon + a)^2 \qquad \text{if } L_0 + cw \geq E\varepsilon - a$$

otherwise $p = 1$ \hfill (A2.2)

We depart from the Blanchard and Summers model in specifying the one-period utility of a representative insider such that labour supply is not perfectly inelastic

$$U = p + f\delta p + bw \qquad (A2.3)$$

where δ is the level of productivity ($E\varepsilon$) and f reflects preferences. Since we are interested in what happens to the employment process when δ changes, as opposed to the ramifications of an arbitrary assignment of its initial level, we begin with the initial condition that $E\varepsilon = 0$. Alternatively, we could specify δ as the change in productivity from its initial level, but this adds no benefit at the cost of more cumbersome notation. To tie into the Krugman set-up as best we can, we specify δ as an increasing function of employment in the industry. However, given that we maintain the many firms, many unions setting discussed in Blanchard and Summers, the unions take the current period productivity level as given. That is, a true externality remains. Under the assumptions that (i) employment implies insider status, (ii) once laid off the probability of being rehired is zero, and

(iii) the utility of being unemployed is zero, the inter-temporal objective function at time 0 is given by

$$U_0 = E_0[(p_0 + f\delta_0 p_0 + bw_0) + \theta p_0(p_1 + f\delta_1 p_1 + bw_1) + \theta^2 p_0 p_1(p_2 + f\delta_2 p_2 + bw_2) + ...] \tag{A2.4}$$

where p_i denotes the probability of being employed in period i and θ denotes the subjective discount factor. Since this problem is intractable due to the dependence of the random variables within the expectation operator, we work with the following objective function in recursive form linearized around p, w, and δ

$$V_0 = (p_0 + f\delta_0 p_0 + bw_0) + (p_0 - \bar{p})\theta\Delta(1 - \theta\bar{p})^{-1} + \theta\bar{p}E_0 V_1 \tag{A2.5}$$

where $\qquad \Delta \equiv \bar{p} + f\delta\bar{p} + b\bar{w}$

We first guess that the maximum value is of the form

$$V_0 = \alpha - \beta L_{-1} + \lambda\delta_0 + \mu(\delta_0 - \delta_{-1}) \tag{A2.6}$$

with the coefficients α, β, λ, and μ to be determined. This expression for V_0 implies that
$E_0 V_1 = \alpha - \beta c w_0 - \beta\delta_0 + \lambda E_0\delta_1 + \mu E_0(\delta_1 - \delta_0)$.
Substitution into the recursive form yields

$$V_0 = (p_0 + f\delta_0 p_0 + bw_0) + (p_0 - \bar{p})\theta\Delta(1 - \theta\bar{p})^{-1} + \theta\bar{p}[\alpha - \beta c w_0 - (\beta + \mu)\delta_0 + (\lambda + \mu)E_0\delta_1] \tag{A2.7}$$

Using the expression for the probability of employment in (A2.2) we can solve for the optimal wage and optimal probability as functions of β

$$w_0^* =$$

$$(1/c)\left[-L_{-1} + \delta_0 - a + \frac{(2a/c)(b + \theta\bar{p}\beta c)}{1 + f\delta_0 + \frac{\theta\Delta}{1 - \theta\bar{p}}} \right] \tag{A 2.8}$$

$$p_0^* = 1 - (a/c^2)\left[\frac{b + \theta\bar{p}\beta c}{1 + f\delta_0 + \frac{\theta\Delta}{1 - \theta\bar{p}}} \right]^2 \tag{A 2.9}$$

where the optimal probability in any period is now a function of the cumulative change in productivity, unlike in the Blanchard and Summers set-up. Using the method of undetermined coefficients, the optimal wage and probability together with Equations (A2.6) and (A2.7) now imply the following value for β (the values of α, λ, and μ are of no interest here)

$$\beta = (b/c)(1 - \theta\bar{p})^{-1} \tag{A2.10}$$

This, in turn, implies the following values for the optimal wage and probability of employment as functions of structural parameters

$$w_0^* = (1/c)\left[-L_{-1} + \delta_0 + a[(2b/c)(1 + \theta b\bar{w})^{-1} - 1]\right] - (2ab/c^2)\Phi \tag{A2.11}$$

and

$$p_0^* = 1 - (ab^2/c^2)[(1 + \theta b\bar{w})^{-1} - \Phi]^2 \tag{A2.12}$$

where $\Phi \equiv \dfrac{\theta\bar{p} f\delta + f\delta_0 (1 - \theta\bar{p})}{(1 + \theta b\bar{w})^2 + (1 + \theta b\bar{w})[\theta\bar{p} f\delta + f\delta_0 (1 - \theta\bar{p})]}$

When $\delta = 0$, $\Phi = 0$ and the solutions above collapse back to the original Blanchard and Summers solutions. For $\delta > 0$, it is easily shown that Φ is both positive and smaller than $(l + \theta b\bar{w})^{-1}$, implying that the optimal probability of employment is higher. Moreover, $dp^*/d\delta > 0$, which drives the employment implications of the model.

Neglecting the drift term of the original Blanchard and Summers solution for employment and defining the white noise shock $\eta_t \equiv \varepsilon_t - \delta_t$, we can describe the employment process as follows

$$L_t = L_{t-1} + (2ab/c)\Phi_t + \eta_t \tag{A2.13}$$

Thus, given the properties of Φ, employment increases with increases in δ, which, in turn, leads to further increases in δ. For a given labour force, increases in Φ induce reductions in unemployment.

References

Alogoskoufis, G. and Manning, A. (1988), 'On the persistence of unemployment', *Economic policy*, Vol. 5, pp. 2-43.

Baldwin, R. (1989), 'The growth effects of 1992', *Economic policy*, autumn 1989 issue.

Blanchard, O.J. and Diamond, P. (1989), 'The Beveridge Curve', *Brookings papers on economic activity*, No 1, pp. 1-60.

Blanchard, O.J. and Summers, L.H. (1986), 'Hysteresis and the European unemployment problem', in: Fischer, S. (ed.), *NBER macroeconomics annual 1986*. Cambridge, MIT Press, pp. 15-78.

Bruno, M. and Sachs, J. (1985), *The economics of worldwide stagflation*. Oxford, Basil Blackwell.

Buiter, W. (1985), 'A guide to public sector debt and deficits', *Economic policy*, 1, pp. 13-60.

Caballero, R. and Lyons, R. (1989), 'The role of external economies in US manufacturing', NBER Working Paper No 3033, July.

Caballero, R., and Lyons, R. (1990a), 'Internal versus external economies in European manufacturing', *European economic review*, June.

Caballero, R. and Lyons, R. (1990b), 'External effects and Europe's integration', CEPR conference volume, *The impact of 1992 on European trade and industry*, forthcoming.

Clark, K., and Summers, L. (1982), 'Labor force participation: timing and persistence', *Review of economic studies*, 49, pp. 25-44.

Coe, D. and Gagliardi, F. (1985), 'Nominal wage determination in 10 OECD countries', OECD Economics and Statistics Department Working Paper 19, March.

Diamond, P. (1982), 'Aggregate demand management in search equilibrium', *Journal of political economy*, 90, October, pp. 881-94.

Diamond, P. and Fudenberg, D. (1989), 'Rational expectations business cycles in search equilibrium', *Journal of political economy*, 97, June, pp. 606-19.

Dornbusch, R. *et al.* (1983), 'Macroeconomic prospects and policies of the European Community', Center for European Policy Studies, Discussion Paper 1. Reprinted in: Blanchard, O., Dornbusch, R. and Layard, R. (eds.), *Restoring Europe's prosperity*, pp. 1-32. Cambridge, MIT Press, 1986.

Drazen, A. (1987), 'Reciprocal externality models of low employment', *European economic review*, 31, pp. 436-43.

Drazen, A. (1988), 'Self-fulfilling optimism in a trade friction model of the business cycle', *American economic review*, 78, pp. 369-72.

Gordon, R. (1989), 'Hysteresis in history: was there ever a Philips curve', *American economic review* (Papers and Proceedings) 79, pp. 220-25.

Gottfries, N. and Horn, H. (1987), 'Wage formation and the persistence of unemployment', *Economic journal*, Vol. 97, No 388, pp. 877-884.

Gregory, R. (1986), 'Wages policy and unemployment in Australia', *Econometrica*, 53 (Supplement).

Hammour, M. (1989), 'Social increasing returns in macro-models with external effects' (Mimeo). Columbia University Department of Economics, November.

Hargraves-Heap, S.P. (1980), 'Choosing the wrong natural rate: accelerating inflation or decelerating unemployment and growth', *Economic journal*, 90, pp. 611-20.

Heller, W.P. (1986) 'Coordination failure, under complete markets with application to effective demand', in: Heller, W., Starr, R. and Starrett D. (eds.), *Equilibrium analysis: essays in honor of Kenneth J. Arrow*, Vol. 2, Cambridge University Press.

Howitt, P. and MacAfee, P., 'Animal spirits' (Mimeo). Canada, MIT and the University of Ontario.

Kennan, J. (1986), 'Comment on hysteresis and the European unemployment problem' in: Fischer, S. (ed.), *NBER macroeconomics annual 1986*, Cambridge, MIT Press, pp. 78-85.

Kiyotaki, N. (1988), 'Multiple expectational equilibria under monopolistic competition', *Quarterly journal of economics*, 103, pp. 695-741.

Krugman, P.R. (1989), History vs. expectations, NBER Working Paper No 2971, May.

Layard, R. and Nickell, S. (1987), 'The labour market' in: R. Dornbusch and R. Layard (eds.), *The performance of the British economy*, Oxford University Press.

Layard, R., Nickell, S. and Jackman, R. (1984), 'On vacancies', LSE Centre for Labour Economics, Discussion Paper 165, August.

Lindbeck, A. and Snower, D. (1985), 'Wage setting, unemployment and insider/outsider relations', Institute for International Economic Studies, Stockholm, Working Paper 344, December.

Matsuyama, K. (1989), 'Increasing returns, industrialization, and indeterminacy of equilibrium' (Mimeo). Department of Economics, Northwestern University, June.

McDonald, I. and Solow, R. (1981), 'Wage bargaining and unemployment' *American economic review* 71, pp. 896-908.

Murphy, K., Shleifer, A. and Vishny, R. (1989), 'Industrialization and the big push', *Journal of political economy,* 97, pp. 1003-26.

Mussa, M. (1978), 'Dynamic adjustment in the Heckscher-Ohlin-Samuelson model', *Journal of political economy,* 86, pp. 775-91.

Phelps, E. (1972), *Inflation policy and unemployment theory.* New York, Norton.

Rotemberg, J. and Saloner, G. (1987), 'A super game theoretic model of price wars during booms', *American economic review,* 77, pp. 917-26.

Sachs, J. (1979), 'Wages, profits and macroeconomie adjustment: a comparative study', *Brookings papers on economic activity,* 2, pp. 269-319.

Sachs, J. (1983), 'Real wages and unemployment in the OECD countries', *Brookings papers on economic activity,* 1, pp. 255-89.

Saint-Paul, G. (1990), The high unemployment trap (MIT Mimeo).

Shleifer, A. (1986), 'Implementation cycles' *Journal of political economy,* Vol. 94, pp. 1161-1191.

Stiglitz, J. (1984), 'Price rigidities and market structure', *American economic review,* 74, pp. 350-55.

Weil, P. (1989), 'Increasing returns and animal spirits', *American economic review,* 79, pp. 889-94.

Part II

Monetary policy and price stability

4. Central bank independence as a prerequisite of price stability

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1. Introduction

A European monetary union (EMU) with a single currency requires that national monetary policies are replaced by a single monetary policy. Accordingly, the Delors Committee has proposed to centralize the formulation and implementation of monetary policy in a new European system of central banks (ESCB). The ESCB is seen by the Delors Committee as an 'autonomous Community institution' that is 'committed to the objective of price stability' but subject to that supports the general economic policy at the Community level.

Among the desirable features of the ESCB which the Delors Committee has listed in its report the status of independence figures prominently. Independence from Community authorities and from national governments is apparently recognized as a prerequisite of price stability. Indeed, there is ample evidence available that the stability performance of a central bank is positively correlated with the degree of relative independence from government (Bade and Parkin (1978), Demopoulos, Katsimbris and Miller (1987), Burdekin and Wohar (1989)). This is also illustrated by Table 4.1 which shows the average CPI-inflation record of five European central banks, measured over longer time periods. For the total period considered, 1960-88, as well as for the much shorter EMS period, 1979-88, we find that more independent central banks have created much less inflation than dependent central banks.

This paper deals with the interconnection between central bank independence and the provision of price stability. If the status of independence is an indispensable prerequisite of attaining and, more importantly, of permanently preserving the stability objective, it follows that the ESCB should be given the full status of an independent institution as was pointed out by the Delors Committee. However, the economic argument applies with the same force to the transition towards EMU. The transition will be greatly facilitated if it develops in stability. This in turn makes it advisable to introduce the institutional feature of central bank independence as early as possible by transforming the national central banks into independent institutions. Such an initiative would be in line with the Delors Report which proposes already for Stage I: 'consideration should be given to extending the scope of central banks' autonomy' (point 52).

The plan of the paper is as follows: Chapter 2 provides a brief review of the main lines of economic thought that suggest shielding central banks from government influence. Chapter 3 develops a set of institutional elements which defines the full status of independence. Chapter 4 examines central bank independence as a device to credibly commit to price stability. Chapter 5, finally, evaluates what difference it will make to the transition process towards EMU if national governments first transform their central banks into independent institutions at Stage I.

2. The political economy of inflation

The history of all countries provides evidence that governments tend to run inflationary policies. This chapter reviews the main lines of economic thought on why governments may have an interest in inflation. It is useful to consider first the various effects of inflation (Fischer and Modigliani (1978), Garfinkel (1989)).

2.1. Effects of inflation

Inflation affects the allocation of resources and the distribution of income and wealth in different ways depending on whether or not it is anticipated and how much uncertainty it generates about relative prices and future inflation.

The most famous effect of inflation is that it generates an additional stream of government revenue by forcing the holders of legal tender to acquire additional amounts of money from the government's central bank in order to preserve the real value of their money balances (Friedman (1971)). Given that currency carries no interest, money-holders are effectively taxed, i.e. they have to give up re-

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Table 4.1.

Average inflation record

		(% p.a.)
Central bank	1960-88	1979-88
Deutsche Bundesbank	3,5	2,6
Schweizerische Nationalbank	3,9	2,9
Banque de France	6,9	7,1
Bank of England	7,9	7,4
Banca d'Italia	9,2	10,8

Source: IMF.

sources in exchange for the additional money balances. In addition to this redistribution effect the inflation tax reduces the resources available for income-generating production. The reason is that inflation induces money-holders to reduce their cash balances to a level which is suboptimal from a social point of view. As a result resources will be wasted through unnecessarily increased transaction costs.

Another redistribution of income from the private sector to government arises from the fact that in most countries income taxes are progressive and non-indexed. This implies that effective marginal and average income tax rates rise automatically with the rate of inflation. With unchanged tax law, therefore, anticipated inflation reduces the after-tax real wage rate earned by labour and the after-tax real rate of interest earned by private savers. This leads to an increase in the natural rate of unemployment and to a reduced flow of real savings. Especially the effect on savings may be quite large; for the USA, Fischer (1981) has estimated that 1% of permanent inflation over a 20-year period effects a loss in real savings of 1 to 3% of GNP.

There are further manifold distortionary effects of anticipated inflation on financial decisions and relative rates of return. They need not and cannot be summarized here because they crucially depend on the precise nature of national tax laws and accounting regulations. Given this diversity, a common positive rate of inflation in the Community will generate differential distortionary effects across member countries.

Unanticipated inflation is another matter to be considered. In the absence of complete indexing, contract prices like wages and interest rates do not compensate for unanticipated inflation. Consequently, unanticipated inflation causes additional welfare-reducing distortions. It redistributes wealth from creditors to debtors and income from employees to employers. This in turn induces agents to invest more resources into the forecasting of inflation and into the search for insurance against unanticipated inflation. More importantly, given that agents are risk-averse, the uncertainty about future inflation, as measured by the conditional variance, induces agents either to require a compensating risk premium or to reduce the exposure to unanticipated inflation by cutting the contract length in labour and financial markets to a minimum. Either response is welfare-reducing because it raises the real cost of long-term investment projects and reduces the scale of real capital formation.

Last but not least, the additional uncertainty generated by inflation-prone policies reduces the information content of relative price changes as signals of changes in relative scarcities and raises the variance of relative prices. Estimates for

Germany suggest that an increase in the relative price variance of 1% induces a decrease in capacity output of about 0,3% (Neumann and von Hagen (1989)).

In sum, the theoretical and empirical literature on the effects of inflation shows that inflation generates a great variety of welfare-reducing distortions. These costs of inflation suggest that governments should abstain from applying the inflation tax. However, the pure theory of optimal taxation (Phelps, 1973) provides a counter-argument: given that direct income taxation generates distortions on its own, it is optimal to combine direct taxes and the inflation tax such that the total level of distortions is minimized. The logic of the argument is indisputable. Its empirical relevance, in contrast, is in question:

(i) to date, economists have only very rough ideas about the order of magnitude of distortionary costs. The available empirical knowledge is much too limited to permit computing the optimal (i.e. distortion-minimizing) rate of inflation with any degree of confidence;

(ii) there is revealed-preference type evidence available from low-inflation countries which suggests that the true optimal rate of inflation hardly exceeds a measured rate of 2%;

(iii) the pure theory of optimal taxation bypasses the question of distributional justice in neglecting the empirical fact that the inflation tax is mainly paid by low-income households who do not have the opportunity or knowledge to economize on cash balances to the same degree as high-income households and companies.

In conclusion, it follows that the provision of price stability is in the public interest.

But given that governments nevertheless adopt inflationary policies, there must be a positive interest in inflation that requires explanation. Economics provides two main answers which are non-exclusive: (a) governments use monetary policy to achieve two goals instead of one, price stability and additional employment. Consequently they try to optimize over both goals: accept some inflation in exchange for some additional employment; (b) politicians are *homines oeconomici* who work in their own interest. They are thus led to adopt policy measures that favour special interest groups at the expense of public interest.

2.2. The inflation/unemployment trade-off

It is commonplace that governments defend the creation of inflation by arguing that some stimulation of the economy is necessary in order to raise employment. The basic idea is that with nominal wages fixed by collective wage agreements,

monetary policy can reduce real wages by raising the price level by more than was anticipated by wage setters. This in turn induces an increase in employment and production above the natural or normal rate.

Although the argument is correct, the Phillips-curve discussion of the early 1970s has pointed out that the argument is incomplete, hence misleading. It leaves out the endogenous adjustment of inflationary expectations. Given the empirical fact that the inflation expectations of labour catch up with actual inflation (Neumann *et al.* (1990)), it follows that there does not exist a stable trade-off between inflation and unemployment. Therefore, a government which creates inflation in order to raise employment will end up in permanent inflation with no lasting gain of employment.

It may be useful to consider the numerical illustration provided in Table 4.2, in which it is assumed that a government tries, on the one hand, to raise employment by creating unanticipated inflation, π-π^e, and, on the other hand, to hold down actual inflation π. The goal function specifies the government's gain G from running such a policy:

$$G = a(\pi - \pi^e) - b\pi^2, \text{ with: } a = 4, b = 0,5 \qquad (1)$$

The employment gain is proportional to the unanticipated inflation and enters the government's goal function with a positive weight, $a = 4$. The inflation target enters the goal function negatively (with a weight of $b = 0,5$) because it reflects a loss, and it is squared because the cost of inflation increases exponentially with π. To simplify the exposition, it is assumed that the government controls the rate of inflation at any point of time by controlling the money stock.

Consider first the alternative states of the economy 1 to 4, given in Table 4.2, where by assumption the public expects zero inflation and sets nominal wages accordingly. If the government meets the expectation, equilibrium state (1), its net gain will be zero; see the last column of Table 4.2. However, by creating unanticipated inflation government can do better. Given the public's expectation, it appears that creating an inflation rate of 4% will be paying; see the economy's state 3. This promises the government a net gain of 8 because the gain from extra employment exceeds by this amount the concurrent loss arising from the cost of inflation. Note that it would be less rewarding for government to choose a higher rate of inflation; compare state 4 with 3.

Table 4.2.

Exploitation of the inflation/unemployment trade-off
Government's goal function: $G = a(\pi - \pi^e) - b\pi^2$ where: $a = 4, b = 0,5$

Alternative states of the economy	Inflation		Government's				Remark
	Expected π^e	Actual π	Gain from extra employment $a(\pi - \pi^e)$	−	Loss from inflation $b\pi^2$	=	Net gain/loss (+) (−) G	
1	0	0	0		0		0	Equilibrium (1)
2	0	3	12		4,5		7,5	
3	0	4	16		8		8	Optimal for $\pi^e = 0$
4	0	5	20		12,5		7,5	
Government chooses $\pi = 4$ but expectations catch up:								
5	3	4	4		8		− 4	
6	4	4	0		8		− 8	Equilibrium (2)
Government tries to run ahead of expectations:								
7	4	5	4		12,5		− 8,5	
8	5	5	0		12,5		− 12,5	Equilibrium (3)

π = rate of inflation; π^e = expected rate of inflation.

However, picking an inflation rate of 4% will not secure an equilibrium because the inflation expectations of the public will not stay put but will catch up. Consequently, the initial gain in employment will be lost and government will end up in an equilibrium where the inflation rate of 4% is fully anticipated and, therefore, monetary policy produces a net loss; see the economy's state 6. Of course, the government might be tempted to escape the unfortunate situation by further pushing up the rate of inflation. But, as can be read from economy states 7 and 8, this would be a non-rational response as it would result in even greater net losses.

Finally, compare the three equilibria: states 1, 6 and 8. They have in common that the government does not achieve a net increase in employment because the rate of inflation is fully anticipated. But the net losses for government differ widely among the three alternative states. It is obvious that under the circumstances government should prefer the price-stability equilibrium of state 1 over all other equilibria. But as Kydland and Prescott (1977) already concluded, there is no way for government to secure this desirable equilibrium, if it keeps its discretionary power over monetary policy.

It is at this point that the application of game theory to macroeconomics comes in (Barro and Gordon (1983)). Suppose government announces a target rate of inflation of zero: if the public believes it, $\pi^e = 0$, the preferred equilibrium state (1) will occur. However, game theory explains why the government's announcement will not be credible. If the public knows (from observed past behaviour) the government's goal function (1), it will understand that government will be tempted to effect an inflation rate of 4% rather than zero inflation because this policy surprise will permit a net gain of 8, provided the public takes the government's announcement of zero inflation seriously. Therefore, the public will distrust the announcement and anticipate instead the equilibrium rate of inflation of 4%. This, in turn, will leave the government no choice but to validate the expectation, in order to avoid additional damage. Consequently, the economy will be locked into the inefficient inflation equilibrium (2) of state 6.

This type of analysis leads to the following conclusions: first, if a government is devoted to the public interest and rational, it will wish to abstain from using monetary policy for artificial stimulation of the economy because it understands that such a policy eventually is welfare-reducing. Second, a government that keeps its discretionary power over monetary policy intact cannot make a credible commitment to stability.

2.3. Economic theory of politics

The economic theory of politics replaces the normative concept of public-interest government, which dates back to Wicksell (1896), by a positive concept that tries to derive predictions of the actual behaviour (Schumpeter (1942), Downs (1957), Niskanen (1971)).

The basic idea is a simple one: given that the economic model of man has proven a forceful model in the explanation of the behaviour of economic entrepreneurs, it may have similar cognitive power when applied to politicians and governmental bureaucracies (Brunner (1975), Neumann (1985)). This means that the behaviour of politicians or governments is not simply to be described by specific preferences and changes thereof but is to be explained under the assumption of constant personal preferences by a changing set of institutional and other constraints of political actions.

The economic theory of politics has many applications. Two main strands are relevant here: (i) the more general theory of a political business cycle (Nordhaus (1975)); and (ii) the specific partisan theory of macroeconomic policy (Hibbs (1977), Alesina (1989)). The fundamental starting point of both approaches is the assumption that politicians behave rationally and try to maximize their own preferences — and not just or exclusively the 'social good'. Both approaches identify the problem of re-election as the major constraint that politicians have to pay attention to in all their actions. Finally, both approaches assume that politicians believe in an exploitable Phillips-curve trade-off, i.e. unemployment can be reduced by raising inflation.

The political business cycle theory deduces the prediction that in order to raise the probability of re-election politicians will try to stimulate the economy before elections by pushing up money growth, advertising special social expenditure programmes, and cutting taxes. After having been re-elected, politicians will switch back to a less-expansionary policy stance in order to fight the inflationary consequences of the pre-election stimulation. This results in a business cycle driven by politics. But note that the emergence of a political business cycle is possible only if voters either are myopic or suffer from some informational disadvantage (Rogoff and Sibert (1988)).

The more specific partisan approach adds a further dimension to the explanation of macroeconomic politics by assuming that the subjective preferences of politicians contain an ideological component: left-wing politicians in comparison to right-wing politicians have a specific preference for less unemployment. For this reason they prefer and produce

higher inflation, when in office, than their political opponents.

It should be noted that for both types of political business cycle theory the empirical evidence collected to date is mixed (Neumann and Lohmann (1987), Neumann (1989)). On the one hand, one finds that the time series behaviour of output, employment and inflation supports the prediction of political cycles at non-impressive significance levels only. On the other hand cross-country studies indicate that there exists a non-negligible number of clear-cut cases where governments have tried to manipulate the business cycle to their advantage.

In sum, it seems that the economic theory of politics makes an important contribution towards the explanation of why and under which circumstances political self-interest drives governments to taking recourse to inflation. The short-run temptation of inflation is threefold: it facilitates the financing of budget deficits, it promises an uncertain, transitory gain in employment, and it may achieve a reduction in the real value of outstanding government debt. The longer-run costs of inflation to society, in comparison, tend to be undervalued by governments because their time horizon is shaped by the comparatively short length of the electoral cycle.

3. Constitutive features of an independent central bank

The typical political constraints of democratic government explain why governments have a natural tendency to take recourse to inflation. If there is political consensus that the objective of price stability is to be given precedence over other economic objectives, there is only one safe solution: government must tie its hands by giving up its discretionary power over monetary policy. This study argues that a credible commitment to the objective of price stability can only be achieved by a constitutional reform that provides the central bank with the full status of autonomy. The proposal of the Delors Committee for the future ESCB recognizes the basic problem but needs to be developed more clearly.

This chapter is devoted to clarifying the status of central bank independence. It reviews and develops a sufficient set of institutional elements which together secure the full status of independence. The following elements or principles will be considered: (i) prohibition of lending to public-sector authorities; (ii) independence of instructions from governmental authorities; (iii) exchange-rate sovereignty; (iv) provisions for personal independence of board and

council members; (v) constitutional rank for the central bank statutes.

3.1. Prohibition of lending to public-sector authorities

There is a broad consensus that the objective of price stability is to free monetary policy from the traditional obligation of having to finance public-sector budget deficits through central bank credit. All major inflations of this century resulted from the misuse of monetary policy as a convenient, 'noiseless' means of government finance. But note that it is not sufficient to provide the central bank with the right to refuse government finance. This would induce the temptation of putting pressure on the central bank to waive its right in a specific situation. The safe solution is to prohibit lending to government under all conditions.

However, it is not sufficient to rule out direct lending only. Outright purchases of government bills and bonds is just another way of contributing central bank money to the finance of government. Unlimited open market operations in government paper, even if they are conducted with the sole aim of implementing a monetary target, interfere with deficit finance, facilitating it at times, hampering it at other times. Unavoidably, this link between open market operations in government paper and deficit finance, though an indirect one, provides an opportunity for political pressure on the central bank.

In conclusion, it is advisable to prohibit the acquisition of government debt in any form. It is to be recognized that foregoing the traditional instrument of open market operations does not reduce the efficiency of monetary policy. Modern techniques of money-supply control, such as lending to the banking system through securities repurchase agreements, permit a much more flexible short-run control of monetary aggregates. This conclusion is based on the favourable experience with repo transactions, which the Deutsche Bundesbank has been conducting on a large scale since 1985 (Neumann (1990)).

Given that repo transactions are usually based on government securities rather than private debt, such as bonds issued by commercial banks, one might argue that such transactions are just another form of contributing to government finance. But this conclusion is not warranted because outstanding repos are liabilities of banks, comparable to discount or lombard loans. What type of securities underlies such loans as collateral is inessential.

Finally, it is to be noted that the traditional instrument of open market operations raises additional problems within the Community frame. Should the future ESCB be permitted

to conduct such operations, as has been proposed by the Delors Committee, the relative prices of the member countries' national debts will be affected depending on the security mix chosen by the ESCB in each operation. It is to be expected that this, in turn, will then generate political demands for constraining the ESCB's open market operations in specific ways. The clean solution of a complete prohibition of public debt acquisition, in contrast, would eliminate the potential for conflict from the beginning.

3.2. Independence of instructions from governmental authorities

Trivially, independence will be lacking if the central bank receives and has to obey instructions from government or other authorities. Therefore, the central bank council or board should be provided explicitly with the undivided authority to decide on the target of monetary policy, on instruments and implementation procedures, on the bank's internal organization, and, last but not least, on the budget.

Formal independence of instructions from government is indispensable. But it does not guarantee factual independence from the government's will if the statutes of the central bank contain an obligation to support general economic policy. An explicit obligation provides government with the right to ask for a more expansionary course of monetary policy at any time, and it makes it very difficult for the central bank not to comply with such demands. Of course, the obligation can be weakened by attaching a modifying clause. For example, in the statutes of the Deutsche Bundesbank it reads: the bank is obliged to support the government's general economic policy 'subject to the preservation of its primary objective' of safeguarding the domestic value of the currency.

It should be noticed, however, that the modifying clause is much too vague to effectively shield the central bank from political pressure for monetary overexpansion. An important empirical aspect to be considered in this connection is the existence of a variable time-lag of monetary policy with respect to measured inflation. Politicians typically neglect this lag and, consequently, argue at times of relative price stability that an increase in the rate of money growth is welfare-improving as it will not endanger (current) price stability but is likely to support full employment. Although the argument is unfounded, it serves its purpose of pressing the central bank to adopt a more easy policy stance.

The monetary history of Germany shows that even the Bundesbank was unable to resist such political pressure at times. Examples are the years 1977/78 and 1985 to 1987. In both cases, the achieved relative degree of price stability was

not preserved because the allegedly harmless stepping up of monetary expansion induced reflation thereafter.

In conclusion, an explicit obligation of the central bank to support general economic policy impairs the status of independence and secures government an inroad on the central bank's primary objective of price stability. A modifying clause does not make a substantial difference. A clean solution is to avoid any explicit obligation. As will be shown below, there is no need for an explicit reminder or tie. An independent central bank will support general economic policy anyway, as long as this is in line with the preservation of domestic monetary stability.

3.3. Exchange-rate sovereignty

The objective of permanent price stability is not necessarily in conflict with exchange-rate stability. But the cumulative evidence since the early 1970s indicates that safeguarding the domestic value of the currency over longer periods of time is possible only if the external value of the currency is permitted to settle at, or gradually approach, its equilibrium value or path. The price stability objective implies, therefore, that the central bank should be provided with the full sovereignty to decide on all exchange-rate matters.

Alternatively, if the central bank were forced by government to permanently fix the exchange rate at some value, it would loose its ability to control the domestic price level over the medium to long run. Monetary policy would then serve to turn the targeted exchange rate into an equilibrium rate by effectively adjusting the domestic price level path to the path of foreign inflation. It is well known that fixing the exchange rate *vis-à-vis* a dominant currency makes an efficient monetary policy for a smaller country provided: (i) its economy responds to world market shocks in a similar fashion to the dominant economy; and (ii) the authorities of the latter keep to a stable monetary path. The experiences with the Bretton-Woods system as well as with the EMS indicate, however, that an adjustment of the exchange rate may be necessary at times, in order to avoid a permanent import of foreign inflation.

The EMS has profited from the fact that exchange-rate adjustments were not simply ruled out from the beginning but have been effected over the 1980s at increasing time intervals. At the same time, the flexibility of the exchange-rate mechanism has suffered from the involvement of national governments in the negotiations of realignments and in decisions on intra-marginal interventions. As a result, the timing as well as the degree of several parity adjustments has been affected by considerations other than economic stabilization. This is not surprising, given that governments

are forced to pay attention to special interest groups like farmers or export industries. But for this very reason it is important that governments hand over to central banks the sovereignty over intervention and exchange-rate matters.

The vision of the final state of EMU implies that the bilateral exchange rates in Europe will be irrevocably fixed with zero margins and that the ESCB will be given the undivided authority over monetary policy. Applying the principle of exchange-rate sovereignty will then mean that only the ESCB should have the right to decide on interventions in support of the European currency *vis-à-vis* the US dollar and the yen. The alternative solution of splitting the responsibility for exchange-rate matters between the Commission and the ESCB has no merits. It would impair the ESCB's status of independence, hence undermine its credibility. The evidence from the United States, where both the Treasury and the Federal Reserve System intervene in foreign exchange markets, is quite telling in this respect.

3.4. Provisions for personal independence of board and council members

The three institutional elements considered so far—prohibition of lending to public-sector authorities, independence of instructions from governmental authorities, and exchange-rate sovereignty—are necessary but not sufficient to constitute the full status of independence. They permit but cannot guarantee that monetary policy will be geared to safeguarding the domestic purchasing power of the currency, if the members of the central bank council or board are lacking the necessary professional competence and/or are dependent on the domestic political process.

As regards professional competence, two aspects are to be considered. First, the central banker must be sufficiently qualified to fulfil his internal duty of controlling the central bank department assigned to him. It goes without saying that the specific qualification necessary depends on the department to be administered, be it accounting, banking, human resources or research.

Second, and more importantly, a central banker must have a sufficient analytical understanding of macroeconomics in general and of the specifics of monetary policy in particular. Lack of macroeconomic competence results in an undesirable dependence on the judgment of other people within or outside the bank. For this reason the design of the eligibility standard and of the selection procedure needs careful evaluation.

A more fundamental issue than lack of professional competence is independence from internal domestic politics. Whether a central banker will act independently of the

political process will to some extent depend on his personal characteristics and specifically on his past involvement in actual politics. It is for this reason that all over the world governments tend to implant into the governing bodies of central banks — as well as in constitutional courts — people of their own political affiliation (Woll (1988)). On the other hand, institutional economics suggest that more important for the actual behaviour of agents than past dependencies are the changed constraints they are confronted with in a new environment. From this it follows that the people appointed to central banks are likely to act independently, if such behaviour promises personal satisfaction rather than disadvantages.

The crucial aspect is incentive compatibility. The modalities of appointment and of contract should be set such that upon appointment the appointee divorces himself from all former political ties or dependencies and accepts the central bank's objective of safeguarding the value of the currency as his professional *leitmotif*. To achieve this effect, incentives must be provided which make it unattractive and unnecessary to leave the central bank before the normal age of retirement. Two special issues have to be considered: salaries and terms of office.

With respect to salaries, it is advisable not to copy the US practice of a remarkably low pay-scale but provide salaries comparable to those received in top positions of the banking industry. Otherwise the risks are that either highly qualified people will not be available or — as is the rule in the USA — that candidates will use the appointment only as an attractive stepping-stone to a better paying position in the financial industry. In the latter case, the desired personal independence of central bankers will not be guaranteed.

Another point in this respect is the question of indexation. Suppose the salaries of board and council members were fully indexed: this would be counterproductive as it would reduce the incentive to avoid inflation. On this consideration, the proposal to fix the salaries of central bankers in nominal terms for the whole term of office has some merits. But note that this implies a fall in the relative wage rate over time, given that wages in the market-place will rise with productivity. Therefore, indexing to the growth of economy-wide productivity would be appropriate.

As regards the duration of the term of office it is obvious that renewable, short-term contracts do not provide the foundations for personal independence. As a guiding principle, the institution of reappointment should be ruled out, in order to avoid the incentive of raising the probability of reappointment by serving special political interests. Moreover, the minimum duration of the single contract should

exceed the normal duration of the political cycle (of four or five years) by a safe margin, in order to avoid giving politicians in office a handle on the majority opinion in the central bank council.

There is no simple criterion available that permits the determination an optimal uniform contract period. However, the age of the candidates has some bearing, in this respect. Suppose the contract duration were set at eight years, as it is the rule in Germany. This would imply that a person who is appointed at the age of 45 years, will have to leave the central bank at age 53. Clearly, most people will not wish to retire that early. Therefore, the arrangement would create the incentive of either campaigning in political circles for a second term or of turning the eight years' service as a central banker into an effective stepping-stone for another career in private industry later on. It follows that a relatively short contract period will hardly promote personal independence. Moreover, there seems to be no reason not to keep people of that age in the central bank council or board by permitting a much longer contract length from the beginning.

These considerations suggest that it is not optimal to set a fixed term of office that applies uniformly but permits reappointment. A more appropriate approach appears to be the fixing of age limits for appointment as well as for retirement. A promising solution is to combine a uniform retirement age with a variable though not unlimited appointment age. For example, for a uniform retirement age of 70 years the appointment age might be set at a minimum of 45 and a maximum of 55 years. Depending on the age of the appointee the effective contract length would vary between 15 and 25 years.

The proposed procedure for appointment provides the institutional cornerstone for personal independence of council and board members. Clearly, the numbers mentioned are less important than the general structure of the solution. Its strength is to be seen in the following characteristics:

(i) it excludes the problematic institution of reappointment;

(ii) it avoids the undesirable incentives associated with short-term contracts;

(iii) it nevertheless provides the necessary flexibility for the choice of candidates by setting a reasonable time-span with respect to appointment age.

Finally, a more specific issue may be considered: the appointments of chairman and of deputy chairman. It is common practice in all countries that chairpersons are selected by the government. This assignment is in line with the basic philosophy of existing monetary constitutions that the cen-

tral bank must be subordinated to government. But under the alternative constitution of central bank independence the traditional assignment looses its force.

There are two lines of thought which suggest that the chairman as well as the deputy chairman should be elected by the central bank council. First, while it is of advantage to provide the members of the central bank council with longer-term contracts of 15 to 25 years' duration, there is no need to appoint one of them to chairman or deputy chairman for his whole term. Moreover, as regards professional competence and reputation a preferable solution to current practice is to have a person first serve some years on the council before he is elected chairman. But this rules out letting the government decide because otherwise hopeful candidates will be induced to lean towards the current government.

Second, given that the council members possess the expertise on monetary policy matters, enjoy personal independence and consequently concentrate on the task of preserving price stability, they will tend to select from their ranks those as chairpersons whom they consider to be the truly *primi inter pares* and who, therefore, in all likelihood will be the best representatives. In contrast to government, the council will take its election decision in disregard of any specific political constellation.

Providing the central bank council with the right to elect the chairman and deputy chairman presupposes that the admissible term of chairmanship, say five to 10 years, is specified in the statutes of the bank. Repeated re-election would not be ruled out.

3.5. Constitutional rank for central bank statutes

In most if not all countries the central bank statutes can be changed by a simple majority in parliament. This implies that even those governments who have to rely on a bare majority can threaten the central bank with a radical change of the statutes when the bank does not comply with its demands. Actually it does not require an explicit threat, the mere possibility may be sufficient to induce the central bank to choose a more expansionary monetary stance than is compatible with its stability objective.

Therefore, it is advisable to put the statutes of central bank independence on a more safe footing either by writing it into the country's constitution or by providing the statutes with the same rank. The requirement of a qualified majority in parliament, say, of two-thirds, for any amendment of the statutes is the copestone of the full status of central bank autonomy.

4. Central bank independence as a commitment to price stability

This chapter deals with the problem of commitment. It will be argued that the full status of central bank independence is the superior solution to any rule-type or other institutional solution in providing a credible commitment to price stability. This requires first the clarification of the concept of price stability.

4.1. Concepts of price stability

In policy discussions it is seldom spelled out what is meant by price stability. To clarify which concept of price stability may constitute an appropriate norm for monetary policy, consider the following analytical decomposition of the actual rate of change of the price level, denoted by dp:

$$dp = Edp + e + s \tag{1}$$

Edp is the anticipated permanent rate of inflation, and e as well as s represent different types of one-time changes in the price level p. First, there are normally distributed one-time price level changes e which result from normally distributed real and monetary shocks. Typically, the variance of e is comparatively small. This is different with the second type of one-time price level changes, denoted by s. They represent infrequent but relatively large shifts of the price level, caused by real factors, such as an oil-price shock or a change in the rates of turnover and excise taxes.

Equating price stability with price level constancy does not provide a useful norm for monetary policy. First, the norm is not operational. Given that the one-time price level changes, summarized by e, cannot be anticipated and that the central bank cannot affect the price level immediately but only with a variable lag, offsetting measures tend to be counter-productive. But note that price level shocks e may partly be caused by monetary supply surprises. Avoiding such surprises is indicated in any case. Second, the norm invites destabilizing actions in the case of larger one-time price level shifts s. Consider the famous example of an oil-price shock. A larger jump in this relative price will raise the supply price of output and reduce output and employment for unchanged aggregate demand. Undoing the induced price level increase by contracting the money supply would reduce aggregate demand, hence further contract production and employment. There are no merits in trying to offset price level effects induced directly by one-time shocks s. This is even more obvious in the case of purely tax-induced price level changes.

From these considerations it follows that monetary policy should be guided by a price stability norm which sets the expected permanent rate of inflation at zero

$$Edp = 0! \tag{2}$$

and avoids unnecessary noise in the supply of base money.

4.2. Credible commitment to zero-inflation

There is wide agreement among macroeconomists that under real world conditions central bankers have no device to make credible (i.e. binding) policy commitments (Persson and Tabellini (1989)). If they announce that they will hold on to a path of monetary expansion compatible with an expected zero-rate of permanent inflation, this announcement will not be credible, no matter how serious about it they are *ex ante*. The public knows from past experience that, after it has settled for a wage agreement, the opportunity set of central bankers has changed in their favour, giving them the incentive to create an inflation surprise, in order to achieve a transitory employment gain (see Section 2.2 above). Consequently, the public will not believe in the announcement but anticipate a positive rate of inflation, and this in turn will force the central bank to validate the inflation expectation in order to avoid a recession.

This unfortunate state of affairs induced monetarist economists to favour subordinating monetary policy to a coercive money supply rule. The basic idea underlying the rules debate is that the time-inconsistent behaviour of central bankers is to be eliminated by taking away from them the power of discretion. Since Friedman's famous proposal of a k-percent rule, several alternative monetary rules have been proposed. All of them were designed to tie the hands of central bankers so that future monetary policy becomes predictable.

However — and this is crucial — none of these coercive rules guarantees an expected zero-rate of permanent inflation. The reason for this is simple: any trend change in the velocity of money or in the normal supply of output would require a timely amendment of the rule, in order to keep the permanent rate of inflation to the intended zero path. But permitting such amendments invites political abuse, especially if a cut-back in the trend growth of output supply is diagnosed. The danger of any amendment is that it will be used to set aside the objective of price stability.

To sum up, coercive rules for monetary policy cannot satisfactorily solve the problem of credible commitment to the objective of price stability. At this point it is useful to recall what causes the commitment problem. It is the obligation

of government-dependent central banks to achieve two macroeconomic goals, price stability and employment stabilization, although they have only one instrument at their disposal, the base money supply.

A credible commitment to the objective of price stability in the sense of the game-theoretic term of binding precommitment presupposes an institutional setting which predicts with a probability of (almost) one that the objective will be attained over an indefinite future. This implies that the institutional setting must provide central bankers with the ability as well as with the incentive not to permanently deviate from a monetary expansion path that keeps permanent inflation at the zero value. It remains to be shown that a central bank which enjoys the full status of independence *vis-à-vis* government fulfils both conditions.

Consider first the question of ability. There are two aspects to this question. The first is freedom of action. Given the institutional elements discussed in Section 3 above, the independent central bank will be an authority of its own. It can neither directly nor indirectly be forced to stimulate the economy at the expense of the price stability objective. The second aspect is technical ability. In contrast to the mechanics of any coercive rule, the independent central bank can readily take account of any trend changes in velocity or output supply. Technical errors may be made. But corrective action will be taken the moment errors are diagnosed, provided the set-up is incentive compatible.

Incentive compatibility is given if the central bankers cannot increase their payoffs by deviating from the path of monetary stability. The payoffs consist of a pecuniary and a non-pecuniary component. The pecuniary component is the salary. Given that central bankers' salaries will not be indexed to inflation, they will suffer a rising loss in personal real income if they permit permanent inflation. Hence they will have a pecuniary disincentive in creating inflation.

The non-pecuniary component of the payoff is social image and power. Both will suffer if there is permanent inflation. The independent central banker's job is safeguarding the internal value of the currency. Not to live up to this indicates lack of professional competence or irresponsible behaviour, or both; hence, it is image reducing. As can be read from the history of the Deutsche Bundesbank, the aspects of image and power are closely interrelated. The power provided to central bankers by the full status of independence will be fully utilized and maintained only by executing the policy of price stability against the special interests of organized interest groups and government. To deviate for a relevant period of time from the stability path is power reducing, as it induces expectations of inflation which will make it difficult to return to price stability.

In sum, the status of independence provides central bankers with the ability and the incentives to avoid permanent inflation. In comparison to any other existing or proposed institutional solution only the status of independence constitutes binding precommitment to a zero rate of permanent inflation. For this reason, special sanctions, such as loss of pension in case the permanent rate of inflation exceeds a specified threshold (Vaubel (1989)), appear to be unnecessary.

Finally, it is appropriate to consider the logical possibility of deflation. At the surface it seems that independent central bankers may be tempted to create a permanent rate of deflation in order to raise their personal income in real terms. That would clearly be an undesirable situation because, similarly to inflation, deflation is welfare reducing.

But in fact, the setting of independence does not create a net incentive for central bankers to enforce deflation because that would reduce the probability of remaining in office. While inflation redistributes income from the private sector to government, deflation generates continuous losses of government revenue. By driving agents into lower income tax brackets, it reduces progressively the revenue from income taxation and lowers the normal flow of seigniorage from disbursed central bank profits.[1] For this reason, in contrast to inflation, even moderate deflation would immediately raise strong opposition from all factions in parliament. Rational central bankers will not ignore this. They will take into account that deflation is likely to generate a qualified majority in parliament which has the power to change the central bank statutes, hence to stop the policy of deflation and to eventually dismiss the central bank council.

To sum up, it is safe to conclude that the status of independence is a solution which reliably sets the incentive to avoid inflation as well as deflation.

5. Central bank independence and EMU

This study has tried to provide the theoretical underpinning for the solution proposed by the Delors Committee for the ESCB. The study establishes that providing a central bank

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[1] Given that the independent central bank does not acquire government debt in any form, government receives seigniorage only through profit disbursement (Klein and Neumann (1990)). Provided the bookkeeping and accounting rules are fixed in the statutes of the central bank, profit disbursement to government does not impair the bank's status of independence. It is beyond the purpose of this study to develop a schema for the distribution of the ESCB's disbursed profit to the governments of the member countries. But it seems that the distribution should be proportional to the member countries' shares in the ESCB's capital.

with the full status of autonomy solves the precommitment problem. Complete independence is the only institutional solution to generate among citizens the necessary trust and expectation that price stability will be kept over an indefinite time horizon. The study has also discussed extensively the set of necessary elements which together define the full status of independence. Finally, it has pointed out major aspects that will need further elaboration, in order to achieve an institutional design for the ESCB that sets the right incentives.

The most important issue that will need re-examination is the formulation of the mandate. The Delors Report has proposed that 'the system should support the general economic policy set at the Community level by the competent bodies' subject to the objective of price stability (point 32). For reasons explained above, writing this mandate into the statutes of the ESCB will discredit the credibility of the solution, hence generate the expectation of permanent inflation for the final stage of EMU.

It is advisable to avoid an explicit legal obligation on the ESCB of having to support general economy policy. The decision to do without it might be facilitated by the consideration that an explicit obligation is neither operational nor necessary. It is not operational, given that the views on whether a demanded action will damage the price stability objective or not may easily differ. In that event the obligation will not be enforceable, and any public quarrelling with the ESCB will only aggravate the situation by inducing expectations of reflation. On the other hand, if the central bankers share the government's diagnosis that a certain action will not damage the preservation of price stability, they will adopt it anyway.

Independence is not to be equated with irresponsible behaviour. The conjecture to the contrary has no empirical backing. There is no evidence available that the more independent central banks have behaved in a less responsible fashion than government-dependent central banks. On the contrary, the evidence suggests that their policies have been more conducive to stable economic growth than those of most other central banks.

A closely related issue is accountability. Apart from the unquestionable aspects of orderly auditing and regular reporting in the form of monthly and annual reports, there is no need for additional institutionalized procedures of political accountability. The principle of democracy is to require any institution that makes political decisions to defend its performance in parliament. A political decision is to decide on a trade-off between conflicting political objectives. But the independent central bank would be committed to only

one objective, i.e. price stability. Hence the bank will not decide on political issues but take technical decisions with respect to achieving this single objective.

It is also useful to compare the US practice, where the chairman of the Federal Reserve System has to appear in parliament on a regular basis, with the German practice, where this is not required. There is no evidence that the US practice has promoted the Federal Reserve System's stability performance in any significant way. On the contrary, the procedure gives an incentive to politicians to try to use it as a back door towards regaining political influence on the conduct of monetary policy.

Given that the full status of central bank independence provides the best solution for a single monetary policy in the final stage of EMU, it is natural to ask whether the transition towards the final state could be significantly facilitated by providing the status of independence to the existing national central banks at an early stage of the transitional process. Recall that the Delors Report (point 52) has suggested to consider this option at Stage I of the process towards EMU.

To examine this question it is useful to spell out necessary conditions for entering the final stage of EMU. The replacement of national currencies by a European unit or their bundling by means of an irrevocable locking of exchange rates presupposes, first, that the national rates of inflation have converged. In the absence of this condition, the bundling of national currencies would subject those economies to an adjustment shock whose rate of inflation has not converged to the Community mean. Secondly, the common rate of inflation must be close to zero in order to assure the electorates of all member countries that entering the final state of EMU is worth the loss of sovereignty with respect to their own currency and will not lead to permanent inflation.

The alternatives for achieving these conditions in the transitional process are: (i) a centralized coordination of national monetary policies by the Committee of Central Bank Governors, as sketched by the Delors Report for Stage I of the process towards EMU; and (ii) the parallel, competitive stabilization of the currencies by independent national central banks.

In principle, the solution of centralized coordination can achieve the desired result, provided the most independent central bank is permitted to set the necessary path for achieving price stability and provided the other central banks are authorized by their governments to fall in line with that path. The approach is well known from the early 1980s. Its central feature is that the more dependent central banks can

borrow credibility from the most independent bank. This facilitates the process towards stability by guiding the public's uncertain expectations and by reducing the cost of adjustment.

However, the success of the approach depends crucially on the condition that credibility is kept intact. And this will be difficult to achieve because in all countries involved the public will keep some scepticism. While the public of a country with a government-dependent central bank will put some probability on the expectation that its government will try to exploit the borrowed credibility after an initial period (Backus and Driffill (1985)), the public of the country with the most independent central bank will put some probability on the expectation that its central bank will validate such violation of the coordinated move towards stability to a certain degree by raising the group's expansion rate.

The less than complete credibility of the coordination approach makes it essential that each government-dependent central bank moves continuously in tandem with the path-setter over the whole adjustment period. If during the stabilization process one or the other central bank is forced by domestic political events to deviate from the path towards stability, the whole approach is endangered and may easily break down. The reason is that by deviating a dependent central bank validates the public's scepticism, hence loses the borrowed credibility. This, in turn, has negative feedback effects on the other group members, given unchanged exchange-rate parities. The lessons of the 1980s in this respect are that most European governments are not prepared to accept for a long period of time that monetary policy focuses on achieving and preserving price stability. This explains why the EMS's energetic move towards stabilization has come to a complete stop during recent years.

Consider finally the alternative solution to achieving the necessary conditions for entering the final stage of EMU: the parallel stabilization of the currencies by independent central banks. Suppose Europe's national governments or parliaments would grant their central banks the full status of independence in the near future during Stage I of the process towards EMU. By this very reform, each country would establish precommitment to the objective of price stability. Consequently, it would enable each national central bank to initiate a credible monetary path towards price stability, the precondition of entering the final stage of EMU. The parallel move of national monetary policies would be promoted by the exchange of information and by discussion in the Committee of Central Bank Governors. Major conflicts would not arise because no national central bank could be forced by the domestic political process to deviate from the appropriate monetary path.

The principal advantage of this alternative approach is to be seen in the fact that it does not have to rely on the uncertainties of borrowed credibility. It would not be troubled by speculative attacks. On the contrary, the institutional reform would provide the public with the necessary trust that the announced drive towards stability will not be stopped or even reversed at some future date. This, in turn, will make the adjustment process much smoother and, at the same time, will permit it to speed up. Consequently, under this alternative approach the costs of adjustment will be much lower for all member countries, and the transition towards the final stage of EMU will be considerably shorter.

It may be tempting to settle for a halfway house, such as providing the members of the EC Committee of Central Bank Governors with a status of personal independence but leaving the statutes of the national central banks unreformed. However, this would not yield a credible and workable solution. Independent monetary policy requires independence at all stages, from the formulation of monetary targets to daily implementation in money and foreign-exchange markets.

To sum up, precommitment is essential to achieving the objective of permanent price stability. It can only be established by providing the full status of independence to the central bank. From an economic point of view, this is the appropriate solution for the ESCB. At the same time, it provides the most efficient solution for organizing the transition towards the final stage of EMU. In addition to facilitating the transitional process, the early provision of independence to Europe's national central banks would act as a trust-creating signal of the European governments' seriousness about transforming Europe into a zone of permanent monetary and economic stability.

References

Alesina, A. (1989), 'Politics and business cycles in industrial democracies', *Economic policy,* No 8, pp. 55-98.

Backus, D. and Driffill, J. (1985), 'Inflation and reputation', *American Economic Review,* No 75, pp. 530-538.

Bade, R. and Parkin, M. (1978), 'Central bank laws and monetary policies: a preliminary investigation — the Australian monetary system in the 1970s', Monash University, Clayton, Australia, pp. 24-39.

Barro, R. and Gordon, D. (1983), 'Rules, discretion and reputation in a model of monetary policy', *Journal of Monetary Economics,* No 12, pp. 101-122.

Brunner, K. (1975), 'Comments on the demand and supply of inflation', *Journal of Law and Economics,* No 18, pp. 837-857.

Burdekin, R.C.K. and Wohar, M.E. (1989), 'Monetary institutions, budget deficits and inflation: empirical results for eight countries', working paper, University of Nebraska-Omaha.

Cukierman, A. (1989), 'Discretion, precommitments and the prospects for a European Central Bank — Fixed parities versus a commonly managed currency', discussion paper, Jerusalem.

Demopoulos, G.D., Katsimbris, G.M. and Miller, S.M. (1987), 'Monetary policy and central bank financing of government budget deficits: a cross-country comparison', *European Economic Review,* No 31, pp. 1023-1050.

Downs, A. (1957), *An economic theory of democracy,* Harper and Row, New York.

Fischer, S. (1981), 'Towards an understanding of the costs of inflation: II', in: Brunner, K. and Meltzer, A.H. (eds.) *The costs and consequences of inflation—Carnegie-Rochester conference series on public policy,* North-Holland, pp. 5-42.

Fischer, S. and Modigliani, F. (1978), 'Towards an understanding of the real effects and costs of inflation', *Weltwirtschaftliches Archiv,* No 114, pp. 810-833.

Friedman, M. (1971), 'Government revenue from inflation', *Journal of Political Economy,* No 79, pp. 846-56.

Garfinkel, M.R. (1989), 'What is an "acceptable" rate of inflation?', *Federal Reserve Bank of St Louis Review,* Vol. 71, No 4, pp. 3-15.

Hibbs, D. (1977), 'Political parties and macroeconomic policy', *The American Political Science Review,* No 71, pp. 146-148.

Klein, M. and Neumann, M.J.M. (1990), 'Seigniorage: what is it and who gets it?', *Weltwirtschaftliches Archiv,* No 125, June 1990.

Kydland, F.E. and Prescott, E.C. (1977), 'Rules rather than discretion: the inconsistency of optimal plans', *Journal of Political Economy,* Vol. 85, No 3.

Neumann, M.J.M. (1985), 'Homo Oeconomicus als Wirtschaftspolitiker', in: Milde, H. and Monissen, H.G. (eds.) *Rationale Wirtschaftspolitik in komplexen Gesellschaften,* Verlag W. Kohlhammer, Stuttgart, pp. 129-136.

Neumann, M.J.M. (1989), 'Comment on politics and business cycles in industrial democracies', *Economic Policy,* No 8, pp. 90-92.

Neumann, M.J.M. (1990), 'Implementing monetary policy in Germany', in: *Monetary aggregates and financial sector behavior in open economies,* Federal Reserve Board, Washington DC.

Neumann, M.J.M. and von Hagen, J. (1989), 'Conditional relative price variance and its determinants: open economic evidence from Germany', working paper, Bonn.

Neumann, M.J.M. and Lohmann, S. (1987), 'Political business cycles in industrialized democratic countries: a comment', *Kyklos,* No 40, pp. 568-572.

Neumann, M.J.M., Schmidt, R. and Schulte, E. (1990), 'Determinants of contract wages in Germany', *European Economic Review,* No 34.

Niskanen, W.A. (1971), 'Bureaucracy and representative government', Chicago.

Nordhaus, W. (1975), 'The political business cycle', *Review of Economic Studies,* No 42, pp. 169-190.

Persson, T. and Tabellini, G. (1989), 'Macroeconomic policy credibility and politics', draft.

Phelps, E.S. (1973), 'Inflation in the theory of public finance', *Swedish Journal of Economics.*

Rogoff, K. and Sibert, A. (1988), 'Equilibrium political business cycles', *Review of Economic Studies,* No 55, pp. 1-16.

Schumpeter, J.A. (1942), *Capitalism, socialism and democracy,* New York.

Vaubel, R. (1989), 'Überholte Glaubenssätze', *Wirtschaftsdienst,* No 69 (1989/IV), pp. 276-279.

Wicksell, K. (1896), 'Finanztheoretische Untersuchungen', Jena.

Woll, A. (1988), 'Die Unabhängigkeit der Deutschen Bundesbank muß gesichert werden!', *Wirtschaftsdienst,* No 68, pp. 122-124.

5. Money demand and monetary control in an integrated European economy

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1. Introduction

The removal of capital controls and of barriers to competition in the banking industry will have profound effects on monetary control within the exchange-rate mechanism (ERM) of the European Monetary System (EMS). Indeed, controls on international capital flows and financial intermediaries are crucial determinants of the demand for money in different countries, and as a result large swings in money demands are to be expected in the years to come.

This paper analyses the problems raised by these phenomena, starting with a discussion of the determinants of money demands in an economy, like the European economy, which is characterized by high financial integration and integration of goods markets. Section 2 reviews the classic description of monetary instabilities in a multicurrency economy: Gresham's law and its fiat-currency present-day equivalent.

Sections 3.1 and 3.2 deal with a catalogue of the determinants of the overall demand for money in Europe, and of the distribution of the currency portfolio. This discussion helps identify what kind of monetary instabilities are likely to occur in the future. The main problems of the transition towards a monetary union and the desirability of introducing parallel currencies like the ecu are covered in Sections 3.3. and 3.4., while Section 4 summarizes the paper and provides a few concluding remarks.

The final part of the paper argues that monetary policy coordination in Europe should involve a concerted effort in the foreign exchange markets for the purpose of safeguarding bilateral parities, coupled with an explicit interaction of foreign exchange reserves management with domestic monetary management, to be achieved jointly by all member countries.

2. Gresham's law with fiat currencies

The problems of central banking in an economy characterized by the coexistence of different moneys are classics in the history of monetary theory. One of the best-known propositions in monetary economics, Gresham's law, is a description of instabilities in a bimetallic standard.

According to Gresham's law, 'bad money drives out good'. In other words the less-valued currency substitutes for the more valuable currency in monetary circulation. Indeed, 'good' currencies are supposed to disappear from circulation. There are historical examples of phenomena resembling Gresham's law. For example, in the late 1870s, member countries of the Latin monetary union decided on several occasions to close the mints to the private coinage of silver in response to the decrease of the value of silver relative to gold in the industrial markets, and the resulting drainage of gold from monetary circulation, and of silver from the industrial market.[2]

A question of great relevance for Europe after 1992 is whether some version of Gresham's law could still apply, and what would be the consequence of this instability of monetary aggregates. In addition, it would be desirable to reconcile the predictions of Gresham's law with those of recent proposals for monetary reform in Europe, which are based on the opposite view, that the good currency drives out the bad (see Section 3.4 below).

Gresham's law is the description of the effects of arbitrage between the monetary and non-monetary market. In a bimetallic standard the central bank freely exchanges at a fixed nominal price two metals (say gold and silver) for money. Fixing the nominal value of gold and silver coins means to fix also their relative price. Gold and silver are traded in the non-monetary market (industrial market) as well, where also newly mined ore is originally sold. Equilibrium occurs when the official parity equals the relative price of the two metals in the industrial market.

Consider now what happens when some exogenous shock (say an increase of silver ore production that tends to make silver cheaper in the industrial market and gold more expensive) drives the relative price of the two metals away from the official parity. Private agents would find it profitable to buy gold from the central bank at the official parity and to resell it in the industrial market. This would produce a progressive disappearance of gold from monetary circulation. In other words, the 'bad' money has driven out the 'good'. Could anything like this occur in a world, like Europe after the completion of the internal market, of coexisting fiat currencies?

Since there is no 'industrial' market for the currencies we cannot think of a shock there. There could, however, be a change in their relative valuation associated with a change in their relative monetary services: transactions services and store-of-value services. Suppose, for example, private agents

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[2] See de Cecco (1989).

expect a devaluation to occur over some future horizon: in this case the store-of-value services of a currency increase relative to those of another. Agents would bring the bad currency to central banks in exchange for the good one. The good currency drives out the bad from monetary circulation. The same would occur with a change in transactions services originating, for example, when one currency is increasingly used to make payments, and as a result becomes more acceptable in private transactions (see Section 3.2). Also in this case the good currency would drive out the bad.

Is there an inconsistency with Gresham's law? No. In a metallic standard any increase in the monetary value of a currency would also bring about an increase in its monetary circulation. Suppose for example that, starting from equilibrium, agents expect the official parity of gold will increase. This makes gold more valuable as money than as a commodity. Agents would bring gold to the mint for coinage, in exchange for demonetization of silver coins. When the increase in the monetary price of gold comes about, they will be able to bring it back to the industrial market for a profit. Therefore, an increase in the monetary services of a specific currency increases its monetary circulation both under a commodity standard and under a fiat standard.

The original statement of Gresham's law could be easily misunderstood since 'bad' and 'good' refer to the industrial value of the currencies, not their monetary services. Rolnick and Weber (1988) also recognize the importance of the distinction between the industrial value and the monetary value of currencies. They pointed out that this distinction helps explain why in a number of historical instances Gresham's law could not be verified.

In conclusion, whenever different currencies coexist in an integrated economy, fluctuations of their relative valuation affect their circulation. As Triffin's clairvoyant book warns,[3] however, fluctuations in the use of different currencies can jeopardize, and eventually bring to its knees, a system of fixed exchange rates with free convertibility and international capital mobility. Triffin's argument was based on the observation of the dramatic increase in the international use of the dollar, in spite of an unchanged stock of monetary gold. It should be pointed out, however, that in the Bretton Woods system dollars were not convertible to gold at the mint like in the gold standard. Gold reserves were a means to maintain the public confidence, but they were not necessarily to be used to peg currency values. Hence Triffin's 'dilemma' is a more general parable of the instabilities arising from large fluctuations in relative currency demands that might apply also to the present-day ERM.

In order to understand the problems for monetary management arising from these fluctuations, it is useful to discuss in more detail all the factors behind movements in money demand, with specific reference to the European reality.

3. Money demand and currency substitution

The discussion in the previous section has left money demand unspecified, but has only alluded to transaction services and store-of-value services of different currencies. The purpose of this section is to explore in more detail the transactions and store-of-value services of different currencies coexisting in an integrated economy.

When studying the demand for different currencies coexisting in an integrated economic area one has to immediately appeal to the idea of 'currency substitution', since it is possible for private agents in such an economy to hold different currencies in their portfolios. The fluctuations of equilibrium shares of different currencies in private portfolios are determined, among other things, by the degree of substitutability of these currencies, and this substitutability depends on the differences in transactions and store-of-value services that the currencies provide. It is thus useful to attempt to describe them in detail.

Traditional studies of money demand and currency substitution are, typically, empirical. The methodology of these studies is to determine whether some measures of goodness of fit of money demand equations are improved or affected at all by the introduction of foreign variables, like foreign interest rates or expectations of exchange-rate changes. This method is largely inappropriate in our case. Since Europe will undergo dramatic economic and administrative reforms in the years to come, it is quite likely that the forces affecting the demand for different currencies will also be changing dramatically. Empirical studies of money demand equations by their very nature cannot reveal directly and explicitly these determinants of money demand: therefore they have no use as a guide to understanding its evolution in the years to come. By contrast, it is much more useful to attempt to bring out explicitly the reasons why money is held, and speculate how these determinants will evolve in response to the liberalization of financial markets, the removal of capital controls, and the integration of goods markets.[4]

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[3]   Triffin (1960).

[4]   The alternative method proposed, however, is limited by its own infancy: the analysis sketched out below does not lend itself to sophisticated econometric applications.

Monetary control in Europe will be drastically affected by two classes of factors:

(i) factors affecting the overall demand for money;

(ii) factors affecting the distribution of currency portfolios;

which are discussed in detail below.

3.1. Factors affecting the overall demand for money

In modern market economies money is held for two main reasons. The first is that it facilitates private transactions. Whenever the search for a counterparty with coincident wants is costly, or whenever a counterparty's creditworthiness (or the value of the asset used in the exchange) is costly to verify, money can provide a superior way of organizing transactions. In addition, money provides a common *numéraire*, thus easing the calculation of prices, and it allows to carry value across both time and space.[5] Note that these phenomena justify the presence of a common medium of exchange even in an economy with no externalities (except those created by the costs of finding partners in an exchange) and no government.

The other reason why people hold money is that they are forced to do so by governments. Historically, governments have seized the monopoly of the issue of the medium of exchange to gain an additional source of fiscal revenue. Currently, this monopoly is not seriously disputed (except by a small fringe of economists who believe that market failures do not justify the existence of governments), even though central banks are increasingly using it not to generate fiscal revenue but to ensure stability in financial markets and more broadly in the whole economy. This monopoly is, however, continuously eroded by developments in transactions technologies.

In private transactions, the extent of the use of money is determined by the sophistication of the banking industry, which provides, among other services, transactions services to the public. For example, the more frequently that banks are open, the less cash will individuals have to hold at any point in time to carry out their own transactions. Similarly, the easier it is to reach a bank branch (the higher the geographical density of bank branches), the less idle balances people will hold in their pockets.

In Europe, the forthcoming liberalization of the banking industry, and in particular the ability of banks to compete over the whole territory of the EC, will increase to the maximum competitive pressures, which will also be pressures to provide better transactions services at lower costs. The competition in transactions services will very likely increase, for three reasons:

(i)   since transactions services use mostly computers and networks, the cost of production of these services has dramatically fallen in the recent past;

(ii) the potential for innovation is very large. This can be illustrated by considering how far the stock of money can shrink when the opportunity cost of holding cash increases dramatically. For example, in Israel at the height of hyperinflation (1984 and 1985), the stock of money (IFS line 34) was just 3,9% of GDP; by contrast, in 1985 the stock of money was equivalent to 17,2% of GDP in the Federal Republic of Germany. Indeed, a society where all transactions are cleared by means other than cash is nowadays technologically feasible, and economists have started considering in what ways it could work;[6]

(iii) the recent experience in the United States has shown that competing in transactions services can be very profitable. Money-centre banks like Citibank have created their pre-eminence in the 1970s by exploiting to the maximum the potentials of the 'consumer banking' market.

Among the areas where the banking industry in Europe has not yet fully exploited business opportunities, whose potential is demonstrated by the experience in the United States, are the use of cheques, credit cards, and automatic teller machines (ATMs). Table 5.1 compares European countries with the United States in the use of a number of transactions services that are linked with consumer banking. Panel A show the availability of cash dispensers and automatic teller machines by reporting the number of inhabitants per machine. Except for the UK and, to some extent, France, all European countries in the panel are characterized by much lower availability of ATMs than the United States. Panel B reports the number of cheques issued per inhabitant, and the total value of cheques issued per inhabitant. The difference between the USA and Europe is also quite striking: the number of cheques issued per capita in the USA is 10 or 20 times the number in Belgium or Italy, four times that in the UK and two and a half times that in France. The second column in the panel shows that the average denomination of cheques differs markedly across countries,

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[5] This section will not deal in detail with the services of money as a store of value, since fluctuations in the overall demand for money due to fluctuations in expected store-of-value services (purchasing power) are not likely to be of major importance in the years to come. On the other hand, fluctuations in desired currency portfolios are likely to be affected by expectations of relative store-of-value services, and will be discussed below in Section 3.2.

[6] See, for example, Black (1970).

indicating that their use by households is uneven. Panel C shows the use of credit cards. Here too the difference between the USA and Europe is evidently vast, and gives a strong indication of the potential for the credit card industry in the European Community.

An increased use of cheques will not, of course, proportionately shrink the demand for M1, since cheques are themselves part of M1. It will, however, have two effects. On one side, in the face of a higher stock of circulating cheques, banks should decrease the ratio of (free) precautionary reserves to deposits. On the other side, the possibility of using cheques instead of cash helps households and firms to rationalize their liquid-asset management, leading to lower use of money balances.

The effects of the spreading of ATMs are those already briefly sketched above. Easier access to a bank, including during holidays and weekends, will induce lower holdings of cash balances, and, to a large extent, lower holdings of chequebook accounts. This is facilitated if ATMs offer the widest possible array of services, including transfers across chequebook accounts and other accounts (like brokerage or money market accounts).[7]

Finally, credit cards provide the most obvious, and most successful to date, substitute for cash in transactions. As Table 5.1C has shown, this is the area with possibly the greatest business potential in Europe.

The other reason why private agents hold currency is that they are forced to do so by governments. Governments can induce private agents to hold extra amounts of cash either directly, by requiring the use of cash in certain transactions, and by requiring certain agents to hold cash balances in their portfolios, or indirectly, by limiting the portfolio choice available. The former restrictions in particular are clearly visible in European countries. Among the transactions in which governments prescribe the use of cash there are all transactions with governments themselves. In no country are taxes payable with credit cards, and the payments of taxes or other liabilities to the government account for a very large fraction of total payments. To illustrate this, Table 5.2 shows the annual government receipts in France, Germany and Italy as a percentage of the end-of-year money stock in those three countries. The table shows that the volume of government receipts accounted for as much as

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[7] This observation points to a limitation in the data of Table 5.1A: in countries like Italy, for example, ATMs are available only during regular office hours, are normally located just outside bank branches, and do not perform any operations beyond the withdrawal of cash, allowed only to account holders at the bank owning the machine.

Table 5.1A.

Cash dispensers and ATMs

	Number of inhabitants per machine (1988)
Belgium	11 763
France	4 862
Germany	8 213
Italy	9 958
Netherlands	14 454
United Kingdom	4 108
USA	3 024

Source: Bank for International Settlements, *Statistics on payment systems in 11 developed countries.*

Table 5.1B.

The use of cheques

	Number of cheques (per capita)	Value in USD
Belgium	24,6	35 937,9
France	82,4	49 813,9
Germany	10,0	34 523,0
Italy	12,9	25 990,4
Netherlands	19,0	1 229,0
United Kingdom	53,8	354 070,0
USA	214,6	234 656,0

Source: Bank for International Settlements, *Statistics on payment systems in 11 developed countries.*

Table 5.1C.

The use of credit cards

	Number of payments (per capita)	Value per capita in USD
Belgium	1,0	110,2
France	12,5	3 927,7
Germany	1,0	101,0
Italy	0,3	45,2
Netherlands	—	—
United Kingdom	12,2	789,0
USA	35,7	1 676,0

Source: Bank for International Settlements, *Statistics on payment systems in 11 developed countries.* The numbers for France include direct-debit payments, and are thus not directly comparable. The numbers for the Netherlands are too small.

160 to 170% of the end-of-year money stock in Germany and France, and 70% in Italy. These ratios, of course, would increase substantially if other transactions of the governments which usually require the use of cash were included, and in particular all those transactions connected with the flotation and the servicing of government securities. Finally, to obtain an estimate of the full impact of these transactions on the demand for money it would be necessary to compute statistics of their average velocity — in other words the frequency with which money goes from private hands to the hands of the public sector in the process of tax payments is likely to be much lower than the frequency of money-financed transactions between the government and the private sector in financial markets.

Table 5.2.

Government receipts as percentage of money stock
(Receipts: annual; money stock: end of year)

	France	Germany	Italy
1952-59	64	86	52
1960-69	63	83	45
1970-79	112	164	36
1980-87	158	176	69

Source: International Financial Statistics: government receipts — line 81; money stock — line 34.

A second set of legal restrictions compelling private agents to hold cash balances are those imposed on financial intermediaries to guarantee their liquidity. The most important are of course the reserve requirements of banks. Tables 5.3 and 5.4 report, respectively, the statutory reserve requirements of commercial banks, a breakdown of the monetary base, and a computation of average reserve ratios. The differences across European countries are striking: reserve requirements vary from 0 (Denmark and Belgium) to 25% (Italy).[8] Reserve ratios vary from 0,4% (United Kingdom) to 20,4% (Spain). These reserve requirements crucially affect bank margins: since they decrease the share of interest-yielding assets in bank portfolios, they decrease the interest which banks are able to pay on their liabilities, for given returns on their productive assets.

How will the integration of goods and financial markets affect these determinants of money demand? There is no direct impact, as far as the total demand for money is concerned, on the government transactions. The integration

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[8] Twenty-five per cent of the increase in deposits since 1984.

Table 5.3.

Reserve requirements at commercial banks

(% of demand deposits (mid-1988))

	Reserve requirement
Belgium	0
Denmark	0
France	5,0
Germany	6,6 to 12,1
Greece	7,5
Ireland	10,0
Italy	25,0
Luxembourg	0
Netherlands	15,0
Portugal	15,0
Spain	18,5
United Kingdom	0,5
USA	3,0

Source: Grilli (1989). In Greece, Italy and Spain required reserves are remunerated to some degree. The number for Italy is applied against the increase in deposits since May 1984. In the Netherlands a small, variable, and remunerated reserve requirement was introduced in May 1988. In the USA the ratio increases to 12% on deposits larger than USD 40,5 million.

Table 5.4.

Average reserve ratios, reserves and high-powered money

	High-powered money (% of GDP)	Reserves (% of GDP)	Reserves/ deposits
Portugal	14,8	5,8	5,8
Greece	18,3	8,4	17,3
Spain	19,8	12,3	20,5
Italy	17,5	11,8	18,7
France	6,3	2,0	5,2
Germany	9,4	3,6	6,8
United Kingdom	3,7	0,2	0,4
Belgium	8,2	0,4	1,1

Source: Giavazzi and Giovannini (1989).

of goods and financial markets is not likely to decrease them significantly, and should not exert particular pressures on governments to improve the efficiency of their own cash-management systems. We should, however, expect a significant impact from changes in reserve ratios. These changes will come about from a process of competitive deregulation, forced on the governments by the integration of financial markets and the mobility of financial capital.

Competitive barriers in the banking industry will be eliminated with the implementation of the second Banking Directive, which will be effective from 1 January 1993. By that

time, depositors will be able to place their funds anywhere in the Community, and banks will be able to invest anywhere they please. As a result, any bank which wants to stay in business will have to pay competitive rates on deposits and charge competitive rates on loans: in other words, deposit and loan rates will tend to be equalized in the Community, so that the Community-wide margin (difference between interest rates on assets and on liabilities) will shrink towards those of the most efficient banks. Banks unable to charge the most efficient margins will be driven out of business.[9] In this scenario, governments will not be able to apply higher reserve requirements on the banks in their territory since they would have to face massive disruptions (defaults, acquisitions, shrinking of the industry), which are politically costly, and have serious side-effects on the real economy. Governments will therefore have to decrease reserve requirements to the lowest acceptable levels: this will imply a very large shrinkage in the total stock of high-powered money in Europe (but also, of course, a large change in its currency composition).

To get an estimate of the plausible shifts in the stock of high-powered money, the data in Table 5.4 are used and it is assumed that a realistic Europe-wide reserve ratio, after the liberalization of the banking industry, is 1,5%.[10] Applying that rate to the level of deposits in the table results in a shrinkage in the stock of high-powered money ranging from 22% in France to 62% in Italy![11]

The forced convergence of reserve ratios, implying very large changes in the stock of high-powered money, will undoubtedly raise difficult problems for monetary authorities. In particular, the effect of these adjustments on money demand will depend on the policies followed by central banks. Since the impact of a decrease in reserve ratios, through the money multiplier, is a large increase in the supply of broad money, which is clearly unwanted by monetary authorities, it will have to be accompanied by a sizeable contraction. Even though in this specific case the changes in the demand for money can be predicted with both sufficient accuracy and margin for reaction, shifts in the composition of currency portfolios — that leave the total stock of money unaffected — are likely to be harder to forecast, and thus more disruptive.

3.2. Factors affecting the distribution of currency portfolios

A recent survey by *Eurobarometer* (cited by Grilli (1989)) asked whether, in a number of areas, there were more advantages than disadvantages to be expected from the creation of a single European market. 79% of the respondents[12] believed that the ability to make payments without complication in the Community will be an advantage, 79% believed that the ability to take any amount of money in any country of the Community will be an advantage, 70% listed as an advantage the possibility of opening a bank account in any country without hindrance. These numbers are important not only because they suggest that these innovations of the single market are strongly perceived to be desirable, but also because they signal that the public is going to actively exploit the profit and cost-saving opportunities they provide.

To organize the discussion of the factors determining the distribution of currency portfolios and the degree of currency substitution, it is useful once more to make use of the distinction between transactions services and store-of-value services.

Starting from the transactions services, the first question to be tackled is what makes the transactions services of a currency different from those of another currency, i.e. what makes the two currencies imperfect substitutes. Most likely it is the interplay of a number of factors,[13] including the geographical distribution of transactions and the existence of government-imposed constraints.

The argument goes as follows. In Europe the single market project will multiply the number of transactions across national borders. Yet it will still be the case that for any individual or corporation, most transactions will be carried out with residents of the same country. Employers and employees are usually geographically close, and most purchases of consumption goods and services are made locally. Because exchanging one currency for another is generally cumbersome (if only because of the inconveniences of having to recompute prices using exchange rates), residents of a country will tend to use a common currency. Since the transactions involving governments and the other legal requirements described in Section 3.1 force residents to make use of the national currency, in local markets transactions will normally be carried out using national currencies.

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9   This argument makes use of the assumption of perfect competition in the banking industry, which is quite inappropriate in other contexts (see, for example, Baltensperger and Dermine (1989) and Vives (1990)) but can be used as an approximation here.

10   This exercise is inevitably an approximation, since differences in the definition of various aggregates, as well as differences in national regulations concerning reserve requirements, are not accounted for. The implicit assumption is that all numbers in the table are directly comparable.

11   In this calculation, the stock of high-powered money ends up increasing only in the UK and in Belgium, by 1,35 and 1,2% respectively.

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12   This is the overall mean obtained over the whole set of EC 12 countries.

13   This view was first put forth in Giovannini (1989).

In summary, the combination of habit and national restrictions makes currencies imperfect substitutes. Yet, it is possible to conceive of cases where the degree of imperfect substitutability due to habit and national restrictions is not enough to prevent a currency from being virtually abandoned. This will be the case when local markets are limited relative to the volume of international transactions. Since it is convenient to use widely-circulating media of exchange, there is an externality at work: the less a currency is used, the less people will want to use it, and vice versa the more a currency is used, the more it will be acceptable as a medium of exchange. This is the mechanism underlying the establishment of vehicle currencies.[14] A glance at the importance of international trade in certain small European economies suggests the potential role of these effects. The sum of exports plus imports account for as much as 130% of GDP in Belgium, 170% in Luxembourg, 112% in the Netherlands and Ireland. In these countries international transactions are almost as important as local transactions,[15] and if the externality from the use of a common *numéraire* is sufficiently strong, there might be significant gains from the adoption of a European currency with wider circulation.

There is, however, no good description of the transition from one equilibrium to another, and no estimates of the gains from the adoption of a common *numéraire* in the small countries, even though there is abundant evidence, including survey evidence, suggesting that these gains are quite substantial. It is therefore difficult to determine to what extent fluctuations in relative demands for currencies will be affected by this phenomenon. By contrast, more precise characterizations of the effects of legal restrictions on currency portfolios are quite possible.

Consider government transactions. The use of national currencies in government transactions is effectively enforced by legal tender rules, which make the national currency acceptable in each country. If these rules are not modified in the years to come, there is hardly going to be any change in the composition of money demand due to government transactions — the substitutability of different currencies in facilitating government transactions is going to be zero. On the other hand, simple changes in legal tender rules can have

profound effects. For example, if the ecu was given legal tender status in Europe, governments would be *de facto* forced to accept it in payment, and therefore the ecu would become perfectly substitutable for all national currencies in their functions as means of payment to governments. If all 12 currencies were granted legal tender status in all 12 countries of the Community, they would immediately become perfectly substitutable as means of payment to governments. This would remove a sizeable anchor that pins down the individual currencies' share in the total demand for money in Europe.

There will also be large shifts in currency portfolios due to changes in reserve requirements. First of all, the phenomenon of regulatory competition described above will greatly affect relative demands for national currencies, since existing reserve ratios differ across countries, and thus the changes in money demand triggered by this phenomenon will differ across countries. In addition, even in the case of reserve requirements it is possible to remove the regulatory anchor of individual currency shares in total money demand. After the second Banking Directive comes into effect, banks will be able to issue cheque deposits in any currency, from any country in the Community. Thus commercial banks in, say, France will have deposit liabilities denominated in French francs, German marks, sterling, etc. The Directive establishes that the main responsibility for liquidity ratios will be on host governments. So far, however, the issue of how to adapt national laws and regulations to this provision has not been brought up. Will countries require the use of specific currencies in the statutory reserve ratios? If banks are not asked to put aside reserves (in proportion to the requirement) matching the currency composition of their liabilities, a very important determinant of the money multiplier will be eliminated. If the currency composition of banks' reserves is not restricted (because the composition of liabilities cannot be restricted) then, as in the examples above, national currencies will become perfectly substitutable for the purpose of providing liquidity to banks: another source of stability in the demand for different currencies will be removed.

In summary, the brief discussion above has shown that the liberalization of goods and financial markets is likely to give rise to very large shifts in currency composition of private portfolios. In addition, measures like the extension of legal tender rules or the application of reserve requirements without discrimination across currencies will tend to make national moneys perfectly substitutable, leaving relative demands indeterminate, even in the presence of a more stable overall demand for money.

Turning to the services of money as store of value, it is important to make a distinction between a regime where

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[14] See, for example, Krugman (1980). General equilibrium models of money as a medium of exchange are found in Kiyotaki and Wright (1989).

[15] The ratio of international trade to GDP is of course a very rough estimate of the importance of transactions with non-residents, because all transactions in assets are not included (the ones in the capital account of the balance of payments, by netting out debtor and creditor positions by class of transactions, are also an approximation) and because GDP is not a good estimate of the number of local transactions.

exchange rates are flexible, one where they are permanently fixed and one where there is a probability that the 'fixed' parities might be changed in the future. In the first case, Kareken and Wallace (1981) have shown that, in equilibrium and given exchange-rate expectations, the spot exchange rate is not pinned down by the demand for currencies as stores of value: given exchange-rate expectations currencies are perfectly substitutable as stores of value, and therefore the composition of the total currency portfolio is irrelevant. The exchange rate would be completely indeterminate if currencies were also perfectly substitutable in their transactions services.[16]

Giovannini (1990) refers to the determinants of currency substitutability in a regime of permanently fixed exchange rates. In that model, there is a well-defined demand for transactions services for each currency (i.e. currencies are not perfectly substitutable in their transactions services). Currencies are found to be perfectly substitutable in their store-of-value services also under fixed exchange rates, since in that case they have an identical opportunity cost, represented by the common nominal interest rate.[17] Given the exogenous exchange rate, this perfect substitutability of currencies is reflected in an indeterminacy of the distribution of foreign exchange reserves, within the total demand for money as a store of value.

Finally, the maximum fluctuations in relative money demands (and hence in the distribution of foreign exchange reserves) is obtained in a regime of adjustable parities. In that case the demand for foreign exchange reserves is mostly affected by the desire of the private sector to avoid the capital losses arising from a discrete change in bilateral exchange rates. If the exchange-rate devaluations occur whenever the monetary authorities' holdings of reserves fall below a known lower bound, the private sector can forecast with some accuracy the timing of the occurrence of the exchange-rate devaluation. It will attempt to get rid of all cash balances in the depreciating currency just before the devaluation. One crucial feature of these speculative attacks is that they can be self-fulfilling. As Obstfeld (1986) shows, in fairly general settings private agents can justifiably believe that monetary authorities will ratify foreign exchange crises, by devaluing the exchange rates.

3.3. Threats to the stability of Stages I and II of economic and monetary union

What are the lessons for the management of the transition towards EMU? The discussion above has identified a number of important sources of fluctuations in money demand and in the composition of currency portfolios, likely to come into play in the near future. These fluctuations are unavoidable, given the planned process of European integration.[18]

The transition to EMU is therefore extremely delicate. The completion of the internal market will increase the substitutability of EC currencies. In the absence of significant reforms, this will lead to monetary instability. The threats of money-demand instabilities are especially serious because there has been no significant change in the monetary policy procedures of central banks, nor are there any to be expected during Stage I of the Delors Report.

According to the Delors Report, the tasks for monetary policy during Stage I are, beyond the liberalization of financial markets and the increased EMS participation, new procedures for coordination in the Committee of Central Bank Governors and the Ecofin Council. The new procedures are:

(i) a lengthening of its chairman's term from six months to three years;

(ii) the establishment of the right of the chairman to publicize the deliberations of the Committee;

(iii) the creation of a permanent research staff and three subcommittees.

These reforms are meant to 'gradually bring about a change from *ex post* analysis to an *ex ante* approach to monetary policy cooperation' (Delors Report, point 52), by facilitating 'multilateral surveillance'. Understandably, however, these reforms could not extend to the replacement of current operating procedures of national central banks.

A glance at the operating procedures recently followed by some EMS members[19] can help identify where the problems will be coming from: since the most used target for monetary policy is some definition of monetary aggregate, instabilities

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[16] Note, however, that this result is consistent with a perfectly stable total demand for money.

[17] When the exchange rate is credibly fixed, the forward rate is always equal to the spot rate.

[18] Increased substitution among currencies, of course, does not necessarily imply—in equilibrium—larger fluctuations of money demand. The analysis of Woodford (1990), however, shows how a wide array of monetary models, under a number of hypotheses on the exchange-rate regime and expectations formation, predict that increased currency substitutability is a source of monetary instability.

[19] See, for example, Bank for International Settlements (1986).

in money demand will have to be transmitted elsewhere, to interest rate reserves or exchange rates, and inflation. A recent timely study by the European Commission[20] warns that even the past experience has revealed a number of structural changes in the relations between various monetary aggregates and their explanatory variables. The difficulties of monetary targeting in the presence of financial innovation are probably best illustrated by the vicissitudes of the British monetary authorities, who have been forced to focus on a wide range of monetary aggregates, including M3, M4 and M0.

Similar problems affect the institutional provisions for Stage II in the Delors Report. Stage II should be characterized by some form of coexistence of a European system of central banks and national central banks. It will 'primarily constitute a training process leading to collective decision-making, while the ultimate responsibility for policy decisions would remain [...] with national authorities' (Delors Report, point 55). Exchange-rate changes are permitted, even though under 'exceptional circumstances' (Delors Report, point 57). Once again, explicit references on provisions to minimize monetary instability are absent. Furthermore, ambiguities on the importance of credibly fixing exchange rates persist. These ambiguities are a necessary condition for the self-fulfilling speculative attacks mentioned above to materialize.

What are the likely effects and the costs of the instabilities arising from currency substitution, and why are they a threat for an orderly convergence to EMU? These questions are central in the current debate on the role and the effects of monetary policy. The direct effects of fluctuations in currency demands are swings in liquidity in money markets, with ensuing swings in interest rates. Why are these swings in liquidity dangerous? If these movements are of extreme proportions, they can give rise to financial crises, which are liquidity crises accompanied by substantial increases in interest rates. These phenomena can trigger failures of financial intermediaries and increase uncertainty in the marketplace.[21] The increase in uncertainty, in turn, exacerbates two typical problems of financial intermediation: adverse selection and credit rationing. Since lenders cannot perfectly assess the riskiness of borrowers, they charge interest rates that reflect their average assessment of the quality of loan projects. This means that high-quality borrowers pay too high interest and low-quality borrowers pay too low interest

(the adverse selection problem). At the same time, lenders are likely to deny arbitrarily loans to good borrowers, since they cannot tell who are the borrowers with the riskiest investment projects (the credit rationing problem). The increase in uncertainty and interest rates during a financial crisis thus dries up lending and business investment, producing the conditions for a recession. A likely side-effect is also a massive deposit withdrawal in the interbank market, caused by concerns about the liquidity and the viability of the banks themselves.

The threats to an orderly convergence towards EMU are directly linked to these phenomena. Speculative attacks on individual currencies, triggered by the belief that exchange rates *can* be changed, give rise to liquidity and interest-rate crises. In order to avoid a recession, the monetary authorities thus face tremendous pressure to increase liquidity in the money markets of the currencies under attack. This can be done in two ways:

(i) By actually increasing liquidity. This requires active coordination among all central banks involved in the ERM, and might give rise to resistance due to the possibly inflationary impact of liquidity injections in the currencies under pressure, the problem of establishing a precedent, etc.

(ii) By devaluing the exchange rate. This is the easiest way out. It brings real interest rates back in line, and automatically increases liquidity in the markets where it is needed. Exchange-rate devaluations, however, also set the clock of EMU back to time zero, since they ratify expectations of exchange-rate changes and they give rise to inflation-rate differentials.

The choice is thus among one of three alternatives: a financial crisis and a recession; a liquidity injection (with possibly inflationary effects); and a setback of the EMU, represented by an exchange-rate realignment. The institutional reforms to support Stages I and II should be designed with the explicit aim to minimize the probability of occurrence of events forcing countries to make this kind of choice.

3.4. The dangers of parallel currencies

The second important lesson from the discussion in Section 3 is that the introduction of parallel currencies, like the ecu, is not the way to go.

The basic idea of parallel currencies is not new. One of the first, and best known, proposals to achieve a monetary union in Europe appeared in *The Economist* and went under the

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[20] Commission of the European Communities (1989).
[21] For an illuminating analysis of the history of financial crises in the USA, and the role of monetary authorities, see Mishkin (1990), whose basic approach is adopted here.

name of 'All Saints' Day Manifesto'.[22] That proposal advocated the issuance of a new currency, 'Europa', whose purchasing power would have been kept constant in terms of a basket of European goods. The stability of Europa's purchasing power would have driven private agents to progressively shift their currency portfolios towards it, in a sort of market-determined monetary reform.

A more recent, and less sophisticated, proposal for a market-determined currency reform is the one put forth by the UK Treasury.[23] In that document it is argued that a desirable transition to a common currency is one where this currency emerges as the best one in terms of efficiency of its transactions services and stability of its purchasing power. The UK document also suggests that a private ecu could reduce transactions costs associated with inefficient payments systems (HM Treasury (1989), paragraph 22).[24]

All the problems described in Sections 3.1 and 3.2 would be multiplied by the issuance of a parallel currency like the ecu. In addition, the inevitable pressures for competition among central banks would contribute to enhance the general uncertainty on policy stances and the evolution of money markets which almost surely leads to financial instability.[25]

The appeal of these proposals is of course the intellectual appeal of market-driven reforms. The discussion above, however, has provided a comprehensive characterization of the reasons why these market-driven reforms are elegant only on paper, since they do not account for market imperfections, which are the very *raison d'être* of central banks and their operations in national money markets. Even if the probability that the counter-arguments offered above are correct was less than one, it would be inappropriate to introduce the ecu as a parallel currency, a strategy that would have a small chance to fail with such serious consequences. Our knowledge of the determinants of money demand is too imperfect to make parallel currencies a manageable option in the transition to monetary union.

4. The management of foreign-exchange reserves during the transition to monetary union

In the previous sections it has been argued that the most difficult problem of the transition towards EMU is the instability and fragility of the intermediate stages. The implication is that monetary authorities should devise institutions and operating procedures which ensure the maximum credibility of the transition, as well as of the commitment to price stability. In particular, institutions and operating procedures should minimize the probability of disruptive reserve fluctuations forcing countries to react by changing bilateral parities. These accidents would be particularly damaging, since the whole spirit of the transition towards EMU is to increase the stability of currency values and the integration of markets—two objectives that are undermined by exchange-rate changes.

For these reasons, it is useful to focus attention on the management of foreign-exchange reserves, the most important tool to safeguard exchange-rate credibility. This section deals with the economic costs of alternative schemes for reserve management, the problems of reserve financing in the present-day EMS, and the methods to estimate the size of foreign-exchange reserves necessary to ensure credibility of bilateral parities.

4.1. Problems of reserve management

The technique and costs of alternative methods of reserve management are crucial, because they give rise to different incentives to national monetary authorities, and as a result affect the credibility of a fixed-rates regime. Such incentives are linked to the transfers of resources associated with balance-of-payments flows,[26] and affect the credibility of fixed exchange rates.

To illustrate the real effects of alternative fixed exchange-rate systems it is useful to distinguish the resource costs of reserves from the international transfers of resources arising from balance-of-payments surpluses or deficits. The resource costs of reserves are the opportunity costs of the resources tied up. In a gold standard, for example, countries hold stocks of gold in their foreign-exchange reserves. The opportunity cost of these gold holdings is equal to their value times the market interest rate, net of any increases in the value of gold relative to the *numéraire*. Similarly, countries holding reserves in a third currency (like the US dollar in

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[22] *The Economist*, 1 November 1975. The proposal was signed by G. Basevi, M. Fratianni, H. Giersch, P. Korteweg, D. O'Mahony, M. Parkin, T. Peeters, P. Salin and N. Thygesen.
[23] HM Treasury (1989).
[24] It is not clear, however, whether 'private' means in that proposal 'used by the private sector' or 'privately issued'.
[25] This point is made by Carli (1989).

[26] See Persson (1982) for a full analytical treatment of these points.

the EMS) end up paying seigniorage to a foreign country: the opportunity cost of reserves denominated in the third currency is equal to the stock of reserves times the interest rate.[27]

In the case where countries hold each other's currencies in their foreign-exchange reserves, they end up paying seigniorage to each other on the amount of foreign-exchange reserves held. This transfer of resources favours countries with balance-of-payments deficits, who can finance them by selling their money to the partner's central bank.[28] This problem, however, can be eliminated in a system where all reserve transactions are charged market interest rates. The condition for the absence of any resource transfer becomes the solvency condition, which in this case is equivalent to a commitment to adjust domestic monetary policy (domestic credit policy) so as to ensure the ultimate consistency and viability of fixed exchange rates.

Currently, in the EMS there is a mechanism designed to provide the needed foreign exchange to central banks who are defending their bilateral parity in the markets. This mechanism is the 'very short-term financing facility' (VSTFF). Any country whose bilateral parity reaches the margins of intervention is entitled to unlimited financing through the VSTFF. Central banks draw on VSTFF credit lines they have with the EMS partners with whom their currency is diverging. Credit lines mature 45 days after the end of the month in which the operation has taken place, and can be renewed to a maximum of three months at the request of the borrowing central bank.[29] The original rules governing the VSTFF were modified in September 1987 (the Basle-Nyborg agreement). The maturity of credit lines was extended by one month and the ceiling applied to the renewals was increased. The accounting and computation of interest in these credit facilities is done in ecus.

While credit lines for margin interventions under the VSTFF are 'automatic', the ones granted for interventions within the bilateral margins may be subject to approval. Indeed, the Bundesbank has required that all credits extended for interventions within bilateral margins under the VSTFF be subject to approval of its board. This is well justified. Like all financing facilities of fixed exchange-rate regimes, the VSTFF does not allocate the burden of adjustment to any specific country. Indeed, the systematic sterilization of the

effects of VSTFF operations on the monetary base, by eliminating the corrective effects of reserve flows on domestic money supplies, shifts the burden of adjustment to the partner who is compelled to accommodate the policies of the sterilizing central bank (for a description of the practical working of the VSTFF, and the problems of sterilized intervention in the EMS, see Giavazzi and Giovannini (1989)). In the limiting case where both central banks fully sterilize the effects of these operations on the monetary base, the system of fixed rates can only collapse.

Notice, in addition, that the experience of EMS interventions suggests that defending parities when bilateral margins are reached is much more 'costly' (in terms of volumes of reserves used) than when exchange rates are within the bands. For this reason most countries have tended to intervene before margin limits were reached, and the full automaticity of the VSTFF has thus been seldom used.

These problems of the VSTFF suggest two weaknesses of the current ERM, which make it less than perfectly credible. On the one hand, it is not known how much individual countries could effectively borrow before encountering resistance from their partners, and what would be the effect of this resistance. This uncertainty in itself makes the VSTFF less credible, and hence less effective in absorbing foreign-exchange markets fluctuations. On the other hand, there is not sufficient feedback from the VSTFF to individual countries' monetary policies. This occurs because the VSTFF is not a routine facility, but is used under exceptional circumstances, and thus it works more like a 'last resort' facility. In order to achieve better coordination of monetary policies, countries would have to jointly monitor, on a day-to-day basis, their operations in the foreign-exchange markets in order to be able to fine-tune their domestic operations in response to international imbalances.

4.2. The gains from exchange-rate credibility

The discussion above suggests that one crucial element to make exchange-rate targets credible is close coordination among central banks, and in particular effective mechanisms to join the setting of domestic monetary policies to the management of foreign-exchange intervention for the purpose of pegging bilateral parities. Only continuous interaction between the foreign-exchange management function and the money-creation function of all central banks involved can induce private markets to believe that exchange-rate targets will be held forever.

Another important ingredient to make foreign exchange-rate targets credible is the existence of enough foreign-exchange reserves devoted to exchange-rate stabilization. These resources are essential to withstand temporary fluctuations in

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[27] Net, of course, of any interest earned on foreign reserves, if they are held — at least in part — in interest-bearing assets.

[28] The case of the USA in the second post-war period is often quoted in this respect.

[29] Renewals, however, are subject to a ceiling.

excess money demands without jeopardizing the smooth functioning of money markets and the credibility of fixed rates. Indeed the Delors Report states that during Stage II 'a certain amount of exchange reserves would be pooled and would be used to conduct exchange market interventions in accordance with guidelines established by the European system of central banks Council' (point 57).

It is well known that the two pillars of a fixed-rates regime are foreign-exchange reserves and coordination of national monetary policies. One of the implications of the discussion on money demand and financial innovation above, however, is that the management of foreign-exchange reserves is proportionally more important than the coordination of monetary policies. The reason is that in order to carry out monetary policy coordination central banks have to be able to rely on stable money demand functions. Jointly setting monetary targets to support fixed exchange rates is a vacuous exercise if the demand for money shifts unpredictably. These unpredictable shifts, however, can be effectively dealt with by an efficient system of reserve management. Hence a well-working reserve-financing arrangement is an essential element in the current stage of the transition towards monetary union and is much more important than monetary policy coordination, although the latter should by no means be abandoned. A system of reserves management allows central banks to absorb unforeseeable shocks, and to slowly adapt their operating procedures to fast-evolving money markets.

How much should be devoted to exchange-rate stabilization? The discussion of the problems of the VSTFF suggests that just promising unlimited amounts in case of need is not enough to guarantee credibility, since just the promises of unlimited amounts are not credible. What would be much more realistic is a situation where, within a certain limited budget, intra-European exchange-rate stabilization is carried out in the absence of pressures from national monetary authorities, just as the Delors Report suggests. This alternative would be feasible only if the amount of foreign reserves necessary to ensure credibility of bilateral rates is not 'excessive'.

A method to estimate the size of the reserves pool is illustrated by studying a simplified two-country world. The money-market equilibrium conditions say that the stock of money in the hands of the public should equal its demand

$$\frac{M - R}{P} = f(.)$$

$$\frac{M^* - R^*}{P^*} = f^*(.)$$

where M and M* are the stocks of money issued by national authorities, R and R* are reserves pooled together to stabilize exchange rates (and therefore not in the hands of the public), and f(.) and f*(.) represent two generic money-demand equations. The real exchange rate π is defined as the relative price of foreign goods, while the nominal exchange rate $\bar{E}$ is equal to the domestic-currency price of foreign currency. Hence $P^*\bar{E} = P\pi$. The nominal exchange rate is of course exogenous. Substituting the money-demand equations into the definition of the nominal and real exchange rate we have

$$\bar{E} = \frac{P\pi}{P^*} = \frac{M - R f(.)\pi}{M^* - R^* f^*(.)}$$

Let $\bar{R} = R + \bar{E}R^*$ represent the total stock of foreign-exchange reserves. How large should it be, in order to ensure that R or R* never turn negative? Simple algebra shows that the conditions for both holdings of domestic and foreign currency to be non-negative are

$$\bar{R} \geq \bar{E}M^* - \Phi M$$

$$\bar{R} \geq M - \frac{\bar{E}M^*}{\Phi}$$

where $\Phi = \dfrac{f(.)\pi}{f^*(.)}$ represents relative money demand.

Note that when Φ has the maximum range, from zero to infinity, the two inequalities above imply that the total stock of foreign-exchange reserves should exceed, at every time, the total stock of money in any of the two currencies. Thus when relative money demands have the maximum range the stock of foreign-exchange reserves should be very large. But what do relative money demands depend on? All factors mentioned above in Sections 3.1 and 3.2 come into play, especially the credibility of the exchange-rate target $\bar{E}$. To compute the equilibrium-relative money demands it is thus necessary to compute the expected future equilibrium relative money demand, given assumptions about their determinants, the dynamic behaviour of monetary policies and real shocks, and the nature of equilibrium in the goods and assets markets. Since equilibrium-relative money demand depends on expected future equilibrium-relative money demand, it is necessary to solve a functional equation. In Giovannini (1990) a numerical methodology is illustrated to solve this problem and applied to German and French data. Under a variety of assumptions on the behaviour of relative money supplies and demands, the size of total reserves holdings that is required to make bilateral targets credible (i.e. it is

such that the holdings in any one of the currencies never turn negative) is of the order of one-tenth of the stock of money in one of the two countries.[30] These preliminary explorations seem to suggest that when fixed exchange rates are fully credible, they can be supported by a relatively limited stock of foreign-exchange reserves.

5. Summary and concluding remarks

This paper has discussed the problems of the management of the transition towards monetary union in Europe. It has argued that several factors indicate that in the near future money demand throughout the member countries of the ERM will become substantially more volatile. This increase in instability makes the current ERM more vulnerable to shocks, and requires reforms aimed at making the announced plan of converging to a monetary union more credible to the public.

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[30] An important condition is, of course, that the countries' monetary policies converge in the long run. This condition is imposed by allowing very substantial short-run divergences of national monetary policies.

In the absence of credibility, shocks will more easily force countries to change bilateral parities, and will end up substantially slowing down monetary convergence, this delaying the ultimate objective of monetary union.

The two pillars of a fixed exchange-rates system like the ERM are the coordination of monetary policies and the management of foreign-exchange reserves. The coordination of monetary policies is the joint setting of monetary targets consistently with stable exchange rates. This exercise, however, cannot be performed with a sufficient degree of accuracy whenever money demand functions become unstable. For this reason, I argued that in the near future the overriding task for monetary authorities will be to coordinate the management of foreign-exchange reserves in order to provide enough of a buffer stock to withstand unforeseeable shifts in money demand, and at the same time to send a credible message to the markets that the plan of monetary convergence is strongly supported. With the help of an efficient system of reserve management, the function of monetary policy coordination will also have to be strengthened, and will have to adapt to the evolution of European money markets.

References

Baltensperger, E. and Dermine, J. (1989), 'European banking, prudential and regulatory issues', mimeo, Insead, presented at the Salomon Brothers Center and Insead Conference on European banking after 1992, April.

Bank for International Settlements (1986), *Changes in money-market instruments and procedures: objectives and implications*, Basle, March.

Black, F. (1970), 'Banking and interest rates in a world without money', *Journal of Bank Research*, No 1 (autumn), pp. 8-20.

Carli, G. (1989), 'The evolution towards economic and monetary union: a response to the HM Treasury paper', Rome, Ministero del Tesoro, December.

Commission of the European Communities (1989), 'Monetary policy indicators in an evolving monetary environment', *European Economy*, No 42, pp. 123-133.

de Cecco, M. (1989), 'The Latin monetary union', mimeo, University of Rome.

Giavazzi, F. and Giovannini, A. (1989), 'Limiting exchange-rate flexibility: the European Monetary System', Cambridge, Massachusetts, MIT Press.

Giovannini, A. (1989), 'Currency substitution and monetary policy', mimeo, Columbia Business School.

Giovannini, A. (1990), 'Credibly fixed exchange rates', mimeo, Columbia Business School.

Grilli, V. (1989), 'Europe 1992: issues and prospects for the financial markets', *Economic Policy*, No 9 (October), pp. 387-422.

HM Treasury (1989), 'An evolutionary approach to economic and monetary union', London, November.

Karaken, J. and Wallace, N. (1981), 'On the indeterminacy of equilibrium exchange rates', *Quarterly Journal of Economics*, pp. 207-222.

Kiyotaki, N. and Wright, R. (1989), 'On money as a medium of exchange', *Journal of Political Economy*, 97, pp. 927-954.

Krugman, P. (1980), 'Vehicle currencies and the structure of international exchange', *Journal of Money, Credit and Banking*, No 12 (August), pp. 513-526.

Mishkin, F.S. (1990), 'When do we need a lender of last resort? A historical perspective', mimeo, Graduate School of Business, Columbia University, February.

Obstfeld, M. (1986), 'Rational and self-fulfilling balance-of-payments crises', *American Economic Review*, Vol. 76, No 1, pp. 72-81.

Persson, T. (1982), 'Real transfers and international adjustment in fixed exchange-rates systems', in: Persson, T., *Studies of alternative exchange-rate systems*, Monograph Series No 13, Institute for International Economic Studies, University of Stockholm.

Rolnick, A. and Weber, W. (1988), 'Explaining the demand for free bank notes', *Journal of monetary economics*, Vol. 21, No 1, pp. 47-71.

Triffin, R. (1960), *Gold and the dollar crisis*, New Haven, Yale University Press.

Vives, X. (1990), 'Banking competition and European integration', mimeo, Universitat Autònoma de Barcelona, paper presented at the Conference on European financial integration, Rome, January.

Woodford, M. (1990), 'Does competition between currencies lead to price-level and exchange-rate stability?', mimeo, University of Chicago, paper presented at the Conference on European financial integration, Rome, January.

Part III

Macroeconomic policy and public finance

6. Economic federalism and the EMU

Paul Van Rompuy, Filip Abraham and Dirk Heremans[1]

1. Introduction

At the start of a new decade, the European Community is experiencing a remarkable process of intensified economic integration. This process will lead to the realization of an economic union in which goods, services and factors of production will move freely across national borders.

The increased convergence of the macroeconomic performance of the Member States during the recent past has also opened the perspective of the creation of a Community-wide monetary union.

The striking similarities between the conditions that will shape the economic and monetary union (EMU) in the Community and those which actually exist in federal countries, raises the interesting question of the relevance of the latter for the design of the economic policy framework in Europe.

In order to explore this problem, the theory of economic federalism will be summarized first. Attention will be paid in particular to the traditional economic policy functions: allocation, stabilization and redistribution.[2] Furthermore, the practice of economic federalism will be illustrated by means of stylized facts on federal countries in North America and in Europe.

The second and key chapter of this study examines the relevance of the theory and practice of economic federalism for the future European EMU. This part of the study concentrates on the assignment of regulatory functions in products and labour markets. As for the latter, the conditions for sustainable labour cost policies in the EMU will be focused on. The problem of the coordination of macroeconomic stabilization policies is not dealt with in detail since it is the subject of other specific contributions to this volume.

Finally, policy recommendations that result from the foregoing analysis, will be formulated in a concluding section of the study.

2. Economic federalism: theory and facts

2.1. The theory of economic federalism

From an economic point of view, a federal system can be defined in a nutshell as an economy in which public functions are provided for by a multi-level public sector which consists of the federal, State and local governments.

The public functions referred to cover a broad range of government activities, which can be summarized as follows: the supply of public goods and services, taxation, redistribution and stabilization. Furthermore, governments shape the framework in which market activities take place by the design and enforcement of rights and rules.

A body of economic theory known as 'economic federalism' has developed during the post-war period in which the optimal assignment of these public functions is analysed, whereby 'optimal' refers to the criteria used in the analysis. Two approaches can in this respect be followed. In the normative approach, the efficiency criterion dominates the assignment problem. An efficient assignment of public functions implies then the highest overall welfare in the economy, measured by a utility yardstick or by the sum of private and public wealth. Governments are in this view instrumental in achieving a maximum level of welfare: they serve the public interest. In the more recent positive approach, governments are the playing field of various interest groups and bureaucrats, each of which is aiming at its own welfare. The resulting division of public functions will, in general, not be optimal in the efficiency sense. In the sequel, both approaches to the assignment problem are examined although more attention is paid to the efficiency point of view because the underlying theoretical framework has up to now been built on a more solid basis.

In order to structure the exposition, the public functions examined here are classified according to Musgrave as: allocation, referring to the supply of goods and services as well as to taxation, stabilization and redistribution. A fourth function, i.e. regulation, is discussed separately since it creates part of the institutional framework in which the three Musgravian functions take place.

2.1.1. The efficient allocation of public goods and services

The problem that is examined in this section is the following: what kind of public goods and services should be supplied by what level of government in order to maximize overall welfare?

Before embarking on the analysis of this problem, the characteristics of the economy need to be specified. The overall framework of an economic and monetary union (EMU) is most appropriate for a federalist system. It implies, in addition to the existence of a monetary union, i.e. a one-currency area, the unrestricted movement of goods and services and of labour and capital. Markets for private goods and services are assumed to be competitive. Consumers also have preferences for non-private goods, which have the characteristic that the amount available to one individual does not reduce the amount available to others.[3] As defined in this way, non-private goods include pure public goods as a special case since they are available to each consumer in equal amounts.

A basic and realistic feature of the economy is that consumers have different preferences for private and for non-private goods. As a consequence, they evaluate non-private goods differently. The public sector, which acts as supplier of the non-private goods, is furthermore assumed to produce efficiently, which means that its output is obtained at minimum average cost. For simplicity one can assume production at constant average cost throughout the economy, an assumption which is relaxed further on.

The optimal allocation of non-private goods is first examined in an ideal world, where consumers have perfect information and can move at no cost. In this situation, the so-called Tiebout solution to the allocation problem applies.[4] Production of private and non-private goods takes place at some given points in space, and consumers will move in order to find the package of goods that suits them best. As a result, homogeneous communities or jurisdictions will be formed that consist of individuals who have identical preferences for the non-private goods. The 'Tiebout model' implies that governments compete in a way identical with the competitive conditions in the markets for private goods. Preferences for non-private goods have been revealed by consumers who move around, 'voting with their feet'.

The benefits or costs derived from non-private goods (and 'bads') may spill over from one jurisdiction to the other. These externalities can be internalized through bargaining between the jurisdictions involved in a way that maintains the efficient, i.e. welfare-maximizing, property of the system. The conditions under which such efficient bargains may be struck are specified in the so-called Coase theorem.[5] It assumes the specification as well as the possibility of enforcing property rights, on the one hand, and the absence of bargaining costs, i.e. information, administrative and trans-

action costs, on the other. Such a Coasian contract will specify the subsidies and taxes that are required to internalize the externalities.[6]

As a result of the movement of consumers between jurisdictions and of the Coasian contracts, a panorama of the federal system in the best of all worlds emerges. It will consist of a multi-level hierarchy of governments each of which is responsible for the supply of different packages of non-private goods. The latter should be interpreted in a broad sense, so as to include subsidy and tax schedules that take care of externalities that result from efficient contracts between jurisdictions. The multi-layer government produces non-private goods that embody externalities of increasing order as one moves from the bottom to the top of the hierarchy. It should be noted that the production of non-private goods is financed by imposing a non-distortionary head tax, which equals the average cost of production so as to equalize marginal cost and revenue.

The ideal world sketched above, in which first best allocations are obtained, is, however, far from the real environment in which economic activity takes place. In order to close the gap between these two worlds, the restrictive assumptions of the competitive Tiebout model will be relaxed one by one.

First of all, mobility of households is less than perfect and involves private and, in some cases, social costs due to externalities. The latter may occur because of congestion in fiscally attractive jurisdictions or because fiscally induced mobility results in a loss of efficiency in the production of private goods, e.g. if private production increases as a consequence of the migration to locations that have comparative disadvantages in the production of non-private goods.[7] In principle, the loss of efficiency can be taken care of by bargaining between the jurisdictions involved and by defining the appropriate lump-sum taxes and subsidies that correct for the congestion costs and inefficiencies created. In the same way, locational rents in the production of non-private goods can be taxed and transferred to households that incur mobility-related costs.

A second imperfection relates to the information and transaction costs that households and bargaining jurisdictions have to bear. Imperfect information on the side of households may give rise to private institutions that specialize in the production of scarce information on public-sector conditions in the economy. A more serious problem is posed by information and transaction costs faced by the jurisdic-

3   See Breton (1965).
4   See Tiebout (1956).
5   See Coase (1960).

6   See, for example, Inman and Rubinfeld (1988) for an application of the Coase theorem to the design of a federalist constitution.
7   See, for example, Buchanan and Goetz (1972).

tions that enter into a bargain on externalities. The conditions for efficient bargains are indeed severe: all parties should have perfect knowledge about each others' preferences and endowments. Furthermore, strategic behaviour which leads to hiding one's true preferences should not occur. These conditions will, of course, in reality only rarely be fulfilled, in particular if the number of parties involved is high.[8] As a consequence, mutual advantages may not be exploited. Furthermore, high bargaining costs and strategic behaviour may lead to the breakdown of the process. In this case, efficiency will be restored by establishing a central institution or government, which acts as an intermediary and arbiter between parties and enforces the contracts. A central government appears on the stage as a public good that corrects for the market failure created by the absence or breakdown of private bargaining efforts.

A third imperfection arises if production of a non-private good displays increasing returns to scale, i.e. decreasing average costs, as may be the case for transportation and communication networks. Such a situation does not necessarily call for an all-encompassing government, acting as a producer and internalizing the positive externalities resulting from the decreasing unit costs.[9] Subsidized or regulated private production may be an acceptable second best solution.

The approach to the assignment of public functions developed in the preceding sections has resulted in a blueprint of a federal economy, which displays strong tendencies for decentralization. Indeed, externalities and failure to reach agreements between competitive lower level governments constitute the only motive to assign functions to a higher level in the hierarchy. No attention has been given to the way in which preferences for non-private goods are revealed, nor to the behavioural assumptions of representative governments and bureaucracies.

It is beyond the scope of this study to review the contributions of the recently developed public choice approach that analyses voting procedures and the behaviour of political parties and bureaucrats.[10] In this analysis, governments are the playing field of rent-seeking interest groups that aim at reducing the efficiency of the economy.[11] Political parties are instrumental in the rent-seeking process and, if in power, will satisfy their respective interest groups. As the number of parties in the ruling coalition increases, the size of the government will tend to expand and debt finance may be

preferred to taxation.[12] Bureaucracies will enforce the bias towards centralization and government growth since this strategy will increase their income and power.

The existence of only a few political parties and intergovernmental competition will counter the centralization bias and increase the overall efficiency of the economy. From this point of view, a federal structure consisting of a large number of competing lower level governments is preferable to a centralized government. This conclusion supports the subsidiarity principle adhered to in the previous sections.

To summarize, in a second-best federal system, a multitude of competing lower level governments supplies a differentiated package of non-private goods. Each jurisdiction contains households that are identical with respect to their preferences for non-private goods. Externalities are internalized by taxes and subsidies, settled in contracts between jurisdictions. In this system, there exists a perfect mapping between the individuals who benefit from the non-private goods and those who pay for them. This so-called 'fiscal equivalence rule' forms the backbone principle of the efficient allocation of non-private goods. In terms of public expenditure shares, an overwhelming part will be situated at the lowest level of the hierarchy, i.e. the local governments. Intermediate levels of governments such as provinces or states, play a role in the supply or monitoring of decreasing-cost non-private goods and in the administering and enforcement of contracts between local communities that are designed to internalize externalities. For this purpose, they use subsidies and taxes which will in general differ between second-level governments. The federal government has also a task in maintaining the EMU, i.e. in guaranteeing the free movement of goods, services and factors of production and in using its monopoly of the money supply. Furthermore, the federal government will be called for as an arbiter of last resort between State and local governments and will, in this function, act as a supreme bargaining and contracting level in matters such as inter-State communication and transportation and in the design of basic rules for environmental policy. In this aspect it has the responsibility to enforce the federalist economic constitution, in which basic property rights and rules of economic conduct are specified. And finally, the federal government will be the appropriate agent to supply pure public services, such as defence and legal security.

Decentralization of public functions is characteristic of the picture of the federal system sketched above on efficiency grounds. The basic theme in this approach is the so-called 'subsidiarity principle', according to which a function should be allocated to the lowest level of government, unless welfare

8 See, for example, Olson (1969).
9 See, for example, Tullock (1969) for the alternative solutions in the case of increasing returns to scale.
10 For a survey of the literature on bureaucratic theories, see, for example, Mueller (1979).
11 See Tollison (1982) for a survey on rent-seeking.
12 Roubini and Sachs (1989) find an increasing bias for debt finance as the cohesion of the coalition weakens.

gains can be reaped by assigning it to the next higher level. Yet, the resulting blueprint of the federal system is still incomplete since nothing has been said so far about important matters, in particular redistribution and stabilization.

2.1.2. Redistribution in the federal economy

The cohesion of a federal system can be rationalized on economic grounds on a benefit-cost basis from the point of view of the lower-level jurisdictions that are part of it. Solidarity and social cohesion form, in addition to efficiency considerations, an important element in the explanation of the relative stability of the existing federations. These characteristics refer to the distributive features of the federal economy, which are to some extent different from those in a unitary or centralized setting. In the blueprint model of the federal economy described above, decisions on the allocation of income and wealth originate in the preferences of the basic jurisdictions. As a consequence, redistribution between jurisdictions also stems from solidarity considerations at the basic level of the federal hierarchy.

Interjurisdictional redistribution should be distinguished from intrajurisdictional redistribution. The latter refers to the interpersonal dimension of the redistribution issue within a given jurisdiction, which is examined first. Some authors, e.g. Pauly (1970), have suggested that spatial proximity reinforces basic altruistic considerations which are present, irrespective of the geographical location of the individuals. The latter will be stronger as more common elements have been shared in the cultural and historical environment. It follows that, in principle, redistribution between the members of a jurisdiction should be taken care of by that jurisdiction itself. In a first best world, lump sum taxes and subsidies should be used. The difficulties encountered in assessing individual endowments will, however, lead to the use of distortionary taxes, such as income and consumption taxes. Regional differences in redistributive schemes and taxes will give rise to serious externalities if households are mobile and well informed. 'Generous' jurisdictions will experience an inflow of needy individuals from less generous regions. Eventually, taxpayers will move out of the generous regions until the redistributive system converges to that of the other neighbouring regions.

In order to correct for the externalities caused by the region-specific redistributive schemes, jurisdictions can enter a bargaining process. The probability of reaching an agreement is, however, low, because of free riding and strategic behaviour, in particular if the number of jurisdictions is large and if the distributive preferences differ substantially. Failure to reach an agreement that satisfies all jurisdictions may lead

to a redistributive scheme enforced by the federal government as a second best alternative. Such a scheme will contain minimum levels of welfare that are guaranteed to all households, irrespective of their location and will be financed by distortionary taxes imposed by the central government. In addition, lower-level jurisdictions can add supplementary benefits, financed by their own tax revenue. In this way, a nation-wide redistributive system is set up, administered or at least monitored by the federal government and allowing for regional differentiation.

In addition to interpersonal redistribution programmes, interregional transfer schemes can be established in a similar way as explained above. They can be rationalized either by interregional altruism or by risk-averse behaviour on behalf of the jurisdictions. Region-specific shocks may indeed imply substantial reductions in regional welfare. The discipline imposed by the EMU does not allow for protective trade or exchange rate measures that could shield the regional economy from such shocks. In view of these unpredictable events it is then rational for all regions to insure themselves by establishing an interregional transfer scheme, which guarantees to regions — and not to individuals as in the case discussed above — some minimum welfare level. The incentive problems related to such schemes are discussed further on. Although interregional transfers are made between lower-level governments and as such are distinct from the interpersonal transfers, there may exist a trade-off between both kinds of redistributive schemes. The more generous the interpersonal scheme, the smaller the reductions in welfare will be when some regions experience negative shocks. On these grounds, one would expect less developed interregional schemes in federations that have an extensive social security system.

2.1.3. The macroeconomic stabilization function

When the federal system experiences nation-wide positive or negative shocks, the question arises which government should stabilize the economy. In the sequel, it is assumed that monetary policy has been assigned exclusively to the central government because of the monetary union framework.

Lower-level governments will have no incentive to use fiscal instruments to stabilize the overall economy. The reason for this lack of interest lies again in the externalities that result from the use of these policies by small and highly open economies. The more the benefits, if any, of the regional stabilization efforts spill over to other regions, the smaller the incentive for the regions to use them since they have to bear the full burden in terms of higher debt or tax rates. The situation is similar to the familiar prisoner's dilemma,

which is typical of non-cooperative game settings. The way out of this dilemma is a coordinated stabilization policy. The costs of coordination in a system containing a large number of jurisdictions, each characterized by different economic conditions, may be prohibitively high. In these circumstances, the failure to reach a cooperative solution will lead to the assignment of the macroeconomic stabilization function to the central government. In this case, a federal stabilization function necessitates the exclusive use of some fiscal instruments in such a way that it cannot be disturbed by the independent action of lower-level governments. This may require explicit agreements between the federal, State and local levels in order to guarantee the efficiency of the federal stabilization policy.

2.1.4. Taxation and debt in the federal economy

It is shown in the section on allocation that both the federal and the lower-level governments raise tax revenue as suppliers of non-private goods. Efficiency requires that the taxes should be differentiated individually so as to reflect the marginal valuation of the non-private goods and services. However, the practical difficulties encountered in discovering these valuations for each type of goods and service offered lead to the use of second-best federal, State and local taxes on factor income and factor use, on output, sales or expenditure.

A second source of taxation (and subsidies) relates to the positive (negative) externalities between lower-level jurisdictions, which entails too low (too high) levels of provision. In order to correct for example positive spill-overs, the federal government can make use of matching grants which will induce lower-level governments to change the composition of their expenditure in favour of activities that create positive externalities.

Mobile tax bases will give rise to interjurisdictional tax competition. For fear of losing tax revenue because of the out-migration of the tax bases, lower-level governments will choose too low rates. As a consequence, the tax rate on mobile tax bases will be too low throughout the economy. Examples are: a tax on capital, the corporate tax and, to some extent, an expenditure tax. Lower-level governments will, in general, fail to reach a cooperative solution to the competitive tax game.[13] The federal government can in this case coordinate tax policies and induce States through tax credit provisions to converge to a uniform level or it can impose a uniform rate.[14] This uniform tax rate may not

correspond to the second best level for each jurisdiction. In this case, the excess revenue may be used to increase expenditure or to lower the rate of other distortionary taxes.

Even if the taxed activities are quasi-immobile because of substantial mobility costs, which may be the case for payroll taxes or taxes on income from labour, spatial differences in the effective tax rate will lower the overall efficiency in the economy. Indeed, interregional specialization and trade flows will not fully reflect comparative advantages of the regions but will, to some extent, be fiscally determined. The incentives to act cooperatively will here be even weaker as compared to the taxing of mobile activities, since the efficiency loss will show up in an indirect way, i.e. in the competitive position of the regions.

Uniform tax rates, including a uniform definition of the tax so as to equalize the effective tax rate, result in revenue sharing provisions. These include, on the one hand, a vertical distribution of tax revenue between the federal government and the lower-level governments and, on the other hand, a horizontal distribution between governments of the same level in the hierarchy. Although in the horizontal distribution mechanism the origin or *juste retour* principle will be dominant, interregional transfers may enter the allocation of the tax revenue as well. These transfers aim at equalizing the budgetary positions of lower-level governments and realize the so-called 'fiscal equalization'.[15] The main purpose of the equalizing transfers is to correct the origin-based distribution of tax revenue on equity grounds. Efficiency considerations may in addition intervene in the transfer mechanism, if lower-level governments provide non-private goods inefficiently because of externalities. This may, for example, be the case if excessive migration from low to high income areas creates congestion in the latter. In order to prevent migration of this kind, low income regions receive a transfer from the richer regions as a substitute for 'exclusion rights'.[16] These transfers have a zero-sum character and do not require federal tax revenue.

To summarize, a federal system will display a wide variety of taxes levied by different levels of government in order to finance the provision of non-private goods. Cooperative behaviour by States or, in the absence of inter-State cooperation, federal intervention will limit or abolish the regional tax differentiation on mobile activities. Interregional equity considerations may intervene in revenue sharing schemes in order to achieve fiscal equalization.

13 See Mintz and Tulkens (1984) in the case of commodity taxes.
14 See Gordon (1983) for first-best solutions to interregional spill-overs of taxation.

15 See, for example, Buchanan and Wagner (1971).
16 See Buchanan (1950).

Interpersonal distribution is, as explained above, a task shared between the federal and the lower-level governments with a dominant role played by the former. A nation-wide progressive income tax will be suitable for the federal redistribution programme. Additional benefits offered by State or local governments are to be financed out of general tax revenue, which should originate in proportional or head taxes. There are indeed arguments against the use of progressive taxes at lower levels of government for distributive purposes. First, if a federal progressive income tax exists, additional progressivity at lower levels of the hierarchy will increase the 'deadweight loss' of taxation. And second, additional progressivity at the State or local level will induce fiscal migration of the tax base.

Finally, the accumulation of public debt in a federal economy needs some attention. All governments can be considered as utility-maximizing agents, facing a relevant budget constraint. In this framework, debt creation may be a rational alternative to finance capital formation or to absorb short-term shocks that increase expenditure or lower tax revenue. From this point of view there is no need for federal limits on debt accumulation by lower-level governments.

As pointed out on several occasions in the preceding sections, independent action by lower-level governments may create negative externalities for the economy. To be more precise, unrestricted debt accumulation by States and local governments may interfere with the macroeconomic objectives pursued by the stabilization policy of the central government.

A first externality relates to interference with the federal monetary policy. Monetary financing of deficits or loans abroad affect the money supply in a direct way. Furthermore, servicing foreign debt is limited by the balance of payments constraint and exchange rate objectives. Therefore, these channels of financing are susceptible to federal limits or prohibition.

A second externality refers to the impact of State and local debt on the interest rate level in the economy. Although an individual State and locality may not exert any influence on the interest rate, depending on its relative size and on the amount borrowed, the joint action of all lower level governments may push up the interest rate and crowd out private expenditure in the economy. However, if capital is mobile internationally, the risk-free interest rate will not be affected. Hence, the rationale for limits on State and local debt on this ground should be evaluated in the specific framework of the federal economy.

A third and probably more serious externality originates in the probability of default by State and local governments. A counter-argument states that these governments will refrain

from excessive borrowing because of the penalty imposed by the capital market in the form of increasing risk premiums. It may, on the other hand, take time before governments realize the seriousness of their financial situation, so that they continue borrowing. They will be encouraged to do so if there is a probability that the federal government will bail them out as a lender of last resort. The bailing-out probability, which imposes a cost in terms of higher taxes on the economy, is the real negative externality in this case. The federal government can, however, control the bailing-out expectations by a consistent policy of abstinence from financial rescue operations or by imposing tight conditions for financial consolidation when loans are granted to financially weak lower-level governments.

2.1.5. The assignment of regulatory functions

Regulatory functions can be considered as public goods of a local, State or federal character, depending on the externalities involved. According to this approach, State regulations do not involve spill-overs to other States. If so, harmonization and coordination of State-specific regulations can result from a bargain between all parties involved. Failure to reach an agreement leaves room for a federal intervention and will lead to a federal regulation in which minimum or maximum levels will be laid down. The latter can then be complemented with State-specific regulations.

Regulations that interfere with the free movement of goods, services and factors of production in the economy induce nation-wide externalities and should therefore be assigned exclusively to the federal government.

As for the other regulatory functions that have an impact on economic welfare, the efficiency question displays three aspects. First, allocation efficiency refers to the minimization of market failures. From this point of view, the most efficient jurisdiction for regulating the economy is that which succeeds best in internalizing the externalities created by the regulation. This criterion has to be complemented with cost considerations. This means that in order to achieve operational or X-efficiency in the assignment of regulatory policies, the regulating jurisdiction should perform its task at a minimum cost. Finally, the effectiveness of regulatory policies will be enhanced if the costs of signalling and of transferring information to the economic agents are minimized.

2.2. Some stylized facts on federal countries

It is the purpose of this section to illustrate, by means of some key indicators, the federal practice in existing federations. The federal countries examined are: Canada, the

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Federal Republic of Germany (FRG), the USA, Switzerland and Belgium. The last country can be considered as a true federation since the constitutional reform of 1988-89. The federations examined here differ substantially with respect to the degree of decentralization of the public functions discussed in the previous section.

The outline of this section follows the structure of the theoretical framework. First, the allocation of the public functions will be focused on by means of expenditure shares of the various levels of government. Second, the assignment of the taxation function will be reviewed. Third, attention will be given to the stabilization function with special emphasis on the budgetary autonomy of the sub-federal governments, in particular the States. Finally, the organization of interpersonal and interregional redistribution will be summarized.

2.2.1. Allocation in federal countries

A first, overall picture of the degree of decentralization can be sketched by means of the share in the consolidated government expenditure of the sub-federal governments (Table 6.1).

The varying degree of decentralization, as shown in Table 6.1, reflects to a large extent the historical federation process. The mature federations (the USA, Canada and Switzerland), some of which were built up as confederations

from independent States, have realized a substantially higher degree of decentralization as compared to the post-war federations such as the FRG and especially Belgium. The last country developed gradually from a highly centralized State into a federal structure.

In order to evaluate the functional decentralization in more detail, the expenditure share of specific public functions is examined in Table 6.2.

Table 6.1.

Share of sub-federal expenditure in consolidated government expenditure

Country	Year	Sub-federal share
USA	1987	36,0
Canada	1987	58,4
FRG	1987	39,4
Switzerland	1987	70,4(a)
Belgium	1989	30,8(b)

(a) and (b): Not corrected for transfers to local government.
(b): Excluding local expenditure but including transfers between States and municipalities.
Source: Lamfalussy (1989).

Table 6.2.

State expenditure on public functions (as a percentage of total government expenditure)[1]

	USA	Canada	Switzerland	FRG	Belgium[2]
1. General services and public order	30,7	34,6	61,4	60,6	n.a
2. Transportation and communications	57,1	54,2	51,5	32,4	22,3
3. Health	35,3	78,8	44,3	16,9	24,5
4. Education	87,2	84,8	84,4	93,6	97,3
5. Social security and welfare	17,8	30,5	12,2	12,5	n.a.

[1] Excluding local government. The data refer to 1985 for the USA and Canada, and to 1984 for Switzerland and the FRG. 'State' refers to provinces in Canada, cantons in Switzerland, *Länder* in Germany and regions in Belgium.
[2] n.a.: Not available for the 1989 budget. The other items are estimates.
Source: IMF, *Government financial statistics yearbook*, 1988.

The data in Table 6.2 refer to the share of State expenditure in total, i.e. central and State, government expenditure for public functions that represent on average three-fourths or more of State expenditure. According to these data, education is the most decentralized function in all federations considered. As for the mature federations, transportation and communications are also decentralized to an important degree. The two European federations, Switzerland and the FRG, have decentralized their general public services to a larger extent than the USA and Canada. The decentralization pattern that shows up in the expenditure shares conforms with the predictions in the theoretical part of the study in the sense that cultural diversity and heterogeneous preferences with respect to education, infrastructure and general public services are, from an efficiency point of view, the *raison d'être* of a federal structure. This is less obvious for the interpersonal distribution, which is reflected in the low or moderate expenditure shares for social security and welfare (see also Subsection 2.2.4).

2.2.2. Taxation in federal countries

Decentralization is approached in the previous section by means of State autonomy to spend on public functions. The autonomy to levy taxes complements the spending autonomy and contributes to the budgetary responsibility of the lower-level governments.

There exists a wide variety of taxes in federations which, according to their degree of autonomy, can be classified into exclusive, competing and shared taxes. Exclusive taxes

display the highest degree of autonomy since the government considered has the exclusive right to tax the related activity or income source. It can, furthermore, define the tax base autonomously and choose the desired rate. Competing taxes embody a somewhat reduced tax autonomy since here a common activity or income source will be used by competing governments, which define base and rate according to their preferences. The competing governments will be at different levels of the hierarchy, i.e. the federal, State and local authorities. In the process of tax harmonization, the tax base has in some federations been defined in a uniform way and is controlled by the federal government. Lower-level governments are free to add surcharges or grant reductions, which may be limited in size. Finally, in the case of shared taxes, the base and the rate are defined by the federal government, which shares the tax revenue according to fixed distribution rules with lower-level governments.

In Table 6.3, the structure of tax and other revenue of the States in the federations considered are represented. Tax autonomy is measured by the share of exclusive, competing and surcharge tax revenue and non-fiscal income in total revenue. It is striking that the mature, highly decentralized federations display a substantial degree of tax autonomy, in contrast to the FRG and Belgium. In the USA and in Switzerland the exclusive taxes are levied on tax bases such as real estate property, bequests, personal wealth, sales or motor vehicles, which cause relatively small spill-over effects. As for Belgium, the tax base follows the same pattern with the exception of the sales tax which could, because of the geographical proximity of the regions and the high geographical mobility, give rise to displacement effects in re-

Table 6.3.

Fiscal autonomy of second-level governments' structure of total income (in percentages)[1]

	USA	Canada	Switzerland	FRG	Belgium
1. Tax income					
Exclusive taxes	18,6	—	10,0	—	4,0
Competing taxes	30,9	30,5	43,5	—	—
Surcharges	—	22,8	—	—	—[2]
Shared taxes	—	—	5,8	70,3	93,0
2. Federal grants	22,3	20,3	14,8	13,5	1,2
3. Non-fiscal income	28,2	26,4	25,9	16,2	1,8
4. Total income (1 + 2 + 3)	100,0	100,0	100,0	100,0	100,0
5. Fiscal autonomy (2 + 3)	49,5	30,5	53,5	—	4,0
6. Total autonomous sources (5 + 3)	77,7	56,9	79,2	16,2	5,8

[1] For the USA, Switzerland and the FRG: 1980; for Canada: 1981; and for Belgium: 1989.
[2] Surcharges on personal income tax are allowed from 1992 onwards.
Source: Heylen (1987).

tailing. Competing taxes are commonly levied on personal and corporate income. It should also be noted that efforts have been undertaken by the federal government in the USA and in Switzerland to harmonize the base and the rates of corporate and personal income tax. Finally, shared taxes are typical of the FRG and Belgium and have been installed from the start in the legal framework of the constitution.

Fiscal autonomy is defined in Table 6.3 as the share of exclusive and competing taxes in total revenue. According to this criterion, the second-level governments in Switzerland and in the USA enjoy the highest fiscal autonomy, followed by Canada. Fiscal autonomy is almost non-existent in the two more recent federations, i.e. the FRG and Belgium, that rely heavily on tax sharing.

As a result of the high fiscal autonomy in the older federations, the differentiation of nominal and effective tax rates is substantial, even when the taxed activity is mobile. In Canada, the provincial surcharge on the federal corporate tax ranges from 9 to 15%.[17] This differentiation also holds for Switzerland and the USA. In the latter, States apply flat corporate surcharge rates ranging from 5 to 10% and progressive rates up to 12,5%.[18] State excise taxes range, in the USA, between 3 and 7,5%, with State-specific tax exemptions. A similar differentiation is found for personal income tax.

These examples illustrate that tax competition does not lead to a spontaneous convergence of effective rates in an economic and monetary union, even if the taxed activities are mobile. Neither is it clear how large the implied efficiency cost is. One may however assume that the efficiency loss increases as transaction costs decrease as a result of technological progress in information and transportation systems. Historical evidence also shows that lower-level governments have no incentive to internalize the externalities caused by tax differentiation through cooperative behaviour. As a consequence, federal governments have a role to play in the harmonization of taxation in sensitive areas such as the corporate, capital and expenditure taxes.

2.2.3. Stabilization in federal countries

It has been argued in the theoretical section that because of the substantial spill-overs involved, lower-level governments have no incentive to engage in macroeconomic stabilization policies. If they nevertheless do so, the overall effect would be inferior in terms of results and resources used to a coordi-

nated stabilization policy. On the basis of these arguments, the federal government appears the most appropriate and efficient agent to undertake a stabilization effort. Experience in federal countries confirms the federal involvement in this field either by relying on monetary or budgetary policies or on a mix of both.

As far as demand management policies are concerned, there may be a concern about uncoordinated budgetary policies, in particular in federations such as Switzerland and Canada, where the sub-federal governments control a substantially larger budget than the federal government. Evidence on the budgetary performance of the sub-federal governments in these two federations does not, however, reveal any disturbing interference with federal expenditure policies. This is due to the sufficient degree of diffusion of sub-federal expenditure and (or) to their relatively low degree of cyclical sensitivity as compared to federal expenditure. These features also apply to the other federations considered, with the exception of Belgium where total sub-federal expenditure is concentrated in three regions.

The performance of the sub-federal governments with respect to net borrowing requirements reveals a larger degree of budgetary constraint as compared to federal borrowing.[19] Except for Belgium, where part of the national deficit has been allocated to the regions, all other federations considered here show smaller sub-federal deficits or even surpluses as compared to the federal budgetary stance.

There may be several explanations for this remarkable evidence. From the theoretical side, public choice theory predicts more constraint on sub-federal spending as compared to the federal level because of the smaller scope in the former for rent-seeking. Empirical evidence seems to give support to this prediction.[20] Second, efficient capital markets are expected to penalize excessive sub-federal borrowing through increasing risk premiums, even more than federal borrowing since the latter can in general exert a more comprehensive taxing power. Evidence on differential risk premiums at the sub-federal level supports this assumption, in particular if regional loans are issued on international capital markets as has been frequently practised by Canadian provinces.[21]

A third and potentially more binding constraint on regional deficits is present in the limits on regional deficits, imposed either by the federal government or by the regions themselves. The former could be the case in Belgium, where on

[17] See Van Rompuy and Heylen (1986), Table II.12, p. II.38.
[18] Figures from the *Book of States*, 1986-87.

[19] See Lamfalussy (1989) for a comparative study.
[20] See, for example, Marlow (1988).
[21] See Lamfalussy (1989).

consultation of a committee, in which the federal government and the regions are represented, limits can be put on regional borrowing during a period of two years in order to maintain the EMU. A similar but less permanent supervision is provided for in the German federal constitution (Art. 103, paragraph 4), where it is stipulated that the federal government can, with the consent of the representatives of the *Länder*, limit the borrowing requirements of the latter.[22] Up to now, use has been made of this provision on only two occasions at the beginning of the 1970s (1971 and 1973).

In the USA and in the FRG, the majority of States and *Länder* have, in many cases, provided for budget balance rules in their own constitution. However, empirical evidence on the effectiveness of these rules shows that in the USA no significant impact on average fiscal performance can be detected and non-restricted debt instruments have been used to evade the rules.[23]

On the basis of the evidence in the federations considered one may conclude that the macroeconomic stabilization function of the federal government does not appear to have been weakened by the uncoordinated budgetary policies of the sub-federal governments. Capital markets and interregional fiscal competition have restrained regions in most cases from excessive borrowing. Supervision and potential federal limits on borrowing, as is the case in the FRG and in Belgium, can be rationalized by the lower degree of fiscal autonomy of the regions and by the smaller degree of diffusion of regional expenditure which could lead to some interference with federal stabilization efforts.

2.2.4. Redistributive policies in federations

As noted in the theoretical section, a distinction should be made between interpersonal and interregional distributive policies. Since redistribution is deeply rooted in the cultural, political and social history of each federation, a wide variety of policies and institutions will result. It is intended to summarize the main tendencies, with special emphasis on the distribution of competences between the federal and the sub-federal levels.

2.2.4.1. Interpersonal redistribution

The focus here is on social security systems in the federal countries considered. 'Social security' is in this context a catch-all for income replacement programmes such as pen-

sions, unemployment benefits, industrial accident and occupational illness allowances, child allowances and health insurance. Income support provisions in the form of welfare allowances are considered as a distinct channel of interpersonal redistribution.

In the FRG, social security is a federal matter in terms of the legal framework and the financial organization. On the other hand, welfare allowances are in principle a competence of the *Länder* and of the local governments. In practice however, the federation has set up a legal framework that guarantees a minimum standard of living and subsidizes the *Länder*, if necessary, to reach this minimum level.[24]

Contrary to the FRG, the Cantons in Switzerland are, according to the Constitution, competent to take responsibilities in matters of social security. In reality, the Bund has organized the most important sectors of social security, such as pensions and industrial accident insurance, unemployment insurance and child allowances for employees and small farmers. As for the non-compulsory health insurance, the Bund has set minimum standards whereas the Cantons can complement them. The latter have full responsibility for welfare programmes and play an important role in the organization of the social security system.

The situation in the USA is characterized by a wide diversity and fragmentation of 'social security'. Unemployment insurance, child allowances and medical assistance are shared between the Federal Government and the States. The Federal Government has defined standards in these areas and subsidizes States by means of conditional grants if the federal standards are complied with. There exist a few exclusively federal programmes such as the old age, survival, disability and hospital insurance programmes and the supplementary security income programme that guarantees a federal minimum income level. Finally, some States have organized additional health insurance, welfare and industrial accident and occupational illness insurance programmes.

Social security in Canada resembles the organization in the USA. Federal programmes include pensions (except for Quebec), unemployment benefits, child allowances and minimum income provisions. Health insurance and welfare are shared between the federal government and the provinces. As in the USA, the latter receive conditional grants if federal standards are applied. Provinces can provide for additional child allowances and are autonomous in the area of industrial accident and occupational illness.

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22 See Vanderveeren *et al.* (1987).
23 See Von Hagen (1990).

24 See De Lathouwer (1989) for a descriptive comparative study of social security systems in federal countries.

The Belgian case is characterized by an exclusively national social security system. Local governments are free to supplement the national guaranteed minimum income.

This short survey shows that decentralized social security systems are sustainable in an EMU. Decentralization refers in this respect to regional differences in contributions and in benefits. In the highly decentralized North-American federations, the Federal Government plays a role in setting minimum standards and in providing financial incentives to the States for attaining these minima. The European federal systems give evidence of a more substantial involvement of the federal government even in the decentralized Swiss case. This more pronounced federal role as compared to the North-American experience reflects the social dimension of the European post-war welfare States. It also prevents distortions in the comparative advantages of the regions by providing for a nation-wide uniform system of employers' contributions that have an important weight in labour cost.

2.2.4.2. Interregional distribution

One of the striking features of federal systems is that interregional solidarity mechanisms form an essential part of the 'federal contract' in the sense that the member States agree on the centralization of competences and on the discipline implied by the adherence to the EMU in exchange for redistributive mechanisms. The latter aim at reducing sharp differences in regional welfare that originate in structural or transitory factors, i.e. region-specific, negative shocks.

Federations use a wide variety of instruments for redistributive purposes which should be distinguished from transfers that aim at internalizing interregional externalities. The latter serve an efficiency purpose, i.e. increasing the regional supply of public functions from which the federation benefits as a whole.

Redistribution in federations has a vertical and a horizontal dimension. Vertical redistribution refers to redistributive grants allocated by the federal government, whereas horizontal redistribution implies a direct involvement of the sub-federal governments. Only one federation, i.e. the FRG, makes use of horizontal redistribution, whereby financially strong Länder contribute to the weaker members of the federation. As for the federal grants, their purpose can be twofold. A first objective is related to the fiscal imbalance between the federal and the sub-federal level. In order to prevent financially weak regions from raising more taxes that would deteriorate their competitive position even more, the federal government can support them by means of unconditional grants. In federations that practice revenue sharing, the vertical fiscal imbalance can be corrected for in the allocation of the tax revenue shared between the federal and the sub-federal governments.

First, the federal share will be determined for each kind of tax revenue. Second, adjustments will be made in the interregional distribution of the revenue to be transferred to the states. The allocation according to the origin of the tax base—the so-called *juste retour*—will be modified in order to take account of the regional differences in fiscal capacity, in tax effort, in need or in a mix of these three factors. Need indicators may refer to population density, degree of urbanization or geographical size.[25] Redistribution by means of revenue sharing schemes is actually practised in Switzerland and in the FRG through the vertical part of the 'Finanzausgleich'. In Canada, where no revenue sharing exists, federal unconditional grants—the so-called 'equalization payments'—are allocated to the provinces on the basis of fiscal capacity.

Distinct from the redistributive unconditional grants are the specific-purpose grants that aim at providing regions with minimum levels of specific public services, such as education, housing, health services and transportation infrastructure. In order to promote the financial responsibility of the regions, specific grants usually are of a matching type, which implies a sharing of the expenditure between the federation and the regions according to fixed proportions. In this way, expenditure substitution induced by general-purpose grants in favour of items that have a lower federal priority is avoided.

The explicit horizontal redistribution embedded in a revenue sharing system is found in the unique 'Länderfinanzausgleich' in the FRG. This redistributive mechanism guarantees financially weak Länder a fiscal capacity per head of 95% of the national average. The latter is measured as the revenue per head of all taxes accruing to the Länder, inclusive of part of the revenue obtained from the exploitation of oil and gas resources.

Table 6.4 shows the shares of intergovernmental (i.e. federal and from State to State) transfers, according to their type, in the total revenue of the sub-federal governments in the federations considered. 'Grants' have been interpreted here in a narrow sense, i.e. exclusive of federal compensations for public services rendered by sub-federal governments and of the redistributive components of revenue sharing schemes. For these reasons, the figures in Table 6.4 may differ from those in Table 6.3, where compensations for federal tasks were included in the federal grants.

It appears from Table 6.4 that fiscal imbalance in highly decentralized federations such as the USA, Canada and

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25 See Friedrich and Van Rompuy (1987), in particular Section C, Chapter I.

Table 6.4.

Intergovernmental transfers — Share of federal and horizontal transfers in total revenue of sub-federal governments (1984)

	USA	Canada	Switzerland	FRG	Belgium
A. Federal grants					
Unconditional	—	7,0[1]	—	0,8[2]	1,2
Specific	20,9	13,6	8,8	5,3	—
B. Horizontal transfers	—	—	—	1,1	—
C. Total (A + B)	20,2	20,6	8,8	7,2	1,2

[1] Equilization payments.
[2] Unconditional grants in the form of 'Ergänzungszuweisungen'.
Source: Van Rompuy and Heylen (1986), pp. 110-76; IMF, *Government finance statistics.*

Switzerland is dealt with by means of federal specific-purpose grants. In the North-American federations, which are characterized by a relatively weak social security system, the unequal provision of social services is mainly corrected for by these grants, which explains their relative importance. The federal grants' practice also reveals a marked preference for specific-purpose grants.

2.3. The EMU in federal systems: some conclusions

The short survey of the distribution of competences in federal countries shows that the EMU can be realized and sustained in highly decentralized economic systems. In view of the formulation of policy recommendations for the future EMU in the Community, the question arises whether general conclusions can be drawn from the wide diversity of workable decentralization schemes that are found in the federal experience.

The federal systems considered appear to have exploited, although to a different degree, the welfare benefits that can be reaped from decentralizing public functions for which preferences differ among sub-federal jurisdictions. The organization of the social security system blurs, however, the comparison between the European and the North-American federations. To a large extent, the more extensive social protection in Europe has been organized on a national scale. This finding can be rationalized *ex-post* in terms of the smaller size of the sub-federal jurisdictions in Europe and of the resulting interregional mobility that would narrow the scope for substantial interregional differences in contributions and benefits. A more important justification for the national approach relates to the nation-wide consensus on the design of a uniform system of social insurance.

The more extensive and nationally organized social protection in Europe has also a negative influence on the relative size of the redistributive grants allocated by the federal government. The specific-purpose grants in the North American federations are, to some extent, a substitute for a more developed nation-wide system of social protection. In the European federations, the specific-purpose grants guarantee a federal minimum level of public services in the areas of education, housing and transportation infrastructure.

Unlike the North American federations and Switzerland, the more centralized and younger European federations, i.e. the FRG and Belgium, show a greater constitutional concern for the coordination of regional budgetary policies. This concern could be rationalized on two grounds.

First, fiscal autonomy is much weaker in the younger federations as compared to their mature counterparts, which renders the budgetary position of the regions in the former more vulnerable to region-specific shocks. A second reason may be related to the degree of economic diffusion of the regions, which differs substantially among the federations considered. Economic diffusion can be roughly approached by its complement, i.e. the concentration of economic activity in a relatively small number of regions. Belgium is in this respect exceptional since the three constitutional regions absorb total GDP. In the FRG, the three dominant *Länder* represent 60 % of GDP, as compared to 29 % in the USA and 42 % in Switzerland. But by contrast, the three dominant Canadian provinces represent three-fourths of GDP and 43 % of total government expenditure. As pointed out above, the Canadian experience does not warrant a greater suspicion of budgetary laxity in comparison to other federations. One may therefore conclude that the regional economic diffusion, which stands for an interregional competitive

setting, is, taken separately, not decisive in designing binding rules for budgetary constraint. A sufficient degree of fiscal autonomy and the potential penalty of financial markets seem to contribute, in addition to a competitive setting, to budgetary restraint at the sub-federal level in the federations considered.

3. The relevance of economic federalism for the EMU

In the previous section, the economic landscape of federal countries is explored from a theoretical and empirical point of view. It remains now to be seen whether conclusions can be derived from this overview that are applicable to the future EMU of the Community.

Before policy recommendations are formulated, the overall framework of the EMU has to be specified. The economic conditions that actually prevail in the Community will be taken as a point of departure. This implies a framework in which the internal market gradually shapes the competitive conditions in the Community and in which economic convergence and exchange rate stability proceed. This setting still sketches a pre-federal stage, both from the economic and institutional point of view. Hence, the pre-federal stage will be characterized, on the one hand, by the realization of the internal market, sustained by an adequate competition policy at the Community level and, on the other hand, by a sufficient degree of macroeconomic coordination and convergence that allows for a persistent stability of the exchange-rate mechanism (ERM). This stage can be seen as a preconfiguration of the EMU.

In the federal stage, the EMU will be completely realized and complemented with an institutional framework in which economic competences are shared between the Community and the national governments. The federal stage also implies a substantial expansion of the Community budget in order to cope with specific federal tasks such as the implementation of redistributive policies and the provision of Community public goods and services.

The implications of the creation of a monetary union for the coordination of macroeconomic policies of the Member States is not examined in this study since they are dealt with in detail in other contributions. In addition to this crucial issue, several other questions arise related to the assignment of competences to the various layers of government in the pre-federal stage in order to arrive at the desirable goal of the ongoing integration process, i.e. the realization of a federal Community.

A first problem bears on the assignment of regulatory policies, on particular industrial policies and product regulation. The question arises whether additional regulatory policies should be elaborated at the Community level in order to sustain the process of market integration. Social regulation, in particular labour cost policy, poses a specific but highly sensitive problem which has far-reaching consequences for the overall economic performance of the Community.

A second issue is related to the interregional distribution in the Community. Social cohesion and interregional solidarity are important corner-stones of federal systems and contribute to their stability. In view of the well-developed solidarity mechanisms in the Member States and of the redistributive mechanisms that already exist at the Community level, the question arises whether additional redistributive mechanisms need to be designed in order to smooth interregional differences in welfare. The latter may be aggravated because of the adjustment processes that result from the increased competitiveness in the internal market. Moreover, as the monetary union is realized, country- and region-specific adverse shocks may impose substantial adjustment costs in terms of unemployment and income losses.

Finally, the movement from the pre-federal to the federal Community may imply a shifting of allocative competences that are distinct from those discussed in the preceding points. The McDougall report has in this respect sketched a realistic blueprint for the Community competences in the pre-federal stage.[26] It remains to be seen whether this blueprint has to be adjusted for the dynamics of the ongoing process of accelerated integration in the Community.

3.1. The assignment of regulatory functions in the EMU

In this section, we apply the previous theoretical and empirical considerations to analyse the scope for centralization of structural and regulatory functions in the EMU. More specifically, we will focus on (i) structural or industrial policies, (ii) regulation in product markets, and (iii) regulation in labour markets, i.e. Europe's social dimension.

As a starting point, we take the current situation in the European Community. Most often, Community-wide regulation is based on the principle that the European Community should intervene whenever national measures threaten to distort intra-EC competition or do not internalize all externalities for other Member States. Based on the earlier theoretical model, this provides a justification for the existing hierarchy of authorities in the European Community.

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[26] See Commission of the European Communities (1972).

The creation of the EMU poses new challenges to the current system. The internal market liberalization enhances the mutual interdependence among Member States and therefore reinforces the spill-over effects of national policies. At the same time, the completion of the EMS and the centralization of monetary and fiscal policies reduce the opportunities for national governments to offset the negative consequences of other Member States' policies.

These challenges raise a double question. First, one wonders whether the creation of the EMU requires a further shift of national to EC regulation and hence a new set of Community-wide norms. Second, there is the question of new principles for regulation in addition to, or as a substitute for, the idea of non-distortion and liberalization of intra-EC trade.

The basic thrust of our argument is that no such new principles are needed. Instead, we believe that the existing principles and policies must be reinforced and possibly extended to new areas of regulation. Moreover, the existing flexibility in the application of the principles to each particular case must be maintained and complemented by a more extensive EC policy review of the economies of the Member States. Under these conditions, a new set of strict EC norms is generally a second-best solution only.

As has already been pointed out, the purpose of this section is not to design a complete new blueprint of an a priori optimal government structure in the Community, but to start from an existing framework in which basic political choices have already been made. The approach may further be limited to the implications of the EMU programme for the reassignment of allocative policies. Hence, the focus will be on the Community-wide impacts—on consumers as well as on producers—of the existing national assignments of competences of economic allocative functions.

It may be observed that in many federal countries it is the size of the market that often determines the locus of government activity. This fact explains the shift over time of competences of sub-federal governments to the federal level. Is this the overriding principle that should also be applied at the European level?

The question is important and has already been given considerable attention in the recent programme for the continent-wide European internal market. The White Paper approach obviously focuses on the adverse external effects caused in trading conditions by national policies, and proposes actions to eliminate these trade barriers.

The implications of the underlying idea that international trade ought to occur on a level playing field are not unambiguous. Should it, like domestic competition, entail competition between firms operating under similar rules of the game? However, certain differences in national environments that result from deliberate social choices, such as differences in education systems, in wages, in pollution standards, etc., provide different production conditions that are precisely the basis for trade.

Moreover, within the EMU context, the market integration approach should be enlarged in several respects. From an efficiency point of view, not only market integration matters for the optimal assignment of functions, but also other spillover effects (e.g. environmental) to other jurisdictions. From a social distribution point of view, minimum levels of public goods should be provided across jurisdictions, and allocative policies may be designed to reallocate the gains and losses from the market integration process. As macroeconomic convergence proceeds, further microeconomic convergence in allocative policies may be required in order to sustain the EMU.

The allocation functions that are of importance to the EMU cover a wide range of policies. They may be classified as:

market intervention functions, i.e. direct interventions in the functioning of markets. They refer to numerous structural policies to be characterized as expenditure intensive;

market regulation functions, i.e. non-expenditure intensive regulation of the general conditions of trade and competition.

In order to determine the case for or against Community involvement in public sector functions, various efficiency criteria such as externalities, scale economies, market uniformity, democratic control, innovation, competition and political homogeneity may be applied to the different allocative functions of government. Hence, the McDougall report arrives at an assignment table, with weak and strong assignment cases. Accordingly, Community involvement may refer to various instruments covering vertical and horizontal participation, coordination, harmonization and regulation. It is found that quite a detailed item-by-item approach is required that distinguishes between numerous types of policy-actions which affect industry and commerce. Hence, there are no straightforward theories that define the appropriate level of government. They rarely give a clear-cut and exclusive assignment to one or other level of government, but often lead to a pragmatic model of shared policies, i.e. decentralized policies that are framed in a way which respects minimum Community requirements.

The previous normative approach, however, may be criticized: it takes the structural and regulatory interventions

as given as it attempts to specify the appropriate level of government by applying various criteria. However, the level of regulation and the importance given to structural policies may depend upon the assignment outcome. An alternative and more comprehensive approach will be required in order to take account of these interactions. The administrative process has to be endogenized, taking account of the strategic behaviour of government and business. Hence, the efficient level of regulation and structural policies may depend upon the answer to the 'what level?' question.

3.1.1. The assignment of industrial policies

Traditionally, the basis for structural policies in industry and commerce is established on: (i) market failures with respect to: competition, externalities in R&D, scale economies in information and risk-bearing for growth industries; and (ii) social concerns aiming at gradual structural changes in order to avoid social inequalities and to achieve a better regional distribution of industries.

The 'what level of government?' question is approached by focusing on the general criteria of:

allocative efficiency, in particular to internalize the spill-over effects of policies on other jurisdictions, and eventually to benefit from scale economies;

social redistribution, i.e. the provision of minimum levels of public goods across jurisdictions.

At the European level, the question of Community involvement is approached by using specific EMU criteria, i.e.:

negative external effects caused in trading conditions by national policies that distort fair competition;

structural adjustment problems and regional imbalances caused by European market integration.

Within an EMU, the emphasis is undoubtedly on the supervision of State aids that affect external trade and distort competition in an integrated market.

What potentially affects trade distortion may depend upon the type of industrial policies involved. To be more specific, global policies, such as subsidies of general or very diffuse application may affect the competitive position of countries and hence the level of trade.

On the other hand, selective policies, such as firm- or sector-specific subsidies are inferior as they may affect the comparative advantages and hence the direction and gains from trade.

In practice, however, Community involvement does not rely heavily upon a priori analytical criteria of potential welfare losses. It focuses on pragmatic criteria of the 'effective' importance of distortions of trade conditions, such as the geographical extent of the market affected and the size of the firms involved.

Referring to the other criteria of allocative, operational and informational efficiency, there also may be some further benefits to be exploited in Europe, e.g. in advanced technology, by evaluating the costs and benefits of *ad hoc* inter-governmental cooperation versus European integration. However, such conclusions should only follow from a more comprehensive approach to the administrative process and not from a limited set of assignment criteria. In a more comprehensive approach within a game-theoretic framework that takes into account strategic interactions between governments and business, industrial policies are no longer obvious. The answer to the 'what level of government?' question may itself determine the efficiency and hence the basis for industrial policies. In addition to allocational efficiency, attention should be given to operational and informational efficiency. Within such a model, subsidies are to be seen as transfer from (unorganized) taxpayers towards (organized) producers. They may also benefit consumers on domestic and foreign markets. Therefore, as a protection device for domestic industries, subsidies will be less popular than tariffs and regulatory interventions.

Efficient levels of industrial policies will be conditional upon financial and fiscal responsibility at the same government level. Otherwise there will be overproduction of these policies, as the costs may be shifted towards other government levels.[27] However, financial responsibility is not a sufficient criterion. With regard to innovation policies it has been demonstrated that the choice of centralization or decentralization crucially depends upon the degree of transferability of acquired knowledge. With large spill-overs of acquired knowledge between regions, centralization will lead to a higher level of R&D effort. If know-how can be privatized, decentralization will lead to more innovations.

As for government subsidy policies, the fiscal responsibility solution, pointing towards decentralization, has to be complemented by further analysis of the democratic decision-making process. Whereas centralization often results in costly compromises, decentralization limits the degree of freedom of decision-makers, leading to more transparent and better-profiled policies. The potential for negative inter-

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[27] See De Bruyne *et al.* (1990) for a discussion of the efficiency of regional subsidy policies in a multi-level government framework.

regional spill-over effects of decentralized government aid is undisputed. However, the effective impact will be dependent upon the industrial policy strategies chosen and upon neutralizing mechanisms set up by business strategies. Hence, it is hard to get a clear picture of the effective market distortive consequences. Moreover, the choice of more or less market distortive instruments may depend upon the centralization/decentralization issue. A clear picture of market distortions may only emerge in rather extreme situations of destructive fiscal and subsidy competition. Differences in corporate taxes may be as harmful to the EMU as differences in subsidies. Whereas the analyses do not always lead to unambiguous answers, it appears that there is a case for a complementary role for the Community to stimulate cooperation and to eliminate market distortions.[28] As it is difficult to design general rules, Community involvement has to rely on a case-by-case approach.

One may, therefore, conclude that instead of relying upon a simple set of normative criteria for a better design of Community involvement in industrial policies, more positive research within a more comprehensive policy framework is needed. The present policy rules should take into account the obvious dynamics in industrial policy-making.

3.1.2. The assignment of regulatory functions in product markets

Traditionally, the rationale for regulatory interventions by governments is based on:

(i) the need for a general regulatory framework in order to facilitate economic and social transactions;

(ii) the need to correct for market failures in case of (negative) externalities, information asymmetries and distortions in competition;

(iii) the need for protecting market participants against risks resulting from the operation of efficient but ruthless free markets. The market system, responding to abrupt changes, is regarded as an 'unfair' allocation mechanism.[29]

The 'locus of regulation' question is approached by focusing on the general criteria of allocative efficiency and social concern for protection of the consumer. At the European level the emphasis is shifted towards EMU criteria, in par-

ticular the Community-wide impact on trading conditions of State regulatory activities. At the limit, uniformity of regulation could be seen as a precondition for effective competition. However, it should be weighed against the administrative cost related to the elimination of cultural preferences and traditions.

Consequently, a whole set of assignment criteria need to be compared in order to determine the case for Community involvement and Community instruments. It requires quite a detailed item-by-item approach of the various types of regulation involved. In several of the sub-categories, there remains considerable scope for debate. The question arises whether broad framework directives are adequate, leaving details for national preference, or whether directly applicable Community regulation is necessary.[30]

As compared to industrial policies, the Community-wide impacts of regulatory functions are difficult to determine, given the vast number of regulatory rules and the virtually unforeseeable number of ways in which they may affect trade. Lacking simple rules, it has to be investigated on a case-by-case basis whether the Community-wide effects are substantial. In the USA, the answer is often of the procedural type resorting to bureaucratic approval procedures.[31]

The introduction of the 'mutual recognition' principle recently accepted by the Community may also be seen as a procedural solution. However, in order to assess the implications of regulatory competition combined with minimum Community requirements, a more comprehensive analytical framework is needed.

Regulatory functions may not be taken as exogenous in order to determine the locus of regulation, as the regulatory process itself may be influenced by the assignment solution. Regulation not only protects the consumer from the effects of a variety of market imperfections (stated in public interest theory), by the regulated firms may strategically use the administrative process to protect their interests as they interact with the regulators (stated in public choice theory).

The regulatory process involves transfers between producers and consumers. In an open economy framework, additional classes of transfer possibilities that affect the level of regulation have to be brought into the picture:

(i) with multiple jurisdictions there are possibilities of transfers from foreign consumers to local producers;

28 See, for example, De Bondt and Van Cayseele (1983) for an analysis of the distortive effects of a decentralized industrial policy.
29 See Owen and Braentigam (1978).
30 This problem was already raised in the McDougall report, Commission of the European Communities (1972).
31 See Breyer (1989).

(ii) foreign competition will increase the demand for regulation in order to protect firms against market forces.

The Community-wide effects of decentralized regulatory policies are to be analysed within a dynamic game-theoretic framework. It is found that the outcome of the regulation game for fair trade competition and consumer protection differs according to the assignment procedures.[32] Traditionally, decentralized regulatory policies have been governed by the destination principle, i.e. the host country control rule, according to which foreign firms must adapt to local provisions. They constitute important barriers to trade and engender forces toward the adoption of tougher regulations. Hence, the regulation game analysis confirms the real world experience that harmonization and market integration in the Community is not well served with host country preference.

The adoption of the origin principle, i.e. home country control combined with mutual recognition of decentralized regulations, results in triggering forces towards less regulation. No competitive gains are to be obtained from tougher regulation. Firms will relocate toward countries that impose the weakest requirements. Competitive distortions caused by decentralized regulatory policies will disappear. Harmonization will automatically be brought about by competition in regulation.[33] Hence, the regulatory game demonstrates that the Community was quite logical in its choice for the home country control rule.

The negative Community-wide effects on consumers induced by the downwardly regulating spiral, constitute the basis for 'minimum standards' to be imposed by the Community. This conclusion needs, however, to be qualified by further analysis. Elements of strategic regulation may come in through the back door of the Community: if minima are put high enough by effective lobbying at the Community level, they will become barriers to entry for producers from countries that apply softer regulations. Moreover, the need for Community involvement and minimum standards may differ according to the regulatory actions involved, as various types of regulation may be affected differently by the transition to the origin principle.

Reputational effects may provide a competitive edge in the market. Reputation in toughness of regulation can act as a

marketing strategy and stop deregulation at the start rather than induce a downward spiral of regulation. It applies to regulations based on information asymmetries that are of value to the consumers.[34] Eventually, these regulations will gradually produce convergence on 'best practices'.

Regulations based on other types of market failures, however, will continue to be eliminated by regulatory competition. Benefits may be obtained, e.g. from removing structural controls on market entry, on permissible business activities, and on price-setting as they lose their anticompetitive impact.

Competitive deregulation may be harmful in other cases, e.g. environmental regulation as a protection against negative externalities. Environmental regulation represents a difficult assignment case. The maintenance of the destination principle for environmental reasons avoids deregulation, but it may be harmful to Community-wide trade. Moreover, it may create a major ambiguity: e.g. car safety regulation may involve information asymmetries as well as negative external effects. This may lead to an excessive reliance on environmental regulation, as host country control can also be abused for a hidden protection of the domestic market. The application of both the origin and the destination principle may lead to regulatory arbitrage by multinational companies in order to exploit regulatory concessions in different countries. Regulatory conflicts may run contrary to the concern of providing a fair level playing field in the Community.

Hence, some Community involvement in environmental policies is unavoidable. A first alternative consists in the White Paper approaches: the Community establishes minimum standards, and leaves further requirements to the nation States provided that the mutual recognition principle is applied. However, when the minimum requirements are put too high as a result of effective lobbying, they may become barriers to trade. More environment-conscious countries will still be under competitive pressure to lower their environmental standards. The second alternative is to maintain host country control but to subject environmental regulations to a Community approval procedure. The Community then has to investigate, on a case-by-case basis, whether the Community-wide negative spill-over effects are substantial.

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[32] An application of the game-theoretic approach to the regulation issue in financial markets is found in Van Cayseele and Heremans (1990).

[33] Note, however, that with trade based on comparative advantage and upwardly sloping supply curves, by regulating the domestic industry and raising the price above the marginal cost of production, prices will primarily risc for foreign customers, and a wealth transfer is effected to local producers. See Tollison (1985).

[34] The forces for re-regulation, counteracting the tendencies for competitive deregulation may differ for products and sectors according to: (i) the importance of information costs and the value of reputation; and (ii) the balance between the costs of private investment in reputation and the costs imposed by regulation.

3.1.3. *The assignment of regulatory functions in labour markets: Europe's social dimension*

In this section, we discuss the scope for centralization of measures affecting labour costs including wage and non-wage components. Non-wage labour costs are influenced by regulations on hiring and firing, social security contributions, over-time and part-time work, pension schemes, unemployment compensation, holiday and sickness pay.

The optimal degree of centralization of labour costs forms a major issue in the current debate on Europe's social dimension. The action programme complementing the Social Charter contains Community regulations in the areas of health and safety standards for working conditions, equal treatment of men and women, professional training and education, Those measures have been welcomed by all parties concerned and some have already been approved by the Council of Ministers.

More controversial are the initiatives on worker participation and consultation, firing in cases of company reorganization, sickness and holiday pay, part-time work, and the creation of a legal framework for a European company. The employers' organizations argue that, in view of the subsidiarity principle, such issues should not be decided at the Community level. Conversely, the unions and the European Parliament judge that the current proposals do not go far enough and criticize the Commission's alleged 'low profile' on social issues. In their view, the debate on Europe's social dimension should also consider an acceptable minimum level of income and social protection, European standards for labour relations, and a broadening of the existing European social dialogue.

In what follows, we discuss whether and which European labour cost regulation is needed for allocative efficiency in the future EMU.

3.1.3.1. Externalities and strategic labour cost policy

As mentioned earlier, externalities provide an argument for assigning the regulatory functions to the federal level. Through their impact on the competitive position of companies, labour cost decisions generate spill-over effects. For example, a Dutch exporting firm benefits from wage moderation or a reduction in social security contributions at the expense of its French or German competitors.

The creation of an internal market reinforces this kind of externalities. As a result of increased competition, firms face a more elastic product demand curve. In its turn, this leads

to a flatter labour demand curve. Hence, moderation in labour costs entails a stronger expansion of employment, production and market share in an integrated market. In short, the manipulation of labour costs becomes more effective for capturing market share in an integrated European market.

In consequence, governments and employers alike will be increasingly tempted to use labour cost policy to gain a competitive advantage in strategic sectors that are faced with intense international competition.

The fact that the EMS rules out exchange rate adjustments, and that the Commission is stepping up its campaign against direct State aids, contributes to the attractiveness of strategic labour cost policies from a national point of view. As an example, Pieters (1989) mentions the Dutch Government's intention to finance a reduction in employer contributions for child allowances with funds that were previously used to subsidize companies. This subsidy scheme was abolished in compliance with EC policies.

In spite of examples like these the literature on strategic trade policy points out several limits on the scope for strategic labour cost policies.[36] To enhance national welfare, a reduction in labour costs must entail a substantial shift in profits from foreign to domestic firms. Labour cost measures should therefore be specifically targeted at imperfectly competitive industries where entry restrictions and/or economies of scale allow for a sustained high level of profits. The selection of such sectors is not straightforward. Moreover, unions should not be able to obstruct the policy. Finally, the measures should not be harmful to other sectors in the economy.

Several of these conditions are not met in the case of labour cost policies. Consider wage costs first. In several EC countries, centralized wage bargaining impedes the flexible use of wages as an instrument to improve the competitiveness of specific sectors. Furthermore, unions do not willingly accept wage cuts or reductions in the level of social protection.

Most of the components of non-wage costs are not very well suited for strategic social policy. Regulations on unemployment benefits, employer social insurance contributions, minimum wages, sickness and holiday pay apply to large parts of the economy. Therefore, measures to promote certain exporting or import-competing industries have far-reaching,

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[36] See Helpman and Krugman (1989) for an analysis of the recent trade theory in imperfect markets.

and often very negative, consequences for other sectors in the economy. Altering the system of non-wage costs is also complex and time-consuming, so that non-wage costs do not appear a very flexible instrument for strategic labour cost policy. Direct sectoral wage subsidies form one of the few exceptions because they can be targeted directly at specific sectors. Even then, Brander and Spencer (1988) show that the impact of these subsidies on a sector's market share is mitigated by the fact that unions appropriate part of the subsidy in the form of higher wages.

In the light of these considerations, we can evaluate the strategic argument for centralization of labour cost policy. Centralization at the European level is warranted when Member States distort intra-EC competition by manipulating labour costs. It is not clear whether labour costs can be systematically used to gain a competitive advantage in specific sectors of the economy. Even if this were the case, European minimum social standards, as proposed in the debate on Europe's social dimension, appear as a second-best policy only, because they invariably apply to the whole economy. What is needed instead is a case-by-case approach to the competitive distortions of changes in labour cost legislation. This effectively amounts to an extension of EC competition policy on State aids to aspects of labour costs.

3.1.3.2. Social dumping

A second argument for centralization of labour cost policy concerns social dumping. It is argued that, even if Member States do not strategically manipulate labour costs, the creation of an internal market will inevitably exert a socially unacceptable downward pressure on wages and social norms in the more developed EC member countries. To avoid the disruptive social effects of market integration, the European Community should impose minimum social standards comparable to the essential requirements on product safety and quality.

A rather pessimistic view on the effects of an EMU for the more developed countries lies at the heart of the social dumping argument. Implicitly, it is assumed that market liberalization is primarily beneficial to the countries with lower social standards. The principle of mutual recognition implies that cheaper products of countries with lower social standards can freely circulate within the European Community. Consumers buy more of those goods, while companies profit from the guaranteed EC market access and the lower labour costs to invest in countries with lower standards. Widespread unemployment emerges in the more advanced EC countries and is translated in lower wages and an erosion of social protection.

This view on an economically unified Europe is plausible when higher labour costs form an essential reason why most firms from high-income countries cannot compete in a competitive European market. This implies that higher labour costs do not reflect a higher labour productivity and are made possible by protective non-tariff barriers. In essence, the labour cost differential with respect to other countries can be interpreted as a rent generated by protection.

Evidently, the social dumping scenario is not the only possible one. Imagine that the creation of an internal market in first instance allows companies from more developed EC countries to penetrate the markets of the less developed EC Member States. Comparing the competitive strength of, say, German firms and Portuguese or Greek companies, this is not an implausible scenario in many sectors. In this case, economic problems in the less developed countries are aggravated, and the EMU could be faced with a widening gap between unemployment and income levels of more developed and less developed Member States.

A more balanced and perhaps more realistic view combines the two previous scenarios. European integration is likely to benefit the more advanced countries in sectors where human capital and technological know-how are of crucial importance. Conversely, labour intensive activities requiring fewer skills will increasingly move south. This pattern of international specialization conforms to what traditional trade theory would predict. The 1992 programme is speeding up this ongoing process as well as directing investment to the developing EC countries instead of to Singapore, Malaysia and Indonesia, to mention a few examples.

Trade theory also provides insights into the likelihood of 'social dumping'. If the above specialization takes place, the downward pressure on wages and social protection in the more developed countries would be limited to less skilled labour, while the premium on human capital would actually increase. Even in the case of unskilled labour, it is possible that trade-induced growth would mostly raise wages in southern Europe without substantial wage erosion in the rest of the European Community. Empirical evidence on the closing gap in the 1960s between US wage levels and wages in Europe and Japan points in this direction. More recently, the steady real wage gains in South Korea, Singapore, Hong Kong and Taiwan suggest a similar pattern.

These remarks do not rule out 'social dumping' but question its scope and inevitability. Faced with the uncertainty about which scenario will ultimately prevail, the case for EEC labour cost norms becomes much more complex. In the transition to a stable EMU with acceptable income differentials between more developed and less developed countries,

one would want to avoid measures which make a negative outcome for the less developed countries more likely. As we show below, labour cost norms may precisely have this undesirable effect.

3.1.3.3. Labour costs and comparative advantage

In the above discussion, it is argued that the main benefits of the internal market for the EC countries with lower labour costs lie in the expansion of labour-intensive industries. In other words, the lower labour costs form an important factor in these countries comparative advantage.

The magnitude of the intra-EC labour cost differentials should not be underestimated. In Table 6.5, we present labour costs for the employer in the different EC countries. It is seen that labour costs in Germany are more than five time those of Portugal and three times higher than in Greece and Spain. Among the northern EC countries, labour costs in the UK lie well below the average. Although the data in Table 6.5 refer to 1981, it is safe to assume that intra-EC labour cost differentials persist today.

Centralized labour cost policy on a Community scale should take the existing labour cost differentials and their impact on comparative advantage into account. In contrast to the area of State aids, Community policy cannot simply act against labour cost advantages of some Member States on the grounds that they distort intra-EC competition. Neither is it certain that the idea of minimum essential EC requirements, which forms the basis for the harmonization of health, technical and environmental standards, is appropriate when labour costs are concerned. Such straight application of existing principles to labour cost policy runs the risk of affecting the comparative advantage of some countries. In this way, the scenario in which developing EC countries are harmed by the creation of an EMU becomes more likely.

This point is particularly relevant for absolute EC norms which specify that social security contributions, minimum wages, sickness benefits, etc. should not lie below a centrally determined minimum level. Considering the substantial labour differentials in the European Community, absolute norms, which are specified as some (weighted) average of the conditions in the Member States, are ruled out. Assume that a norm were to be imposed, which forms the average of the labour costs. From Table 6.5, one finds that this average amounted to ECU 1 459 in 1981. To meet this standard, labour costs for Greek employers would have to go up by 57,3%. Portuguese companies would be confronted with an even higher surge in labour costs of 73,5%. Without any doubt, this would lead to massive unemployment and impede any specialization in labour-intensive products.

We conclude that inadequate absolute norms put considerable strain on the low-income EC countries. This undermines

Table 6.5.

Labour costs in the European Community (1981)

	B	DK	D	GR	F	IRL	I	L	NL	P	UK
Labour costs for the employer on a monthly basis in ECU	1 719	1 732	2 008	623	1 734	1 423	1 545	1 574	1 891	386	1 417
in percentage terms	100	100	100	100	100	100	100	100	100	100	100
Costs of professional training	0,4	1,9	1,6		1,6	1,3	0,3	0,5	0,4	2	1,5
Social security contributions employer	24	5,7	21	18	28,1	14,7	33,5	14,9	24,4	18,4	14,6
Social security contributions employee	9,8	1,5	13,3	12,2	10,2	7,0	6,3	9,9	20,4	9,2	7,5
Taxes employers							0,5	0,5		2,7	
Taxes employee	15,0	39,9	10,0	2,3	0,0	14,9	9,6	2,6	7,0	3,0	15,1
Subsidies employers	1,1	0,3					8,1				0,1
Child allowances (two children)	8,2	0,0	3,5	6,4	5,4	2,5	7,1	7,0	5,8	3,1	7,0
Other costs	1,4	0,4	0,7	1	2,3	1,4	1,2	1,3	2,3	3	1,2
Net income of the employees	58,7	50,9	56,8	73,0	63,2	63,2	63,8	77,3	51,2	64,8	67,3

Source: Commission of the European Communities (1989). An employee is defined as a married male with two children in a one-income family. In the case of Denmark, a single male employee is considered. No data are available for Spain.

their willingness to participate in an EMU. The more developed countries would also be harmed by the economic problems in the less developed countries. The widening gap between more and less developed countries would generate a rapidly increasing stream of transfers in the form of regional aid financed by the more developed Member States. Those countries would actually be paying in regional funds for the competitive market advantage they derived from the EC social minimum requirements. This shows the dangers of an inappropriate labour cost policy for a sustainable redistribution function in an EMU.

It follows that, if absolute norms are imposed, they have to be set at a level close to the existing conditions in the lower income countries. In that case, however, they are not likely to achieve the original goal of preventing social dumping.

3.1.3.4. Flexible adjustment to country-specific shocks in an EMU

Centrally determined absolute norms have an additional disadvantage, irrespective of the level at which they are set. They are based on the conditions in a set of EC countries rather than on the economic performance of the individual Member States. For this reason, they impede a flexible adjustment to unfavourable country-specific shocks.[37]

Consider a situation where a low-income EC Member State is confronted with country-specific adjustment problems. To restore competitiveness, wage moderation or a reduction in the non-wage component of labour costs is needed. EC labour cost norms rule out such measures. Worse, there may even exist a tendency to raise minimum social standards when the economies of the other EC countries perform strongly.

The argument for sufficient country-specific flexibility in labour costs gains in importance in a monetary union. With exchange rate adjustments ruled out, and with national authority in monetary and fiscal matters transferred to the EC level, labour cost adjustments become one of the few remaining instruments to absorb country-specific problems.

Summarizing, we find that labour cost norms in an EMU should: (i) be primarily based on country-specific conditions, and (ii) allow for enough flexibility when a Member State is confronted with serious economic problems.

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[37] This argument is developed in Abraham (1989).

3.1.3.5. Sustainable labour cost policy in an EMU

In this section, we offer some thoughts on the scope for an EC labour cost policy in view of these two conditions. We distinguish between four different options.

1. **Relative labour cost norms** constitute a first alternative to the absolute norms discussed above. They relate non-wage costs and minimum wages to the wage level of a particular country. For instance, the central EC norm could specify that social security contributions should at least account for a fixed percentage share of total wage costs in each Member State. Norms for minimum wages and unemployment benefits could be determined in a similar way.

Relative norms meet the condition that the regulations are based on country-specific economic conditions. In absolute terms, contributions for social security, minimum wages and unemployment compensation in Portugal are lower than in Germany because of the wage differential between the two countries.

Relative norms also guarantee sufficient flexibility in so far as wages adjust to changing country-specific economic conditions. Relative norms tie non-wage costs to the wage evolution. The wage determination itself does not fall under EC control. When wages fall sufficiently to absorb a domestic recession, non-wage costs decline as well. Conversely, wage rigidities lead to labour cost inflexibility in the presence of relative norms.

Based on the information in Table 6.5, the introduction of relative norms would not be too disruptive. Indeed, the intra-EC variation in the shares of the various components of non-wage costs in total labour costs is considerably smaller than labour cost differentials across countries. Of course, this raises the question whether EC norms are actually needed in this case. Also, relative norms are not likely to prevent social dumping because labour cost differentials across EC countries are unaffected. They offer protection against strategic use of non-wage costs, but here again the optimal use of such broad norms remains doubtful. For these reasons, we do not advocate the use of relative norms.

2. A second strategy for Europe's social dimension does not rely on the idea of fixed norms. Instead, **the evolution of labour costs is analysed as part of the regular policy evaluations, by the Commission, of the individual Member States.** Policy recommendations on wage and non-wage costs can then be made taking into account the economic performance of each Member State. Strongly performing economies can then be asked to raise wages or social protection. Weaker economies could be advised to restrain labour costs, perhaps

in exchange for increased regional aid. This would divide the burden of adjustment between strongly and weakly performing economies.

To some extent, this system can be compared to the periodic currency realignments in the European monetary system. It also fits in nicely with the Delors report on monetary union. This report foresees periodic recommendations on monetary and fiscal policy, to which advice on labour cost measures could be easily added. Such strategy would be an alternative to a comprehensive system of detailed labour cost norms. It would also create the opportunity to incorporate national governments, unions and employer organizations in the actual policy implementation.

3. The two previous strategies do not exclude Community initiatives promoting a **social dialogue between employers and unions on a European level.** In view of the stronger labour market interdependence in an integrated Europe, unions and employer organizations will have to debate some issues on a European scale. By providing an institutional framework, the EC authorities can perform an intermediary function comparable to the role of some national governments in individual Member States.

4. Finally, the **competence of EC competition policy in labour cost issues** has to be addressed in a future EMU. Except for renewed efforts to bring direct wage subsidies under control, such extension of competition policy is not envisioned in the plans for an EMU. In spite of this, a case exists for Community intervention if national labour cost measures are primarily aimed at establishing a competitive advantage with respect to EC competitors. Member States would be required to inform the Commission on changes in labour cost measures. The Commission would then determine whether the proposed change distorts intra-EC competition on a case-by-case approach.

3.2. Redistribution policies in the EMU

3.2.1. Interpersonal redistribution

It is argued in the theoretical analysis of economic federalism that, from an efficiency point of view, the decentralization of interpersonal redistribution policies is constrained by the intensity of interregional mobility. Furthermore, as a nation-wide consensus on interpersonal equity develops, the scope for a national redistribution programme increases. The empirical evidence on the European federations has shown that even in highly decentralized systems, such as Switzerland, interpersonal redistribution has gradually been organized at

a national level. The nation-wide redistribution policies allow, in the federations examined, for additional redistribution at the regional level. In the North American federations, which are characterized by more decentralized and less extensive distribution policies as compared to the European ones, the regional differences in contribution and benefit schemes do not appear to cause substantial distortions in competitive conditions. Apparently, regional differences in contributions have been absorbed through time in the productivity of labour. In addition, as product markets become more differentiated and firms engage in non-price competition, modest differences in employers' contributions to social security are more sustainable, in particular in geographically large federations.

Actually, redistribution in the Community as reflected in the progressivity of personal income tax schemes and in the national social security systems shows a high degree of diversity. On the other hand, mobility within the northern EC countries has, since the formation of the common market, been rather weak and the resulting flows should be interpreted more as interregional than international.[38] This has not been the case for the out-migration in the 1960s from Italy and Spain to the northern EC countries, which has been induced by substantial differences in labour productivity and wage-employment opportunities. However, in view of the increased intra-EC trade in the past decades, trade flows have, on the whole, served as a substitute for international migration. At present, the substantial differences in labour productivity and in social protection between the new members of the Community (Greece, Portugal and to some extent Spain) and the other EC trading partners could, however, induce large South-North migration flows in search of better wage-employment and social security opportunities.

It is not evident that these migratory flows will contribute to an improvement of the overall allocative efficiency in the Community. To the extent that the skills of the migrant workers do not match those required in the higher-income economies of the European Community, they will add to the persistent stock of the structurally unemployed in the host countries and cause serious imbalances in their security systems and deteriorate their fiscal stance. In order to prevent a negative benefit-cost balance from increased mobility, two alternative approaches are feasible. In a first scenario, social harmonization could accompany the economic convergence in the enlarged Community and reduce the incentives for excessive migration. As pointed out in the preceding section, such a policy would be most detrimental to the

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[38] See, for example, Straubhaar (1988).

competitive position of the less developed countries if they adopt the social standards of the high-income countries. North-South transfer schemes that would ease the introduction of the more extensive social protection in the less developed countries would reduce incentives and lower comparative advantage in the contributing countries. One may, moreover, doubt whether there exists a sufficient political support for such transfers in the contributing member countries. In a second and more realistic scenario, the Community could intensify labour market policies that aim at developing appropriate skill levels in the low-income countries in order to increase employment opportunities there. Social convergence would then result as a spontaneous consequence of the narrowing income differentials which may be expected from the intensified North-South flows of capital and from increased intra-Community trade.

One may, therefore, conclude that in the pre-federal stage there is no need for Community-wide interpersonal redistribution policies. In order to prevent excessive South-North migration which would on balance cause negative externalities in the high-income countries, preference should be given to Community labour market policies which enhance their flexibility and contribute to the overall economic performance.

3.2.2. Interregional redistribution

As shown in the McDougall report (Commission of the European Communities, 1972), federations make use of high-powered interregional distribution mechanisms in the form of budget equalization schemes. Their effectiveness in reducing regional income differentials has been ranked higher than the implicit and more extensive redistributive mechanisms applied in unitary States.

The regional welfare differences in the Community in terms of income and in the availability of social public services such as education, health services, transportation and housing have undoubtedly increased as a consequence of the recent entry of low-income countries. These structural welfare inequalities necessitate a more extensive interregional equalization mechanism as compared to the situation before the recent enlargement in order to sustain Community-wide solidarity. In addition to this structural inequality, one may expect an increase of the regional welfare differences in the medium term as a result of the adjustment processes caused by more intense competition in the internal market. And, finally, as exchange rates become irrevocably fixed, country-specific adverse shocks may lead to temporary welfare losses, in particular if labour markets lack sufficient flexibility.

In view of the structural and transitory imbalances in the Community, the question arises whether in the pre-federal stage new instruments of interregional solidarity should be developed and if so, which form they should take. In this respect, a distinction should be made between, on the one hand, the structural deficiencies in the supply of vital public goods mentioned above, and, on the other hand, the income losses resulting from transitory adverse shocks.

As for the structural regional imbalances in the supply of vital public goods, there is a clear case for an intensification of the Community grants allocated through the regional Fund. These grants are similar to the federal grants that guarantee acceptable minimum levels of essential public goods. They have positive spill-over effects on other regions and have a productivity-enhancing impact. In order to avoid the undesirable substitution effects referred to in the first section, preference should be given to specific-purpose grants of the matching type. Ideally, specific indicators of need should be used in the allocation mechanism. Regional income per head may serve as a first indicator of need. Regions that in this respect fall below threshold values, defined at 60% of the Community income per head, could be eligible for such grants. For each type of public service, specific indicators of need could be developed. It is also obvious that the development potential of the eligible regions has to be evaluated in order to prevent a purely mechanical allocation mechanism that would favour sparsely populated and peripheral regions.

The Community has developed substantial experience in coping with adjustment problems in specific sectors. Because of the adjustments ahead in view of the realization of the internal market, the demand for sector-specific aid may increase. In this area of Community aid, serious incentive problems may, however, arise. Indeed, experience of the adjustment processes in the past decades indicates that labour market rigidities and, in general, generous social protection schemes, have slowed down the necessary adjustments in some industrialized countries. As a consequence, public deficits and debt have increased sharply and have put a burden on future growth. From this point of view, future sectoral aid should focus more on stimulating the reallocation of resources than on supporting excess capacities. This implies that more emphasis should be put on labour market policies than on output or price subsidies to declining industries. It also implies that in order to prevent free riding on Community funds, reconversion aid should be made conditional on national complementary policies that foster the flexibility of the labour market.

As the Community approaches the federal stage, there may grow a consensus on horizontal equalization grants similar

to the redistribution scheme embedded in the *Länderfinanz-ausgleich* in the FRG. Such a scheme would reduce the impact of adverse, country-specific shocks and involve limited transfers from high- to low-income countries. The question remains whether such transfers should be unconditional, since the eligible countries will still have a considerable control over public expenditure and revenue in contrast to the sub-federal governments in federal systems. If the grants were unconditional, they could, for example, be used for increased tax competition that would distort competitive conditions in the Community. Therefore, it would be preferable, from an incentive point of view, to design formulas that imply a conditional solidarity in the sense that the contributing countries exert some degree of surveillance on the budgetary stance of the eligible countries in the framework of the coordination of macroeconomic policies.

To summarize, the gradual transition of the Community from the pre-federal to the federal stage does not call for new instruments of interregional distribution. The emphasis of the redistributive Community flows should, however, shift from the sectoral aid to labour market programmes and to the support of vital public functions in low-income regions that have a sufficient potential for growth. In the federal stage, however, there is scope for horizontal conditional transfer programmes that would alleviate the adjustment costs imposed by adverse country-specific shocks.

3.3. Some new dimensions of the allocative functions of the Community

The main theme developed in the preceding sections was that in the transition to the federal stage there is no clear evidence in support of an extension of expenditure-intensive Community regulation. Nor is there a strong case for Community-wide, uniform labour cost policies that would reduce comparative advantages and increase the demand for redistribution.

It has been argued that emphasis should be put on strengthening the adjustment capacities of the economies that face serious adjustment problems in the transition stage towards an economic and monetary union. This implies that the existing structural Funds that aim at specific sectoral aid should be exclusively oriented towards productivity-enhancing programmes. This goal can be achieved by increasing, for example, the scope for Community labour market policies, in particular training programmes, and by stimulating the transfer of factors of production from declining to growing industries.

As in federal countries, the positive externalities created by infrastructure policies may result in a suboptimal supply.

This will in particular be the case for the smaller countries that may be reluctant to participate in transnational programmes. Such a situation does not automatically call for a Community involvement since bargaining may result in compensations for the positive spill-overs. But as the scope of the transnational programmes increases, a bargaining solution may not be achieved. This leads to a role for the Community as the appropriate intermediary level and as the agency that organizes the compensatory transfers by means of conditional matching grants. A similar argument holds for the internalization of the positive spill-overs resulting from large-scale research projects, an area where the Community has played a successful coordinating and stimulating role.

Transnational negative externalities that reduce the environmental quality arise frequently in the Community as a result of inadequate production technologies and consumption patterns in the member countries. As far as regulation in this area is concerned, the scope for Community involvement is sketched in the section on regulatory policies. In addition to regulatory measures, the Community could, for example, consider the use of energy taxes in order to reduce air pollution. The use of indirect taxes, i.e. VAT and excise taxes, with the purpose of internalizing negative environmental externalities in consumption and production, can be seen as part of the tax harmonization proposals for the Community in the framework of the realization of the internal market.[39]

4. General conclusions

It was the purpose of this paper to examine theory and facts on federal systems in order to draw useful recommendations for the future development of the Community into an economic and monetary union.

The theory of economic federalism as well as the organization of federal systems have made a strong case for the decentralization of public functions in order to exploit to a maximum the welfare benefits of an EMU. This subsidiarity principle should be the main guideline for the allocation of public functions in the European EMU. Externalities and preferences on a majority basis for pure public functions, including regulatory policies, shape the Community level of involvement in economic and social matters.

An exploratory tour of North American and European federations has shown that the general federal model can be realized in a variety of ways. Apparently, there does not

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[39] See, for example, Proost (1989) for a discussion of Community taxes on energy products.

exist a unique and optimal federal system as such. Diversity is the common feature of workable federations. The Community takes in this respect a unique position because of the thin layer of public functions that will be allocated to the supranational government in the transition to the federal stage.

Summarizing the main recommendations, one can state that in the pre-federal stage the overwhelming task of the Community will be in the design and monitoring of rules that strengthen economic and monetary integration. It is stressed in the sections on regulatory policies that an item-by-item approach that leaves room for competitive deregulation is preferable to the imposition of uniform Community rules. The approach implies that the existing Community policies in the field of trade and competition need to be reinforced and extended to new areas which will be crucial for the realization of the EMU. This holds, in particular, for labour market regulations that affect labour costs and shape the competitive conditions in the Community. It is therefore recommended to include labour cost policies in the regular evaluation by the Community of the macroeconomic performance of the Member States.

The concern for interregional equity will undoubtedly move to the foreground as the integration process proceeds and Community-wide adjustments in the allocation of resources takes place. The monetary convergence will, moreover, put a heavy strain on the flexibility of labour markets if country- and region-specific adverse shocks occur. The scope for a positive balance of the benefits and costs of the EMU would, however, be substantially narrowed if the Community were to engage in large-scale redistributive, income-supporting policies. This does not imply that the Community should abstain from the use of redistributive instruments. It has, on the contrary, been stressed that there is a growing need for Community involvement in the support of vital public functions in areas such as education, transportation and housing. The Community efforts should, as is the case in the federations reviewed, be concentrated on the regions at the low end of the income scale.

It remains a delicate question whether horizontal transfers should be provided for in order to cope with transitory, adverse shocks once exchange rates are irrevocably linked. The suggestion has been made that if such transfers were established, a close surveillance on the economic performance of the eligible member countries remains desirable because of their substantial budgetary and social autonomy.

The further development of the Community in the direction of a federal system will, according to the views expressed here, lead along a path on which the difficult task of balancing the gains from increased efficiency and the need for equity and social cohesion has to be realized.

References

Abraham, F. (1989), 'Wage norms and Europe's single market', International Economics Research Paper, No 63, CES, Leuven.

Brander, J.A. and Spencer, B.J. (1988), 'Unionized oligopoly and international trade policy', *Journal of international economics*, 24, pp. 176-88.

Breton, A. (1965), 'A theory of government grants', *Canadian journal of economics and political science*, 31, pp. 175-87.

Breyer, S. (1989), 'The appropriate level of regulation in Europe: local, national or community-wide? A US perspective', *Economic policy*, 9, pp. 476-79.

Buchanan, J. (1950), 'Federalism and fiscal equity', *American economic review*, 40, pp. 583-99.

Buchanan, J. and Wagner, R.E. (1971), 'An efficiency basis for federal fiscal equalization', in: *Analysis of public output*, Margolis J. (ed.), Princeton, NBER.

Buchanan, J.M. and Goetz, C.J. (1972), 'Efficiency limits of fiscal mobility: an assessment of the Tiebout model', *Journal of public economics*, 1, pp. 25-43.

Coase, R.H. (1960), 'The problem of social cost', *Journal of law and economics*, 3, pp. 1-44.

Commission of the European Communities (1972), Report of the study group on the role of public finance in European integration (McDougall Report). Brussels, European Communities.

Commission of the European Communities (1989), 'The social dimension of the internal market', *Social Europe* (Special issue), 86.

De Bondt, R. and Van Cayseele, P. (1983), 'Regionalisering en de dynamiek in de oriëntatie van het industriebeleid', *Tijdschrift voor economie en management* (Leuven), pp. 337-69.

De Bruyne, G., Van Rompuy, P. and Wouters, R. (1990), 'The efficiency of regional subsidy policies under a national budgetary constraint', in: Chatterji, M. and Kuenne, R. (eds.), *New frontiers in regional science*. London, Macmillan.

De Lathouwer, L. (1989), 'Sociale zekerheid in federale staten: sociale autonomie of sociale unie?' Discussion paper. Centre for Social Policy, University of Antwerp, Belgium.

Friedrich, P. and Van Rompuy, P. (eds.) (1987), *Fiscal decentralization*, Baden-Baden, Nomos.

Gordon, R.H. (1983), 'An optimal taxation approach to fiscal federalism', *Quarterly journal of economics*, Vol. 88, No 4, pp. 567-86.

Helpman, E. and Krugman, P.R. (1989), *Trade policy and market structure*, MIT Press, Cambridge.

Heylen E. (1987), 'Tax autonomy and the financing of second-level governments: a comparative study', in: Friedrich P. and Van Rompuy, P., *Fiscal decentralization*, Nomos Verlag.

Inman, R.P. and Rubinfeld, D.L. (1988), 'A federalist constitution for an imperfect world: lessons from the United States'. Paper presented at the Conference on Law and Economics, Antwerp, 1988.

Lamfalussy, A. (1989), 'Macro-coordination of fiscal policies in an economic and monetary union in Europe'. Committee for the Study of Economic and Monetary Union. Brussels, European Communities.

Marlow, M.L. (1988), 'Fiscal decentralization and government size', *Public economics*, 6, pp. 285-95.

Mintz, J. and Tulkens, H. (1984), 'Commodity tax competition between member states of a federation: equilibrium and efficiency'. CORE discussion paper No 8427. Louvain-la-Neuve, CORE.

Mueller, D.C. (1979), *Public choice*. Cambridge, Cambridge University Press.

Musgrave, R.A. and Musgrave, P.B. (1989), *Public finance in theory and practice* (fifth edn). New York, McGraw Hill.

Olson, M. (1969), 'The principle of "fiscal equivalence": the division of responsibilities among different levels of government', *American economic review, Proceedings* 49, pp. 479-87.

Owen, B.M. and Braentigam, R. (1978), *The regulation game*, Ballinger, Cambridge, Mass.

Pauly, M.V. (1970), 'Optimality, "public goods", and local governments: a general theoretical analysis', *Journal of political economy*, 78, pp. 572-84.

Pieters, D. (1989), 'Naar de éénmaking van de sociale zekerheid in 1992 (Towards a unified system of social security in 1992)', pp. 21-91. Brussels, CEPESS.

Proost, S. (1989), 'The taxation of energy products. Theory and policy in Europe'. Paper presented at the 12th Annual Conference of the IAEE, New Dehli, 1990. KU Leuven, CES.

Roubini, N. and Sachs, J. (1989), 'Political and economic determinants of budget deficits in the industrial democracies'. *European economic review,* 5, pp. 903-38.

Straubhaar, T. (1988), 'International labour migration within a common market: some aspects of EC experience'. *Journal of common market studies* XVII, 1, pp. 45-62.

Tiebout, C.M. (1956), 'A pure theory of local expenditures', *Journal of political economy,* 64, pp. 416-24.

Tollison, R. (1982), 'Rent seeking: a survey', *Kyklos,* 4, pp. 575-602.

Tollison, R.D. (1985), 'Comment on the economic constitution in historical perspective', in: McKenzie, R.B. (ed.), *Constitutional economics,* pp. 55-60, Lexington, Mass, D.C. Heath & Co.

Tullock, G. (1969), 'Federalism: problems of scale', *Public choice,* 6, pp. 19-29.

Van Cayseele, P. (1987), 'Regulation and international innovative activities in the pharmaceutical industry'. Ph.D. dissertation. Leuven, ACCO.

Van Cayseele, P. and Heremans, D. (1990), 'Legal principles of financial market integration in 1992: an economic analysis'. Financial Economics Research Paper No 1. Leuven, CES.

Vanderveeren, C., Van Rompuy, P., Heremans, D. and Heylen, E. (1987), 'De economische en monetaire unie in de Belgische staatshervorming'. Antwerp, MAKLU.

Van Rompuy, V. and Heylen, E. (1986), 'Openbare financiën in de deelgebieden van federale landen. Lessen voor België'. Leuven, ACCO.

Von Hagen, J. (1990), 'A note on the empirical effectiveness of formal fiscal restraints'. Discussion Paper. Bloomington, Graduate School of Business, Indiana University.

7. Macroeconomic policy coordination issues during the various phases of economic and monetary integration in Europe

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1. Introduction

The objective of this report is to discuss the need and scope for macroeconomic policy coordination in Europe during the various stages towards economic and monetary union. Section 2 discusses the proposals of the Delors Committee and discusses also some alternative stages and routes towards European integration. Attention is paid to the concepts of convergence, coordination and harmonization of macroeconomic policies as well as to rules and discretionary outcomes. Section 3 is concerned with the need for coordination of macroeconomic stabilization policies under alternative exchange-rate regimes, when Europe is hit by shocks that cause stagflation. Careful distinction is made between European-wide and country-specific shocks and attention is paid to both monetary and budgetary policies. The advantage of a monetary union is that beggar-thy-neighbour attempts to appreciate the currency are avoided, but the disadvantage is that stabilization policy is more difficult to conduct in the face of country-specific shocks. This is why there may be a case for a European Federal Transfer Scheme (EFTS). Section 4 is concerned with the public-finance aspects of macroeconomic policy under the European Monetary System (EMS) and with the coordination of macroeconomic policies in the economic and monetary union (EMU). Because competition among treasuries and central banks leads to too much seigniorage and too little tax revenues, inflation is too high. An independent European Central Bank (ECB) leads to too low inflation, but the advantages of the increase in monetary discipline are likely to outweigh the disadvantages of a sub-optimal government revenue mix. Unbridled com-petition between the treasuries of the EMU leads to an under-supply of public goods and a downward trend in tax rates. Since Europe's real exchange rate and current account may be manipulated to boost the real income of Europe's citizens, it is likely that budgetary stances will be too tight. Section 5 provides three examples of why coordination of macroeconomic policies may be counterproductive: it destroys the discipline of the monetary authorities, it may provoke an adverse response from the rest of the world, and it may fail because countries disagree on how the global economy works.

The conclusions make a case for an independent European System of Central Banks (ESCB), for a budget-neutral European Federal Transfer Scheme (EFTS), and for coordination of the budgetary policies of the individual treasuries. The conclusions also argue that the EMU poses a serious threat to the size of the public sector in Europe unless the budgetary policies of the various treasuries are coordinated.

2. General issues of macroeconomic policy on the road to economic and monetary integration

2.1. The proposals of the Delors Committee for EMU

The report prepared by the Delors Committee proposes three transition stages on the road towards full economic and monetary union for Europe. The first stage involves a closer convergence and coordination of the monetary policies of the various countries taking part in the EMS,[2] all European currencies to join the EMS, liberalization of capital markets throughout Europe, a wider use of the ecu, completion of the internal markets for goods and services by removing physical, technical and structural obstacles to free intra-European trade, a common competition policy and other means to strengthen the market mechanism, and a doubling of regional and structural Funds. Much progress has already been made on the first stage. The first stage of the Delors proposals for economic and monetary union in Europe has, in principle, been accepted by the Council of Ministers on 26 and 27 June 1989 in Madrid. Eight countries of the European Community must have fully liberalized capital movements by 1 July 1990 and the other countries will follow suit. Spain has recently joined the EMS and the UK has agreed to join the EMS as soon as the capital

[2] For useful overviews of the functioning of the EMS, see Gros and Thygesen (1988), Giavazzi et al. (1988), and Giavazzi and Giovannini (1989a).

markets of Europe are fully liberalized and inflation in the UK has been cut to the European average. It seems clear that the UK first wants to see all obstacles to free intra-European trade in financial assets removed before it gives up its monetary autonomy and joins the EMS. Hence, the upshot of Stage I as far as macroeconomic policy is concerned is an enlargement of the EMS, absence of capital controls throughout Europe and possibly more intra-Community trade.

The main uncertainty around Stage I is whether the large public-sector deficits and debt combined with large black economies imply a greater need for seigniorage revenues in southern Europe and thus a danger for monetary and exchange-rate stability within the EMS. The point is that, in the past, speculative attacks on the currency have been fended off by capital controls, especially by Italy and France, and by Belgium with a dual exchange-rate system. However, once financial markets throughout Europe are opened up it will no longer be possible for countries to peg their exchange rates and have the freedom to set their domestic interest rates. It follows that the high-deficit countries of southern Europe may be faced with a depreciating currency. This is why some advocate a crawling peg between the currencies of southern and northern Europe (e.g. Dornbusch (1988).[3] However, the experience of the Netherlands suggests that it is possible to have a strong currency and high levels of public-sector deficits and debt when there are no restrictions on international capital movements. As long as one is prepared to give up an independent monetary policy, capital market liberalization and fixed exchange rates need not be incompatible (Gros (1989)).[4] However, one could argue that the Netherlands is in a stronger position than, say, Italy because De Nederlandsche Bank has a much better reputation for an anti-inflationary stance than the Banca d'Italia and because the Netherlands has a surplus whilst Italy has a deficit on its current account *vis-à-vis* Germany.

Although the countries of the European Community seem to be committed to Stage I, the uncertainty described above as well as other uncertainties provide reasons why some countries do not necessarily wish to go ahead with transition Stages II and III proposed by the Delors Committee. Other

countries (e.g. Denmark and the UK) have some doubt about Stages II and III, because this may involve too much delegation of national powers to set fiscal and monetary policy to European institutions. The more optimistic countries (France, Italy and Spain) seem more enthusiastic about the EMU, whilst the more realistic countries (Germany and the Netherlands) are willing to go ahead as long as certain safeguards (such as an independent ESCB) are built in.

The second stage proposed by the Delors Committee requires a new Treaty of Rome in order to delegate the responsibility for monetary policy to a European System of Central Banks (ESCB) and implies a considerable loss of national sovereignty. During the second stage the progress of Stage I must be consolidated and reinforced, the EMS-bands must be narrowed, and rules for the size and financing of public-sector deficits must be decided upon at a Community level. During the third and final stage intra-European exchange rates must be supplemented with, and perhaps eventually replaced by, a single European currency, the ESCB must determine monetary policy for Europe as a whole and indirectly the value of the European currency *vis-à-vis* the dollar and the yen, national public-sector deficits must not be financed by printing money and there may be limits on government borrowing from abroad, and the Council of Ministers (together with the European Parliament) is able to impose constraint on the budgets of national governments when they would otherwise imply a danger for monetary stability. The upshot of Stages II and III of the proposals of the Delors Committee seems to be the establishment of a monetary union with a centralized monetary policy, a move away from German hegemony in monetary policy, and some form of coordination of the fiscal policies of the various countries of the European Community.

As already mentioned, it is not clear that Europe will want to go along the route of Stages II and III proposed by the Delors Committee. Indeed, some argue that once capital markets are fully liberalized it is better to move to an EMS with wider bands for nominal exchange rates and others argue on the basis of currency substitution that the market should decide whether one EMS-currency will drive out all the other EMS-currencies. The latter is advocated by the UK, but seems a rather fanciful idea. Yet another idea is that the chances of the EMU being a success are greatest when Europe moves directly from Stage I to Stage III (Cukierman (1989)).

2.2. Transition phases and alternatives in the process of European integration

'It is useful for purposes of the following discussion about coordination of macroeconomic policies to distinguish

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[3] Other reasons put forward in favour of a crawling peg are concern about the future cohesiveness of EMS currencies when international trade in financial assets is fully liberalized and when there is the danger that the US dollar may have to fall by a further 20-30% before global imbalances in current accounts are eliminated. See Giavazzi and Giovannini (1986a) and Melitz (1988b) for related discussions.

[4] A balanced overview of the arguments for and against a breaking down of the EMS as a consequence of fending off speculative attacks being less easy when capital markets are liberalized may be found in Driffill (1988).

between various transition phases in the process of European integration, and also to indicate various alternative roads along which Europe can proceed. This list of transition phases partially overlaps with the three stages proposed by the Delors Committee, but also includes some alternative routes. The following stages can be distinguished (see Graph 7.1):

A. Low factor mobility, few international capital movements, managed exchange rates with German hegemony, and uncoordinated budgetary policies.

B. Low factor mobility, more intra-Community trade (due to gradual removal of barriers to trade), liberalization of intra-Community trade in financial assets, managed exchange rates with German hegemony, enlargement of EMS membership, and uncoordinated budgetary policies.

C. (i) Low factor mobility, more intra-Community trade, free international capital movements, managed exchange rates with German hegemony, narrowing of EMS-bands, and coordination of budgetary policies.

(ii) Low factor mobility, more intra-Community trade, free international capital movements, establishment of an ESCB without German hegemony which decides on joint monetary policy, a further narrowing of bands for intra-Community exchange rates, and coordination of budgetary policies.

(iii) Low factor mobility, more intra-Community trade, free international capital movements, an ESCB without German hegemony and full monetary union, and coordination of budgetary policies.

(iv) As (iii), but also the establishment of a budget-neutral EFTS.

D. (i) Low factor mobility, more intra-Community trade, free international capital movements, establishment of an ESCB without German hegemony which decides on joint monetary policy and ensures a narrowing of bands for intra-Community exchange rates.

(ii) Low factor mobility, free international capital movements, and full monetary union.

(iii) As (ii), but also coordination of budgetary policies and possibly the establishment of a budget-neutral EFTS.

E. High factor mobility, high proportion of intra-Community trade, free international capital movements, and full economic and monetary union.

F. Low factor mobility, more intra-Community trade, free international capital movements, widening of EMS-bands, crawling peg between southern and northern Europe, uncoordinated budgetary policies and possibly a system of dual exchange rates.

G. Low factor mobility, more intra-Community trade, free international capital movements, floating intra-Community exchange rates, and uncoordinated budgetary policies.

Stage A captures the situation of the EMS since 1979. From 1 July 1990, most restrictions on international capital movements must be abolished, Spain and perhaps the UK will have joined the EMS and there will be fewer restrictions on intra-Community trade in goods and services, so during 1990 Europe moves to Stage B (the first stage of the Delors Committee). In addition, it seems clear that the EMS currently operates as a hegemonic German mark bloc and that so far there is not much evidence of coordination and cooperation in practice (see Cohen, Melitz and Oudiz (1988); Giavazzi and Giovannini (1986b), (1989a); Goodhart (1989)).[5] Afterwards, various routes can be followed. One possibility is that monetary and budgetary policies are coordinated at a European level and subsequently this facilitates the move towards the EMU, which corresponds to route C (i) to (iii) and possibly C (iv). The route to a more symmetric exchange-rate arrangement could be via the founding of the ESCB with all member countries having a right to vote on the common policy. An intermediate phase may be to appoint representatives of EMS countries on the board of the Bundesbank (Vaubel (1987); Goodhart (1989)), because this would gradually lead to less German hegemony.[6] The problem with this proposal is that the new Bundesbank, with its co-opted members from the rest of the EMS, may not be the same Bundesbank we know and love so well (Kenen (1987b)). If factor mobility and in particular labour mobility increases, one could move to Stage E. However, if factor mobility is low and exchange rates are irrevocably fixed, then one may want to consider the establishment of a budget-neutral intra-Community transfer scheme (EFTS) and move to Stage C (iv) instead (e.g. Sachs and Sala-i-Martin (1989)).

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[5] De Grauwe (1989a) casts some doubt on whether the EMS can be characterized by German hegemony. However, de Grauwe (1989a) also finds that Italy (and France) managed with the aid of capital controls to almost completely insulate their domestic interest rates from speculative attacks.

[6] Gros and Lane (1989) suggest that tightening of EMS-bands leads to more intervention by all members, even if the formal responsibility for keeping exchange rates within the bands lies with the peripheral countries. Hence, progress on the proposals of the Delors Committee in itself leads to a weakening of German hegemony.

GRAPH 7.1: **Phases in the transition process towards economic and monetary integration**

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                              ┌──────────────┐
                              │   A. EMS     │
                              └──────┬───────┘
                                     │
                                     ▼
  ┌────────────────────────────────────────────────────────────────────────────────────────┐
  │ B. First stage of EMU: liberalization of capital markets and completion of the internal │
  │    market for goods and services                                                        │
  └────────────────────────────────────────────────────────────────────────────────────────┘

  ┌──────────────────────────────────┬──────────────────────┐   ┌──────────────────────────┐
  │ C. (i) to (iii) Advanced stage   │  Low factor mobility │   │ C. (iv) Establish EFTS   │
  │ of the EMU: budgetary policy     │                      │   │                          │
  │ coordination; narrowing of       │                      │   │                          │
  │ EMS-bands until exchange rates   │                      │   │                          │
  │ are irrevocably fixed;           ├──────────────────────┤   ├──────────────────────────┤
  │ establish ESCB                   │ High factor mobility │   │ E. Ideal EMU             │
  └──────────────────────────────────┴──────────────────────┘   └──────────────────────────┘

  ┌──────────────────────────────────┬──────────────────────┐   
  │ D. (i) to (ii) Advanced stage    │                      │   
  │ of the EMU: narrowing of         │  Low factor mobility │   ┌──────────────────────────┐
  │ EMS-bands until exchange rates   │                      │   │ D. (iii) Budgetary policy │
  │ are irrevocably fixed;           │                      │   │ coordination and possibly │
  │ establish ESCB                   │                      │   │ establish EFTS            │
  └──────────────────────────────────┴──────────────────────┘   └──────────────────────────┘

  ┌──────────────────────────────────┐
  │ F. Widen EMS-bands; crawling peg │
  │ between southern and northern    │
  │ Europe; dual exchange rates      │
  └──────────────────────────────────┘

  ┌──────────────────────────────────┐
  │ G. Float: Breakdown of EMS;      │
  │ floating intra-Community         │
  │ exchange rates; uncoordinated    │
  │ budgetary policies               │
  └──────────────────────────────────┘
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An alternative way to proceed after Stage B is to gradually move towards full economic and monetary union and only afterwards, in the absence of high factor mobility, coordinate budgetary policies and possibly establish an EFTS. This corresponds to Stages D (i) to (iii), but when factor mobility is high one need not necessarily coordinate budgetary policies and establish an EFTS so that one proceeds through Stages D (i) and (ii) to Stage E. Yet another alternative is to abolish the idea of moving towards full monetary union and, instead, to widen exchange-rate bands and allow for a crawling peg between southern and northern Europe in order to allow for a greater need of seigniorage revenues in southern than in northern Europe (Dornbusch (1988); Canzoneri and Rogers (1988)).[7] This means a move from

Stage B directly to Stage F, but it is not clear that this is a very sensible argument. The countries of southern Europe, such as Italy, tend to have a large public nominal debt and thus it is a big temptation to use surprise inflation to erode away the real value of debt. In equilibrium the private sector anticipates this temptation and this results in higher than optimal inflation; the EMS eliminates this inefficiency and may thus be optimal for southern Europe even though it reduces the revenues from seigniorage (Gros (1988)). A final alternative is of course to move from Stage B directly to a regime of floating exchange rates, i.e. Stage G. This disintegration of the EMS has the advantage that the intra-Community exchange rates can be used as an adjustment mechanism for coping with country-specific shocks in Europe. When the factor mobility within Europe remains low and there is no coordination of budgetary policies and no willingness to have a budget-neutral EFTS, there may be no alternative to Stage G. This would be a pity, because then the well-known advantages of a greater common currency area (saving on exchange reserves, less exchange-rate risk, less information and transaction costs, etc.) cannot be reaped.

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[7] For the countries of southern Europe, seigniorage appears to have been an important component of their financing policies, whereas for countries such as the Netherlands seigniorage is a negligible source of revenues (Giavazzi (1989), Grilli (1988)). This lack of consensus may well be a source of conflict in the move towards fixed exchange rates and thus provide a case for a national money (e.g. Fischer (1982)).

2.3. Convergence, coordination and harmonization of macroeconomic policies

Coordination and convergence of macroeconomic policies within Europe are stated objectives of the Treaty of Rome. The Council of Ministers made a decision in 1974 'for attainment of a high degree of convergence of economic policies of Member States', which was meant to be mainly a process of setting budgetary policy guidelines (e.g. Steinherr (1984)). In the report of the Delors Committee the concepts of coordination and convergence play a prominent role as well.[8] It is, however, not clear that convergence of policy automatically implies international coordination of policies (and vice versa); especially when there are country-specific shocks hitting Europe. Even when everything is symmetric (i.e. common shocks hitting a symmetric, interdependent system of identical economies), one can converge either on a non-cooperative or on a cooperative outcome! If it is left to the market to achieve convergence and powerful externalities are a fact of life, one may end up in a worse situation than one started off with. Hence, convergence of economic policies does not necessarily seem to be a sensible objective on its own. Obviously, one could argue that the EMS ought to contribute to a progressive convergence of economic performance (e.g. a reduction in inflation differentials) because otherwise there may be a threat to monetary and exchange-rate stability but such an argument has little to do with coordination. Coordination refers to the joint and mutually consistent setting of the national instruments of economic policy to maximize joint welfare of the Member States of the European Community. Conversely, lack of coordination means that each country sets its own instruments of economic policy without taking into account the consequences on welfare of other countries in Europe.[9] Coordination does not necessarily imply convergence of economic policies, especially when individual Member States are of different size, have differential social and economic structures, have different preferences, and/or are hit by different shocks. Convergence is, however, often used as an excuse by individual governments to implement unpopular policies. In some cases market forces can lead to convergence of economic outcomes and to the desirability of convergence of economic policies. For example, if gross wages are for some reason equal to a common marginal productivity of labour in each of the Member States, then perfect mobility of labour throughout Europe implies that it is desirable for each individual government to converge on a common tax rate on labour income. Even under these extreme and unrealistic circumstances coordination is required to decide on which common tax rate to converge, but in general it is not clear that convergence of tax policies and budget deficits in itself is desirable. In fact, international competition in its own right tends to drive tax rates down to a too low level.

International harmonization of economic policies attempts to achieve greater unity in economic structure, to increase the scope for rules, and to reduce the scope for discretionary policies. Harmonization is primarily concerned with long-term objectives such as efficiency and distribution (e.g. commercial policy, anti-trust law, labour law, agricultural policy, regional policy) rather than with the use of discretionary monetary and budgetary policies for purposes of macroeconomic stabilization. In short, harmonization is chiefly concerned with the promotion of free and non-monopolistic competition and efficient markets throughout Europe. The completion of the internal European market (1992) is mainly concerned with harmonization. Harmonization should also be concerned with the operation of economies; for example, making labour markets more competitive and more responsive to shocks. If this goal is achieved, this reduces the need for the European coordination of budgetary and monetary policies.

International cooperation occurs, firstly, through the international exchange of information, secondly, through international harmonization of rules, and thirdly, through international coordination of discretionary policies. Through the European Community, the OECD, the IMF and summit meetings there is already a great deal of exchange of information. The internal market in 1992 and beyond provides a considerable amount of harmonization. The Delors report is partially concerned with harmonization and design of new rules of the game, but important questions for the coming years are whether and how much convergence and coordination of discretionary macroeconomic policies at a Community level is desirable given the increasing degree of economic and monetary integration of Europe. For example, whether and what kind of coordination of budgetary policies is required under an economic and monetary union in Europe.

2.4. Rules versus discretion

Two outcomes are often considered for decision-making in dynamic environments. The rules (or pre-commitment) outcome is relevant when the monetary and fiscal authorities have sufficient discipline or reputation not to succumb to

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[8] Goodhart (1989) claims that the Delors report used the word 'coordination' at least 41 times and the word 'convergence' at least 12 times; in addition, many synonyms (e.g. cooperation, concertation) were used.

[9] Such a non-cooperative outcome corresponds to the Nash-Cournot equilibrium outcome, which in the presence of international externalities is usually not Pareto-efficient for the countries concerned. Roubini (1987a;b) also considers Stackelberg outcomes, which may be relevant in a discussion of German leadership in the EMS.

time-inconsistent behaviour, whilst the discretionary outcome is relevant when the authorities have no credibility and thus the private sector anticipates that the authorities will renege on previously announced policies whenever they have an incentive and get a chance to do so (Kydland and Prescott (1977)).[10] Examples of a potential time-inconsistency problem occur when workers are temporarily locked into nominal wage contracts or when treasuries issue nominal debt, because then the government has an incentive to engineer a surprise inflation and thereby erode the real wage and boost employment or wipe out part of the real debt. Not surprisingly, in equilibrium one ends up with higher inflation in the discretionary outcome. In most of this report, the discussion is concerned with the rules outcome. However, when the case for an independent ESCB (Section 4.3) or the counterproductivity of international policy coordination (Section 5.1) is discussed, the discretionary outcome is also considered.

3. European coordination of macroeconomic policies during the various phases of economic and monetary integration: stabilization aspects

This part considers the role of stabilization policy and the need for international policy coordination under alternative exchange-rate regimes. Since the focus is most of the time on the optimal response to a situation of stagflation, i.e. unemployment and rising prices caused by adverse supply shocks, a standard multiple-country, short-run, Mundell-Fleming model is used for the analysis in this part.

3.1. European coordination of monetary policies[11]

It seems reasonable to assume that there is nowadays little mobility of labour within Europe, perfect capital mobility[12] and imperfect substitution between home and foreign goods

in Europe. Three regimes will be considered: (1) managed exchange rates (development of the EMS according to the first stage of the proposals of the Delors Committee, Stage B); (2) monetary union (advanced stage of the EMU, Stage C (iii) or D (ii); and (3) floating exchange rates (float, Stage G). The EMS is the status quo for Europe, which can either develop into EMU (see Stages A, B, C or D) or there is a danger that it gradually breaks down into a float (see Stages A, B, F or G). Since the breakdown of Bretton Woods the exchange-rate regime between Europe and the USA was a float, but more recently (witness the New York Plaza Summit in 1985 and subsequently the Tokyo Summit in 1986, and the Louvre Accord and Venice Summit in 1987), an era of coordinated exchange-rate management for the global economy has gradually replaced a clean float (e.g. PPC (1988); Funabashi (1988); Kenen (1989)).

It is best to start with the need for international coordination under the hypothetical situation that Europe is characterized by a float. One could think that, when there is full employment, there is no reason for Member States to coordinate their monetary policies. The reason is that the exchange rates adjust to ensure equilibrium in the balances of payments, so that each country can conduct an independent monetary policy and set the growth in its nominal money supply equal to its real growth rate plus its desired inflation rate.[13] However, there may well be a public-finance motive (van der Ploeg (1988b)) or a Mundell-Tobin motive (van der Ploeg (1990a))[14] for international policy coordination in a

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[10] In the language of game theory the rules outcome corresponds to a precommitment outcome, whilst the discretionary outcome corresponds to subgame-perfect outcome.

[11] This section draws on van der Ploeg (1989c; 1990c).

[12] Strictly speaking, perfect capital mobility does not only require absence of capital controls but also perfect substitution between home and foreign bonds. Although it seems realistic to assume full liberalization of European capital markets, it is worth while to point out that there are cases in which capital market integration is only welfare-improving if governments coordinate their monetary policies (Chang (1989)). The point is that financial integration enhances the impact of domestic policies on foreign interest rates, real allocations and welfare and thus liberalization of capital markets increases the welfare losses from non-cooperative policymaking.

[13] Hamada (1976) assumes PPP (purchasing power parity) and uses the monetary approach to the balance of payments to show that under fixed exchange rates national monetary policies are highly interdependent and there are strong incentives to coordinate. The reason is that there is a common inflation rate, given by the weighted growth in the supply of domestic credit expansion plus growth in international reserves minus average growth in real income, and a balance-of-payments surplus occurs when the demand for money exceeds the domestic supply of money. Hence, an expansion of domestic credit leads to a deficit, mirrored by surpluses elsewhere, and a higher inflation rate for all Member States. When welfare depends on inflation and the balance of payments, Hamada (1976) shows that, in the absence of international policy coordination, inflation is higher than desired inflation when the increase in international reserves exceeds the weighted desired increase in reserves. The reason is that countries defend themselves against reserve accumulation by expanding domestic credit and thus raising inflation. A float does not require this type of coordination, because balances of payments are always in equilibrium and each central bank can set its own monetary growth to its desired inflation rate.

[14] An increase in home monetary growth increases home inflation by the same amount but leaves foreign inflation unaffected. It reduces real interest rates and capital accumulation throughout the world. This can be called the interdependent Mundell-Tobin effect. In the absence of international policy cooperation each country fails to internalize the beneficial effects of higher inflation on capital accumulation in the rest of the world and thus pursues too low a monetary growth rate. Effectively, each country attempts to shift the burden of reducing the world real interest rate to its competitors.

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market-clearing world with floating exchange rates. In any case, this view definitely does not hold when one departs from the fairy-tale world and considers a world plagued by widespread unemployment. When unemployment is caused by the downward rigidity of nominal wages, both at home and abroad, the Mundell-Fleming model is the most appropriate framework.[15] A monetary expansion is a beggar-thy-neighbour policy, because the downward pressure on interest rates and incipient capital outflows induces a depreciation of the exchange rate and thus boosts net exports at the expense of foreign output and employment. However, the monetary expansion raises imports and thus consumer prices and depresses real income (defined as the nominal wage deflated by the consumer price index) at home and boosts real income abroad. It is assumed that countries are faced with adverse supply shocks so that they are faced with stagflation and must be concerned about achieving employment on the one hand and fighting inflation and maintaining a satisfactory level of real income on the other hand.

3.1.1. Stagflation caused by common supply shocks

Consider the problem of stagflation caused by a European-wide adverse supply shock (e.g. an oil-price hike). It then follows that, under the hypothetical case of a float and in the absence of European policy coordination, each country has a too tight monetary stance leading to too high interest rates and excessive unemployment rates. The reason is that under a float each central bank attempts to export inflation by appreciating its exchange rate. Coordination recognizes that such competitive appreciations are futile, avoids beggar-thy-neighbour attempts to appreciate the currency and thus leads to looser monetary policies and full employment (e.g. Oudiz and Sachs (1984); Canzoneri and Henderson (1987)).[16]

One of the main advantages of a symmetric regime of irrevocably fixed exchange rates such as the EMU over a float is that international conflicts about the intra-European ex-

change rates and the distribution of inflation are avoided. More precisely, fixing exchange rates under EMU can be viewed as a substitute for international policy coordination. In fact, when the Member States are symmetric and are hit by identical shocks, EMU reproduces exactly the outcome that prevails when central banks coordinate their monetary policies under a clean float or an adjustable-peg regime such as the EMS. When Member States are not identical, EMU is only a partial substitute for international monetary policy coordination under a float.

Many view the EMS as an asymmetric exchange-rate system, because the Bundesbank enjoys monetary hegemony (Giavazzi and Giovannini (1986b)). This means that in the EMS the Bundesbank sets the money supply and the other central banks peg their currencies to the German mark at a given rate. Hence, once capital markets are liberalized, they give up control of their money supply. For example, if there is an Italian balance-of-payments deficit and pressure on the lira to depreciate, the Banca d'Italia must sell foreign reserves and buy up lira in order to defend the currency and meet the demand from importers. Since sterilization (buying of bonds on the open market by the monetary authorities) is impossible once capital markets are fully liberalized, the Italian money supply falls to the extent of Italy's balance-of-payments deficit. Under such a system, a tightening of German monetary policy must imply a tightening of Italian monetary policy, or else the lira will have to depreciate. When the Bundesbank raises interest rates, De Nederlandsche Bank usually follows suit within a couple of hours! Clearly, as long as the Netherlands sticks to a given guilder-mark rate, it will not be able to conduct an independent monetary policy. This is the price one pays for obtaining the credibility of the Bundesbank. The macroeconomic trade-offs and spill-over effects are very different under this asymmetric characterization of the EMS than under the more symmetric arrangement of a float or the EMU.[17]

An increase in the German money supply leads to a corresponding increase in the money supplies of the other countries of the EMS and thus to a larger fall in European interest rates because the non-German central banks are defending themselves against an appreciating currency. Employment throughout the EMS increases due to the increase in consumption and investment arising from lower interest rates, hence a German monetary expansion is now a locomotive policy. A devaluation of a non-German currency is a beggar-thy-neighbour policy, because it boosts net exports at the expense of German employment and output. The European money stock increases, so that interest rates fall throughout the EMS. The non-German cost of living increases, whilst the German cost of living falls.

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[15] Mussa (1990) states that 'The behaviour of real exchange rates is systematically and substantially influenced by the nature of the nominal exchange rate regime'. The point is that in the move from Bretton Woods to floating exchange rates, the volatility of nominal exchange rates and of real exchange rates go up together. Similarly, in moving to the EMS, the volatility of both real and nominal intra-European exchange rates diminished considerably. The main implication of this solid empirical fact is that it is reasonable to assume, at least in the short run, that nominal wages and prices are much less volatile than nominal exchange rates in a regime of floating exchange rates. It thus seems, as a first shot, a sensible approximation to assume fixed real exchange rates under the EMU and volatile real exchange rates under a float.

[16] When countries inherit a high inflation rate and engage in a monetary disinflation, one usually finds that this occurs too fast as central banks attempt to tighten their monetary policy and dump a higher cost of living on their rivals (e.g. Oudiz and Sachs (1985); Miller and Salmon (1985)).

[17] For a related analysis of dynamic monetary policy games under the EMS, see Begg and Wyplosz (1987) and Huizinga (1989).

Returning to the problem of European-wide stagflation caused by an adverse supply shock, absence of coordination of monetary policies in the EMS with German hegemony implies that the non-German central banks use a real appreciation of their exchange rates[18] to disinflate away the adverse consequences of the supply shock so that the Bundesbank expands its money supply by more than the rest of Europe (Giavazzi and Giovannini (1989b); van der Ploeg (1989c)). The reason is that, when the Bundesbank expands its money supply, the rest of the EMS enjoys an increase in employment and output and thus can afford to revalue their currencies and pay more attention to their cost-of-living targets. Monetary stances throughout the EMS are tighter than under EMU. Germany achieves full employment, but experiences a severe increase in its relative cost of labour. The rest of Europe still suffers from unemployment, but manages to soften the blow to real income. The exchange-rate realignment allows the rest of Europe to reduce the damage to its welfare at the expense of Germany. The move from the EMS to EMU benefits Germany, worsens the welfare of the rest of Europe, but makes Europe as a whole better off. Money supplies increase by more under EMU than under the EMS, so the supply shock has a one-for-one impact on the cost of living and leaves unemployment throughout Europe unaffected. Hence, even in a non-cooperative EMS consisting of identical countries hit by identical shocks, the exchange rate will be realigned from time to time, so that the view that the completion of a common market for Europe ('1992' and all that) leads to homogeneous structures and thus by itself creates a lasting monetary union is fallacious.[19] However, if in addition monetary policies are coordinated within the EMS, the movement towards EMU will be facilitated. A corollary is that German leadership of the EMS is no substitute for monetary policy cooperation in Europe.

Finally, consider the breakdown of the EMS into a (non-cooperative) float. When countries are conservative, i.e. care relatively more about the cost of living than unemployment, Germany prefers the EMS to a float. Otherwise, Germany prefers a float. As far as average European welfare is concerned, the EMS is preferred to a float. The reason is, of course, that the EMS avoids to a certain extent the competitive, futile attempts to appreciate the currencies and thus leads to looser monetary stances and less unemployment.

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[18] Any complications arising from speculative attacks are ignored, which may be a bit tricky as capital controls will be abolished from 1 July 1990 onwards.

[19] Basevi and Giavazzi (1987) use numerical simulation to show that, when the EMU consists of countries with different structures, it is not optimal to have fixed intra-European exchange rates, even when countries are hit by identical shocks.

3.1.2. Country-specific shocks: A case for an EFTS

The answer to the question of which exchange-rate regime allows individual governments to best achieve their national objectives without an explicit need for international policy coordination is important and depends crucially on both the origin and the nature of the shocks hitting the various countries of Europe (e.g. Canzoneri and Gray (1985); McKibbin and Sachs (1986; 1988); Kenen (1987a; 1988); van der Ploeg (1989c)).

So far, the non-cooperative responses of monetary policies to a common adverse supply shock under three alternative exchange-rate regimes for Europe have been considered. The main finding has been that for such a shock the EMU (or a fully coordinated float) is the preferred arrangement for exchange-rate management. A second-best exchange-rate regime may be the EMS, because then at least the futile, non-cooperative attempts to appreciate the currency and export inflation by tightening monetary policy that occur under a non-cooperative float are also to a certain extent avoided.

However, when there is an asymmetric demand shock, such as a shift in preferences away from, say, UK goods towards French goods, matters are not so simple. The initial effects of this shock are unemployment and a trade deficit for the UK and over-employment and a trade surplus for France. If labour markets throughout Europe function properly, then UK wages fall immediately and French wages increase to ensure full employment. If this is the case, one should proceed to EMU and reap all the benefits of a greater common currency area (lower transaction costs, lower information costs, no exchange-rate risk, saving on exchange reserves, etc.) (Goodhart (1988)). Alternatively, if nominal wage rigidities prevent labour markets from adjusting immediately to full employment, then workers may migrate from the UK to France and restore balance in this way. The Delors Committee puts a lot of emphasis on this adjustment mechanism, but the idea of people in the UK moving across the Channel to France in order to find a job when they do not even move from the north to the south of England for a job seems a bit unrealistic. Although intra-European migration of unskilled labour (especially from Italy to northern Europe) was significant during the period 1960-74, when foreign labour was essential to the fast-growing economies of Europe and when governments established bureaus to recruit migrant workers, migration among Member States of the European Community has decreased since the Treaty of Rome (especially Articles 7 and 48) became effective (Molle and van Mourik (1988)). Foreigners now constitute only about 2% of the labour force in Europe, so it seems fair to entertain some doubt about a significant degree of intra-European labour mobility. Unfortunately, Europe is

neither characterized by a smooth functioning of its labour markets nor by high degrees of labour mobility (due to differences in language and culture)[20] and therefore some form of policy adjustment may be required. First-best policies should promote more responsive labour markets and more labour mobility, so that there certainly is a role for structural policy improving the functioning of labour markets while mitigating adjustment costs for migrating labourers.

The most obvious second-best policy adjustment, in the absence of wage flexibility and labour mobility, is then a loosening of monetary policy in the UK, a tightening of monetary policy in France and a depreciation of the pound-franc rate, for this boosts net exports of the UK to France and restores equilibrium. Of course, this is not possible under EMU with irrevocably fixed exchange rates whilst it is only possible to a limited extent under the EMS. Alternatively, the UK might loosen its budgetary policy and France might tighten its budgetary policy. However, there is a danger that politicians will go along with the idea, advanced by the Delors Committee, that there should be constraints on too high budget deficits, where 'too high' presumably means that there is a danger that deficits get monetized and thus that there is a threat to monetary and exchange-rate stability. Budgetary stances, once corrected for full employment, are then likely to be pro-cyclical under EMU. These are the main reasons why in the presence of asymmetric real shocks a float is to be preferred to EMU or, to a lesser extent, to the EMS. The case for a float is convincing (as Mrs Thatcher repeatedly seems to suggest) when shocks consist of shifts in preferences, but if nevertheless the traditional advantages of a greater common currency area are large enough to warrant the move towards EMU then another form of policy adjustment must be used.

One possibility is that the establishment of EMU must go hand in hand with the establishment of a European Federal Transfer Scheme (EFTS), perhaps not unlike the system envisaged by the MacDougall Report of April 1977. The political merits of an EFTS should be clear, because it ensures an equitable distribution of the gains and losses of EMU,[21] it responds to basic citizenship rights of people

living in the EMU, and it fits in with the principle of horizontal budgetary equity. It also fits in with the principle of subsidiarity, because the job of arranging such transfers cannot be left to individual governments. The task of the EFTS is to make exchange-rate changes unnecessary by transferring income from one country to another country when there are such shifts in preferences (e.g. Sachs and Sala-i-Martin (1989)). In practice, the scheme operates by transferring income from individuals of one nation to individuals of another nation and replaces, to a certain extent, the national unemployment compensation schemes. One could envisage a Community-wide tax, which in itself would act as an automatic stabilizer, whose proceeds are used to finance a Community-wide unemployment compensation scheme. It is crucial that such a version of the EFTS is budget-neutral. To be more precise the budget of the EFTS should be intertemporally balanced so that taxes are smoothed (see Section 4) and that in time of a boom debt, which was accumulated in time of a recession, is paid off. It is a pity that the Delors report does not contain any recommendations for the establishment of a EFTS, because without it regional imbalances induced by shifts in preferences may persist[22] (for example, initial estimates suggest that one third of state-specific shocks in the USA seem to be cushioned by federal transfers).

The reason for this reluctance to recommend an EFTS is that there may be strong incentive arguments against it, because unemployed individuals are then even less likely to pack their bags and find a job elsewhere in Europe and individual governments are less likely to pursue a rigorous and effective unemployment policy. In other words, an EFTS signals to the bargaining process that real wages can be kept high, provides an invitation for free riding on European funds, and gives a fiscal incentive for government failure. These are strong arguments against an EFTS to do with moral hazard and sometimes with adverse selection. They must be taken seriously, but at the same time it must be realized that they can be rallied against national unemployment compensation schemes as well. Most of these incentive problems can be overcome by changing the rules of national schemes in such a way that benefits are only handed out to the unemployed, if the unemployed at the same time have the duty to accept a job even when the job is not in their field of training (not unlike the Swedish model). If necessary, the schemes can then provide top-up payments to provide an acceptable standard of living. Obviously, the EFTS should be subject to similar rules of the game.

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[20] The recent developments in the two Germanys provide, of course, a spectacular example of labour mobility, which means that from the point of view of optimum currency areas the unification of West Germany and East Germany is a splendid idea. It is essential for the EMU to be a success that labour mobility within Europe is high, which may be fairly probable at the margin in some sectors. Although Molle and van Mourik (1988) provide some empirical evidence, more work on this issue is badly needed.

[21] However, as always one may doubt whether convoluted political horse-trading leads to an equitable distribution. The same worries apply to the harmonization of rules for social security.

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[22] The intention to double the funds for regional and structural policies does, of course, not deal with these problems.

It must be pointed out that the EFTS should operate as a transfer scheme and thus should not affect the overall budget of the European Community,[23] that without the EFTS the budgetary policies of the individual treasuries may be pro-cyclical, and that it may be possible to design incentive rules that avoid these problems of moral hazard. The most obvious incentive rule is to give conditional transfers. For example, transfers to a depressed region should occur on the condition that funds are allocated to training and schooling programmes for the unemployed.[24] In addition, it will be important to harmonize the criteria for being eligible to benefit from the national unemployment schemes as well as from the EFTS. Empirical evidence suggests that country-specific shocks are important for Europe, so despite all its problems, establishment of an EFTS may increase the chances of moving to irrevocably fixed exchange rates in Europe. If Europe is unwilling to introduce an EFTS, then individual countries have a duty to give a much greater role to supply-side policies in order to ensure that national labour markets clear and get rid of unemployment through the market mechanism in a painless and expedient manner.

However, when asymmetric shocks correspond to adverse country-specific supply shocks, the case for a float and thus for the EFTS is a bit more subtle. The reason is that such a shock leads both to unemployment and to higher prices and a lower real income (stagflation) at home so that on the one hand a depreciation of the currency is required as this leads to more employment but on the other hand an appreciation of the currency is required to depress prices and raise real income. It is therefore not clear whether a depreciation or an appreciation of the currency is desirable from a welfare point of view. This is the familiar dilemma one faces when one is stuck with stagflation. In a float the excess demand for home goods induces an immediate appreciation of the

real exchange rate to its new long-run value and a cut in the wedge between consumers' and producers' prices, so that the fall in real income is cushioned compared with the outcome under the EMU (without an EFTS). The counterpart is that the other countries suffer a greater fall in real income. Of course, the falls in employment and output are accelerated whilst the other countries enjoy a temporary increase in employment and output as a result of the appreciation of the exchange rate. Hence, in the face of an adverse supply shock, the EMU (without an EFTS) copes better with unemployment than with real income.[25] The reason is that the EMU leads to an expansion of the stock of money balances at home and a contraction abroad.

As far as the EMS is concerned, an adverse supply shock in Germany leads to a much sharper fall in German employment than the fall induced in, say, French employment by a French supply shock. In addition, a German supply deterioration leads to unemployment, in the rest of Europe whilst an adverse supply shock in the rest of Europe leads to over-employment in Germany. The reason is that in the first case the central banks of the rest of Europe defend their currencies by buying them up and tightening their monetary policy whilst in the latter case the central banks of the rest of Europe prevent their currencies from appreciating by buying German marks and loosening their monetary policy. The adverse effects on real income are symmetric, because the greater increase in French wages arising from a French shock is exactly offset by less of a fall (actually an increase) in German wages so that the effect of a French supply shock on the real exchange rate is exactly the opposite of the effect of a German supply shock.

As far as average European welfare is concerned, the welfare ranking in decreasing order of magnitude is a cooperative float, a cooperative EMS, a non-cooperative EMS, a non-cooperative float and the EMU (without an EFTS). The EMU (without an EFTS) performs so badly because appreciation of the exchange rate can no longer be used as an instrument to remove the excess demand for home goods. As a result the greater expansion of the home money supply leads to a larger increase in prices, a larger fall in (and overshooting of) real income and less unemployment than in the regimes where the exchange rate is allowed to appreciate. Hence, the occurrence of country-specific shocks makes the EMU (without an EFTS) an undesirable regime. There is not much difference between a cooperative and a non-cooperative float. In the former case the home money supply

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[23] When there are temporary and Europe-wide shocks, one could argue that the budget of the EFTS should be balanced in an intertemporal fashion and that this thus permits transfers from one generation to another in order to offset such temporary shocks. However, one could argue that there should be limits to this use of the EFTS and, in general, to the transfer of additional fiscal powers to the federal level, since benefits vary too much throughout Europe and since the Community should not levy taxes as long as it is not fully accountable to the electorates of Europe (see also Goodhart (1989)).

[24] The challenge is thus to supplement redistributive transfer schemes, such as an EFTS, with incentive rules in order to make sure that the EFTS does not take away the incentive for individual countries to adjust to market signals. One way of having such incentive rules is to build in conditionality into the EFTS. For example, training and schooling. Alternatively, one could have loans to depressed regions with conditional elements such as interest rebates, the rebate serving as the transfer. An alternative is, perhaps, to use changes in VAT rates to bring about the required changes in wages and prices, but the problem with such a scheme is that it runs counter to the attempts to harmonize VAT rates in Europe.

[25] This is exactly the opposite of what happens under a shift of preferences from home to foreign goods, because then the depreciation of the currency that occurs under a float softens the adverse effects on unemployment but leads to a further fall in real income.

expands somewhat more, which leads to somewhat smaller output losses and higher losses in real income. As far as the EMS is concerned, when Germany is hit by a supply shock, it expands its money supply by more than when the rest of Europe is hit by a supply shock, so that this leads to smaller output losses and larger losses in real income for Germany.

The main conclusion that sticks out, as far as stabilization policy is concerned, however, is that EMU (without an EFTS) performs badly when Member States are hit by country-specific shocks and performs well when Member States are hit by common shocks.[26] One could argue that this provides a case for the EFTS, unless budgetary and structural policies are both viable and achieve the objective of full employment.

3.2. European coordination of budgetary policies[27]

Now consider the use of fiscal policy to fight the short-run problem of stagflation caused by a common adverse supply shock in an interdependent world with nominal wage rigidities. This is a short-run analysis, so the dynamics of government debt are ignored (see, however, Section 4 for a discussion of debt dynamics). Under the hypothetical case of a float, a fiscal expansion in one country leads to higher interest rates, an appreciation of its real exchange rate, a boost in real income at home and a decline abroad, and an increase in employment at home and abroad. This is the standard two-country Mundell-Fleming story. Treasuries want full employment, high levels of real income and budgetary balance. It follows that, in the absence of international cooperation, right-wing (left-wing) treasuries who care relatively more about the cost of living (unemployment) have too loose (tight) fiscal stances and thus end up with excessive levels of employment (unemployment) relative to the cooperative outcome.[28] The reason is that right-wing (left-wing) governments do not internalize the adverse (beneficial) effects of a fiscal expansion on the foreign cost of living (on foreign unemployment). Clearly, international cooperation leads right-wing (left-wing) governments to tighten (loosen) their fiscal stance.

Under the EMS it is now assumed that the Bundesbank ensures a stable money supply and the other central banks of the EMU ensure relatively fixed intra-European nominal exchange rates. Budgetary policies must then be used to fight the problem of stagflation. Since a fiscal expansion can no longer affect real income through the real exchange rate (as prices are fixed in the short run and nominal exchange rates are irrevocably fixed), the EMS avoids competitive, futile attempts to appreciate the exchange rate and may thus be superior to a float. As far as spill-over effects are concerned, a fiscal expansion outside Germany is a locomotive policy whilst a German fiscal expansion is less effective and less of a locomotive, perhaps even a beggar-thy-neighbour, policy. In the former case the excess demand for non-German goods is accommodated by an increase in the non-German money supply and the excess demand for money in Germany is choked off by a rise in European interest rates, which causes some crowding out. In the latter case the non-German money supplies fall, as the non-German central banks are selling Deutschmarks in order to prevent their currencies from depreciating, which reduces, and may even reverse, the increase in non-German employment! It follows that, in the absence of cooperation, fiscal stances will be too tight[29] and that Germany has a tighter fiscal stance than the rest of Europe. Hence, the EMS has a built-in deflationary bias for budgetary stabilization policies[30] and the price one pays for German hegemony in monetary policy is that Germany cannot be relied upon to be the 'locomotive engine of growth' that pulls Europe out of a recession. Nevertheless, the EMS may be superior to a float since it avoids competitive attempts to appreciate the currency and export inflation. A typical welfare ranking, from a pure macroeconomic stabilization point of view, in decreasing order is: cooperative EMS, cooperative float, non-cooperative EMS, non-cooperative float.

Countries with a large surplus on the current account and a modest public debt, such as Germany, should play a greater role in a coordinated supply-friendly budgetary expansion for Europe (Drèze and Wyplosz (1988)). Supply-friendly is important, because a number of economists fear that Europe may suffer from a capital shortage once demand is expanded.

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[26] Of course, some would argue that the real issue is not whether shocks are country-specific or not but whether shocks are sectoral or not. One could envisage a Community-wide adverse shock to the steel industry. The most appropriate response is then not necessarily macroeconomic stabilization policy, but a coordinated Community attempt at resolving the problems in the steel industry.

[27] This section draws on van der Ploeg (1989b).

[28] Of course, even though right-wing governments end up with too loose and left-wing governments with too tight fiscal stances, right-wing governments will in general have tighter fiscal stances than left-wing governments.

[29] However, if a German fiscal expansion is a beggar-thy-neighbour policy, the German fiscal stance may be too loose.

[30] Drèze et al. (1987), Drèze and Wyplosz (1988), and Wyplosz (1990) also argue that Europe with its widespread unemployment problem is, in view of its domestic problems, in dire need of a coordinated budgetary expansion, but that Europe has not much incentive to reduce global imbalances for the sake of the USA. In either case, too little demand expansion is undertaken in Europe to get a good grip at its problem of widespread unemployment.

Hence, the prescription is for the government to invest in, say, infrastructure and R&D. The irony is that Germany has very little incentive under the EMS to be an 'engine of growth' for Europe.[31]

Under the EMU with an independent ESCB which pursues a stable European money supply and guarantees irrevocably fixed intra-European exchange rates, budgetary policies are essential in order to stabilize the economy in the face of stagflation caused by common, adverse supply shocks.[32] A fiscal expansion in one of the countries raises interest rates throughout Europe and crowds out some of the initial gains in employment due to the fiscal expansion. Employment in the other countries increases when the beneficial effects on net exports outweigh the adverse effects of crowding out. This is likely to happen as the goods markets of Europe become more and more integrated, so that there is a danger that fiscal stabilization responses will be too weak relative to the cooperative outcome. It is easy to show that Germany then has no incentive to lose the monetary hegemony it enjoys under the EMS, whilst the rest of Europe is keen to move towards EMU.

If wages are fully indexed to consumers' prices (and everything else is indexed), monetary policy and thus the particular nominal exchange-rate regime in force are irrelevant for real outcomes. A fiscal expansion is a beggar-thy-neighbour policy, because it induces an appreciation of the real exchange rate and thus cuts consumers' prices and wages at home and boosts wages abroad. Hence, absence of cooperation in the face of a common adverse supply shock leads to excessive budgetary stances as treasuries attempt in vain to export unemployment (Branson and Rotemberg (1980); Bruno and Sachs (1985); van der Ploeg (1988a)).

4. European coordination of macroeconomic policies during the various phases of economic and monetary integration: public finance aspects[33]

This part considers the public finance and allocative aspects of economic and monetary integration in Europe. The basic framework that is adopted is one of tax and seigniorage smoothing (Barro (1979); Mankiw (1987)), extended to see what happens under a float, the EMS (Grilli (1988)) and the EMU. Individual treasuries and central banks minimize the present value of the deadweight burdens associated with the various sources of revenues subject to the intertemporal government budget constraint. Attention is also paid to the externalities associated with using the foreign debt of Europe to smooth consumption in individual countries of the EMU. No particular attention is paid to the use of stabilization policy in the fight against unemployment, since the emphasis is on medium-run issues of allocation and of public finance. Unemployment manifests itself in a higher level of desired public spending, but the role of fiscal policy in reducing unemployment is not considered here. The objective of this part is to discuss the allocation and public-finance aspects of international policy coordination; in the past most of the attention has been focused on the stabilization role of macroeconomic policy.

4.1. Tax and seigniorage smoothing under the EMS

One of the most important rules derived in the theory of public finance is that tax rates should be smoothed over time and that government debt should be allowed to increase whenever public spending exceeds its permanent level. A war or temporarily high level of unemployment justifies government borrowing. However, as long as public investment bears a market rate of return, is does not affect the permanent level of the public primary deficit and thus the treasury is allowed to borrow for investment purposes. A balanced current budget and borrowing only for investment is often referred to as the 'golden rule' of public finance. When seigniorage is also a source of public revenues, inflation and nominal interest rates should go up and down together with tax rates and all of them should be smoothed over time. In other words, when the real interest rate equals the pure rate of time preference, the theory of public finance says that inflation and tax rates should follow a random walk because only then the marginal distortions of the various ways of raising revenues are equalized. The random-

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[31] The point is that Germany currently has no real individual incentive to engage in a demand expansion, whereas many other parts of Europe would benefit from a German expansion. In any case, microeconomic and supply-side problems are much more important in Germany because these stifle Germany's growth of output, investment and employment, and reduce the responsiveness of the German economy to market signals (e.g. Lipschitz et al. (1989)).

[32] Of course, one could argue that the ESCB should adjust its monetary policy in the face of European-wide shocks but this may go at the expense of its reputation for strict monetary discipline (see Section 4.3). This is the reason why one may advocate an independent (and thus passive) ESCB.

[33] This part draws on van der Ploeg (1990b) and attempts to give some reasons why the EMU may pose a threat to the size of the public sector in Europe.

walk property implies that the best estimate of tomorrow's tax rate, given all the information that is available today, equals today's tax rate. It is in this precise sense that tax and inflation rates are smoothed over time; of course, shocks can cause quite a lot of variation in tax and inflation rates over time. The above arguments hold for a closed economy or for a small open economy with a float, but not necessarily for the EMS. Under the EMS, countries other than Germany peg their exchange rate to the German mark and give up an independent monetary policy in order to obtain low inflation through the strong discipline of the Bundesbank (e.g. Giavazzi and Pagano (1988)), but this means that they can extract less seigniorage and end up with a sub-optimal government revenue mix and a too low level of public spending. Of course, this argument should not just be viewed in this narrow public-finance perspective. Generally speaking, benefits accrue from higher inflation (e.g. it may be easier to keep real wages down) and thus in a broader perspective they end up worse off. In order to flesh out the above arguments, it is worthwhile to construct a simple model.

The government's intertemporal budget constraint can be written as

$$d + PV(g) = PV(t + pm)$$

where d, g and m denote, respectively, the levels of public debt, exhaustive public spending and real money balances (all expressed as fractions of the national income), t denotes the direct tax rate, p denotes the rate of inflation (or the growth in the nominal supply of high-powered money), and $PV(g)$ denotes the present value of the stream of future levels of g calculated with the aid of the real interest rate corrected for real growth in the national income, say r, which is (as capital markets are fully liberalized) determined on the world market. In plain words, solvency of the government's finances requires that the current public debt plus the present value of future levels of exhaustive public spending must match the present value of the stream of future tax and seigniorage revenues. The absence of capital market imperfections means that public debt can be used as a smoothing device. The government does this by choosing tax rates, monetary growth rates and public spending levels by solving:

minimize $PV[b_1 t^2 + b_2 p^2 + b_3(g - g^d)^2 + b_4(p - p^*)^2]$

where g^d and p^* denote the desired level of exhaustive public spending and the German inflation rate, respectively. Hence, the government minimizes the excess burden caused by tax-

ation and inflation,[34] attempts to maintain a desired level of spending, and at the same time attempts to achieve an intermediate target by stabilizing the nominal value of its currency *vis-à-vis* the German mark in order to converge to the German inflation rate. Germany has independent monetary policy ($b_4^* = 0$), but for the other EMS countries, b_4 indicates the weight they attach to the EMS anchor.[35] For the Netherlands, b_4 is very large, but for the UK b_4 is small. The optimality of the government revenue mix is measured by the first three terms, whilst the fourth term measures an intermediate target associated with monetary discipline (see Section 4.3.1).

The first-order conditions show that t must follow a random walk and that two optimality relationships must be satisfied

$$p = (b_1 mt + b_4 p^*)/(b_2 + b_4) \text{ and } b_1 t = b_3(g^d - g)$$

Hence, the marginal cost of direct taxes and of inflation (per unit of real money balances) must equal the marginal benefit of exhaustive public spending. For Germany and to a lesser extent the UK, b_4 is negligible and consequently inflation and tax rates go up and down together, but for the EMS followers, b_4 is substantial and consequently their inflation rates are tied to the German rate which leads to a sub-optimal government revenue mix (more precisely, the combined costs associated with b_1, b_2 and b_3 go up when b_4 increases). Exhaustive public spending goes up whenever taxes go down, and vice versa, because the first-order conditions demand that whenever the marginal distortions associated with taxation diminish, the marginal benefits associated with exhaustive public spending must diminish as well.

Upon substitution into the government's intertemporal budget constraint, one obtains (after a suitable normalization)

$$t = (b_2 + b_4)(rd + g_p^d) - b_4 m p_p^*$$

where the permanent level of desired exhaustive public spending is defined as $g_p^d := rPV(g^d)$ and $p_p^* := rPV(p^*)$. The government's inflation-corrected deficit (change in d) then follows as

$$rd + g - t - pm = (g^d - g_p^d) - [b_4/(b_2 + b_4)] m(p^* - p_p^*)$$

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[34] The menu costs of anticipated inflation can usually be measured in terms of triangles under the money demand schedule. However, empirically the magnitude of such costs are small and in any case under the quantity theory these costs are zero. However, if a higher level of anticipated inflation leads to a higher variance of unanticipated inflation, resources will be misallocated, arbitrary redistribution would occur and, perhaps, less long-term contracts will be made. The resulting costs of inflation may be substantial.

[35] Empirical evidence may be found in de Jong and van der Ploeg (1990).

A permanent increase in the desired level of exhaustive public spending requires higher tax and seigniorage revenues, but a temporary increase is fully met and financed by borrowing. An anticipated increase in the desired level of exhaustive public spending leads to an increase in taxes, a cut in spending today and public saving. A permanent increase in German inflation leads to more seigniorage and thus allows a cut in taxes and an increase in exhaustive public spending, but a temporary increase in German inflation leaves the tax rates and level of exhaustive public spending unaffected, leads to a bigger increase in inflation and seigniorage revenues, and thus allows some public debt to be paid off.

The general point is that, when there is a need to raise revenues for the public sector, there is a trade-off between zero tax distortions and zero inflation leading to both a positive tax rate and a positive inflation rate (Phelps (1973)). However, a strong commitment to the intermediate target of defending the currency within EMS-bands (high value of b_4) induces a sub-optimal public revenue mix, i.e. too high taxes and too low inflation (as measured by the terms in b_1 and b_2), and a too low level of exhaustive public spending (as measured by the term in b_3). In this sense, the price one pays for joining the EMS is a too small size of the public sector.[36]

Perhaps it is worthwhile to discuss at this juncture why some economists think that there are important public-finance reasons against moving from the EMS with managed exchange rates to the EMU with irrevocably fixed exchange rates (Dornbusch (1988), Canzoneri and Rogers (1988)). Their point is that the countries of southern Europe, Italy, Spain, Portugal and Greece, have relatively a much greater need for seigniorage revenues than the countries of northern Europe and that a fixed exchange rate deprives the countries of southern Europe of a potentially important source of public revenues-seigniorage. The reason is that the countries of southern Europe have much higher costs of tax collection and a larger black economy (proxied by a relatively high value of b_1), so that the optimal rules for public finance then immediately give rise *ceteris paribus* to higher inflation rates and lower direct tax rates (see above). The first-best policy is, of course, to get rid of the black economy, reduce the costs of tax collection and thus enable oneself to cut the

inflation rate. One could argue that a second-best policy is to have a crawling peg between the currencies of northern and southern Europe as this would accommodate the required differential in inflation rates. Although this seems to provide a convincing public-finance case against narrowing EMS-bands and moving to the EMU, Section 4.3 will argue that the argument may not hold water.

4.2. Competition among the central banks and treasuries of a monetary union

The previous section discussed the public-finance implications of the EMS while the remaining sections focus on the EMU. This section pays attention to a monetary union with a dependent system of central banks, whilst Section 4.3 presents the case for an independent ECB. Section 4.4 assumes the existence of an independent ECB, whose sole task it is to maintain price stability throughout Europe, and concentrates attention on the scope for independent budgetary policies to be conducted by the individual treasuries. In particular, three externalities are identified in Section 4.4 which all go in the direction of a too low level of exhaustive public spending. Before this can be done, it is however worthwhile to see the problems that occur when a monetary union does not have an independent system of central banks.

Consider a monetary union of N countries, denoted by the subscript $i = 1, ..., N$, whose system of central banks is run by the various treasuries and is thus not independent. There is a common inflation rate, p, and exchange rates within the union are irrevocably fixed. The government of country i solves

minimize $PV[b_1 t_i^2 + b_2 p^2 + b_3(g_i - g_i^d)^2]$ s.t. $d_i + PV(g_i) = PV(t_i + s_i)$

where s_i is the amount of seigniorage taken by treasury i from the common central bank. Individual governments are, in contrast to the rather odd recommendation of the Delors Committee for guidelines on public-sector deficits, free to borrow as long as they remain solvent. It also needs to take account of the budget constraint of the dependent system of central banks: $s_1 + s_2 + ... + s_N = pmN$. The main externality is, of course, that the seigniorage each treasury grabs from the system of central banks leads to higher inflation for all the other countries of the monetary union as well.

In the non-cooperative outcome (denoted by a superscript N)

$$b_1 t_i^N = b_3(g_i^d - g_i^N) = (b_2 mN)p^N, \quad i = 1, ..., N$$

must hold and tax rates and thus inflation rates must follow a random walk. As before, inflation and tax rates go up and

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[36] In any case, some argue on empirical grounds that the EMS has not really got such a fantastic inflation-unemployment trade-off (e.g. as measured by sacrifice ratios) anyway (Dornbusch (1989)). The reason may be that EMS countries employed a gradualist disinflation policy whilst some of their competitors (the UK and the USA) employed a shock treatment to get rid of inflation (de Grauwe (1989b)). However, others argue that there is evidence that the EMS has enabled countries such as Ireland to reduce the output costs of disinflation (Kremers (1989)).

down together and move in the opposite direction to the level of exhaustive public spending. In addition, since there is a common inflation rate and the costs of tax collection and the parameters in the welfare-loss are assumed to be the same across countries, tax rates must be the same in all countries of the EMU as well, even though levels of desired public spending and public debt may vary from country to country! (Of course, when the cost of collecting taxes is much higher in one country than in the rest of the EMU, its optimal tax rate will be lower than in the rest of the EMU.) In the cooperative outcome (denoted by a superscript C) the treasuries internalize the adverse external effects from grabbing more seigniorage so that

$$b_1 t_i^C = b_3(g_i^d - g_i^C) = (b_2/m) \, p^C, \quad i = 1, ..., N$$

must hold: the marginal distortion from collecting seigniorage revenues is N times as large as under the non-cooperative outcome. The case of an independent system of central banks (denoted by a superscript I) is relevant when monetary policy is set so as to maintain price stability throughout the region and thus corresponds to zero inflation, $p^I = 0$, whilst the fiscal authorities have no option but to accept this and given this find it optimal to let taxes follow a random walk.

Upon substitution into the treasuries' intertemporal budget constraints, one can show that

$$p^N = (rd + g_p^d)/[m + (b/mN)] \text{ exceeds } p^C = (rd + g_p^d)/[m + (b/m)] \text{ exceeds } p^I = 0$$

where $b = b_2(b_1^{-1} + b_3^{-1})$, d denotes the average of the d_i, and g_p^d denotes the average of the g_{ip}^d. Conflict between the treasuries of a monetary union without an independent common central bank leads each of them to grab too much seigniorage, which pushes up inflation for the whole region.[37] International coordination of monetary and budgetary policies leads to lower monetary growth and inflation, higher tax rates and lower levels of exhaustive public spending for each of the countries of the union, because the seigniorage-inflation externalities are now internalized. An independent system of central banks must be governed by ultra-conservative central bankers and thus achieves a stable price level, so that the treasuries must make up for this loss in seigniorage revenues by resorting to higher tax rates and lower levels of exhaustive public spending than would be the case under a cooperative dependent system of central banks. It is easy to show that the highest welfare is achieved when the various ministers for finance coordinate their budgetary and monetary policies in a dependent system of central banks, whilst the lowest welfare is achieved under an independent system of central banks.

4.3. The case for an independent ESCB: Rules versus discretion

If an independent ESCB leads to a sub-optimal government revenue mix and a decline in public spending and consequently performs so badly compared with a non-cooperative, dependent ESCB and *a fortiori* with a cooperative, dependent ESCB, why then does the Delors Committee strongly advocate an independent ESCB based on the German (and Dutch) model?[38]

The answer must, of course, be that one is afraid that a dependent ESCB is likely to succumb to pressure from individual ministers for finance to finance their levels of public spending. An independent ESCB is by many believed to be the only viable means of ensuring a strong and undeniable monetary discipline. More precisely, an independent ESCB, whose primary task it is to preserve price stability, is not going to either levy a surprise inflation tax in order to wipe out the real value of outstanding nominal public debt, or to increase the money supply in order to accommodate the demand from ministers for finance for more public spending or to accommodate the demand from unions for higher wages.[39] Since ministers for finance, unions and other agents anticipate that an independent ESCB is not going to give in to their demands, they settle for less and as a result inflation in equilibrium is lower than it would be under a dependent ESCB without much monetary discipline. This is the main reason why central bankers—the main signatories of the report produced by the Delors Committee—are very much in favour of an independent ESCB: they dislike inflation more than anything else and an autonomous body for setting monetary policy is the best way to achieve a stable price level!

In view of the above discussion, it must be clear that it is much more relevant to compare non-cooperative and cooperative discretionary outcomes under a dependent

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[37] In fact, the monetary union may end up at the wrong side of the seigniorage Laffer curve, when demand depends negatively on expected inflation (Aizenman (1989)).

[38] In fact, the Delors Committee recommends a federal structure in which the central banks of the EMU countries are incorporated in an ESCB. The ESCB should have an autonomous and independent status. The ESCB should have three levels of organization: (i) the Council of the ESCB consisting of the presidents of the national central banks, which is independent of the Community and national authorities (see the German 'Zentralbankrat'); (ii) the Board of the ESCB, which monitors monetary developments and oversees the implementation of the common monetary policy (see the German 'Direktorium'); and (iii) the national central banks which execute the decisions taken by the Council (see the 'Landeszentralbanken') (also see Eijffinger (1989)). Many more details on the ESC can be found in De Cecco and Giovannini (1989).

[39] Of course, the first-best response is to destroy such incentives to renege on nominal contracts through, for example, wage indexation or the issue of indexed rather than nominal bonds. Conversely, an independent ESCB does not destroy all forms of capital levy.

ESCB with the rules outcome under an independent ESCB. In other words, to asses the case for an independent ESCB, one should trade off the disadvantage of a sub-optimal government revenue mix and a lower level of exhaustive public spending against the advantage of a better monetary discipline and the lower inflation this brings with it.

It is possible to think of at least three potential sources of time inconsistency that may be relevant for an ESCB. The first is when workers are locked into nominal wage contracts and the central bank reneges by eroding the real value of the wage and thus boosting the level of employment (Barro and Gordon (1983), Giavazzi and Pagano (1988)). In so far as Europe enjoys wage indexation, this source of time inconsistency is less relevant. The second occurs when the demand for money depends negatively on the expected inflation rate, because then the central bank has an incentive to renege and levy a surprise inflation tax and use the seigniorage to cut distortionary taxes and boost welfare (Calvo (1978), Barro (1983), van der Ploeg (1988b), Cukierman (1989)). The third occurs when treasuries issue nominal rather than real or indexed government bonds, because then there is in principle an incentive to impose a surprise inflation tax, wipe out the real value of government debt, and have more funds available to cut distortionary taxes (Gros (1988)) and increase the level of exhaustive public spending. In all three cases the rules outcome leads, in equilibrium, to lower inflation than the discretionary outcome, hence all three cases can be used to illustrate the advantages of an independent ESCB. To illustrate the argument, however, attention will be focused on the monetary discipline that an independent ESCB may offer in safeguarding the real value of public debt, probably the most important source of time inconsistency for Europe.[40]

Hence, assume that the treasuries issue, instead of real (or indexed) bonds, nominal bonds with a guaranteed nominal rate of return, $r + p^e$ where p^e denotes the expected rate of inflation. The expected or *ex ante* real interest rate, or just the real interest rate for short, is according to this Fisherian relationship determined by consumption tastes and production technologies, more or less independent of the expected inflation rate, p^e. If you compare any two States with

identical tastes and technologies, any difference in nominal interest rates must then be due to differences in expected inflation rates. The realized or *ex post* real interest rate, $r + p^e - p$, is relevant for borrowing and lending activities. It decreases with unanticipated inflation, which is one way in which governments can reduce the level of their inflation-corrected deficit $(r + p^e - p) d_i + g_i - t_i - pm$, and reduce their debt-GDP ratio over time.[41] The problem of time inconsistency arises because unanticipated inflation can be used to wipe out the real value of public debt. Two outcomes should be considered: rules and discretion. The point about the trade-off between an optimal government revenue mix on the one hand and discipline and low inflation on the other hand can be made both for the EMS and the EMU.

4.3.1. The role of the Bundesbank in the EMS

For simplicity, consider first the EMS and the role of the Bundesbank. Assume that the government minimizes the same welfare loss function as in Section 4.1. The rules outcome is appropriate when the government has sufficient discipline not to renege. The government can then credibly influence expectations of the private sector so that in the determination of its optimal policy it can assume that $p^e = p$. The rules outcome (denoted by a superscript R) is observationally equivalent to a situation where the government issues real or indexed bonds. Of course, the rules outcome must be enforced or else the government has an incentive to cheat with an unanticipated increase in monetary growth and a corresponding reduction in distortionary taxes and increase in the level of exhaustive public spending. The discretionary outcome (denoted by a superscript D) is appropriate when the government cannot make credible announcements and consequently must take p^e as given in the determination of its optimal policies. The first optimality relationship of Section 4.1 changes to $p^D = [b_1(m + d)t^D + b_4 p^*]/(b_2 + b_4)$, so that for a given tax rate, exhaustive public spending is as before but inflation is now higher than under the rules outcome, at least when the government has issued nominal debt. The reason is that a lower monetary growth would not be credible, because then the government is tempted to levy a surprise inflation tax. Upon substitution into the government's intertemporal budget constraint, one has

$$t^D = t^R/1 + b_1[m + (b_2 + b_4)/(b_3 m)]d \text{ less than } t^R$$

[40] There is plenty of evidence that wages in Europe are fairly well indexed to consumers' prices (e.g. Branson and Rotemberg (1980)), so that the scope for eroding the real value of the wage through unanticipated inflation is limited. In any case, it is straightforward to extend the arguments of this part to also allow for an effect of unanticipated inflation on output as in Barro and Gordon (1983). Since money is mainly held for transactions rather than for speculative purposes, there is not much scope for eroding the real value of money balances either. In any case, public debt in Europe is much larger than the stock of real money balances.

[41] Since the real stock of public debt, d_i, is no longer a predetermined variable, an increase in the level rather than in the growth of the nominal supply of high-powered money leads to an equal increase in the price level and can thus be used to wipe out the real value of public debt at 'the stroke of a pen' (see Keynes (1971), Chapter 2). Such capital levies are not discussed here.

It follows immediately that g^D exceeds g^R and it is straightforward to show that p^D exceeds p^R. Hence, a lack of monetary discipline, especially for countries with a high level of public debt, leads to lower tax rates, higher inflation rates and higher levels of exhaustive public spending than would be the case when central banks do enjoy a reputation for sticking to rules. One can argue that this is a reason why countries of southern Europe with a dependent central bank, a lack of monetary discipline and high levels of public debt extract relatively more revenues from seigniorage than from direct taxation. Another reason is that the costs of tax collection and the size of the black economy are greater or that the tax system of those countries is less efficient (higher value of b_1), so that it is optimal to have higher inflation and lower tax rates, even when the central banks of these countries have a reputation for not succumbing to pressures of inflationary finance.

The main reason for the central banks of southern Europe to join the EMS may be that they gain the credibility of the Bundesbank and the associated tying of their hands (proxied by b_4) leading to lower inflation (associated with the term in b_2) which they would miss otherwise. They have to judge whether this advantage outweighs the less efficient public revenue mix they may be stuck with under the EMS (associated with the terms in b_1 and b_3). The choice is to have either an independent monetary policy and no reputation ($b_4 = 0$) or to peg one's inflation rate to the German rate and obtain the credibility of the Bundesbank (b_4 tends to infinity). Hence, to have an incentive to join the EMS, the welfare (as measured by the terms in b_1, b_2 and b_3 only, thus excluding the intermediate target b_4) under a rules outcome with fixed exchange rates and no independent monetary policy (very high value of b_4, denoted by the superscript E) should be higher than under the discretionary outcome with an independent monetary policy and floating exchange rates ($b_4 = 0$, denoted by the superscript F). Since p^E is less than p^F but t^E exceeds t^F and g^E is less than g^F, one has to trade off the merits of lower inflation against the costs of higher tax rates and lower levels of exhaustive public spending. One can show that, for the case of $g_p = g_p^d$, it pays to join the EMS when $(b_2 - b_1 m^2)d$ exceeds $(b_2 + b_1 m^2)m$, irrespective of the value of b_3. Hence, countries with a very high priority for low inflation (high value of b_2), with a low priority for eliminating tax distortions (low value of b_1) and with a large outstanding stock of nominal government debt (high value of d) have a strong incentive to levy an unanticipated inflation tax and thus will want to join the EMS in order to bind their hands to the Bundesbank. For these countries, the gains in monetary discipline outweigh the losses from more tax distorsions. Italy, Ireland, Belgium, and the Netherlands have high levels of public debt and, especially the latter two countries, have no clear wish to reduce tax distortions: no wonder that they are such fervent supporters of the EMS! The UK is very keen on reducing tax distortions and has less of a public debt problem, which may be a reason why it is less keen to join the EMS.

Recent developments in Eastern Europe may well be relevant for the development of the EMS as a zone of monetary discipline. The unification of the two Germanys creates additional demand for West German products from East German citizens to consume what they previously could not and from firms to build a new infrastructure for East Germany. This is why many fear a bout of inflation in West Germany during the process of integrating the two economies. This may well threaten the role of the Bundesbank in the short run as a nominal anchor for the EMS, since inflation in the whole of Europe may then rise. If this occurs, it is less likely that countries will want to join or stay in the EMS for then they have to give up an independent monetary stabilization policy (see Section 3) without necessarily obtaining a lower inflation rate, even though their public revenue mix may become more efficient.[42]

4.3.2. The role of an independent ESCB in EMU

There seems to be a serious political problem in moving from the EMS to EMU. In order for the UK, French and Italians to benefit from the enhanced monetary discipline offered by the Bundesbank, they need to leave it largely untouched as an autonomous institution. Indeed, the ESCB advocated by the Delors Committee is meant to be independent and based on the Bundesbank model. However, from a political point of view the independence and autonomy of such an ESCB may be threatened, because in lieu of the loss of an independent monetary policy the electorates of these countries are likely to want a strong element of control in the ESCB. But this is like throwing the baby out with the bath water, because it would destroy the disciplinary advantages associated with creating the new institution in the first place. Despite the danger of these political problems, it seems worthwhile to compare the non-cooperative and the cooperative discretionary outcomes for the EMU, when it works with a dependent ESCB (denoted by the superscripts ND and CD, respectively) on the one hand, with the rules outcome for the EMU when it works with an independent ESCB on the other hand (denoted by the superscript I, as discussed in Section 4.2).

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[42] Of course one could question why an exchange-rate target is more credible than a direct money-supply target. Presumably, the answer is that the EMS provides an institutional arrangement for forcing countries to stick to their exchange-rate commitments.

It is straightforward to show that (see Section 4.2) $p^{ND} = (rd + g_p^d)/[m + b/(mN + d)]$ exceeds $p^{CD} = (rd + g_p^d)/[m + b/(m + d)]$, which of course exceeds $p^I = 0$. The presence of an outstanding nominal public debt is an open invitation to wipe it out with an unanticipated inflation tax and a dependent ESCB cannot be trusted not to take up the invitation, hence inflation rates under the discretionary outcomes exceed the rates under the rules outcome (p^{ND} exceeds p^{NR} and p^{CD} exceeds p^{CR}). It then follows that t_i^{ND} is less than t_i^{CD}, which in turn is less than t_i^I. Also, g_i^{ND} exceeds g_i^{CD}, which in turn exceeds g_i^I. Hence, as far as the treasuries are concerned, the presence of a dependent ESCB and competition within the EMU improves welfare, since this reduces tax distortions and raises the level of exhaustive public spending (as measured by the terms in b_1 and b_3), but as far as the central bankers are concerned this reduces welfare, since it increases inflation (as measured by the term in b_2). This is in a nutshell the conflict between ministers for finance and central bankers. In a sense, the case of an independent ESCB corresponds to non-cooperation between central banks and ministers for finance whilst the case of a dependent ESCB means that the monetary and fiscal authorities in any particular country are one and the same entity and can thus be assumed to cooperate. It is easy to show that one is more likely to come out strongly in favour of an independent ESCB when the level of average public debt (d) in Europe is high, when the priority one attaches to price stability (b_2) is high, and when the priority one attaches to eliminating tax distortions (b_1) is low. Since the Delors Committee consisted largely of central bankers, it is not surprising that they have come out in favour of an independent ESCB for EMU.

In fact, the conditions under which one favours an independent ESCB over a cooperative EMU with a dependent ESCB (CD) are exactly the same conditions under which a country wants to join the EMS and peg its currency to the Deutschmark (see Section 4.3.1). More relevant, perhaps, is that one prefers an independent ESCB over a non-cooperative EMU with a dependent ESCB (ND) when

$$(b_2 - b_1 m^2)\, d \text{ exceeds } [b_2(2 - N) + b_1 N m^2] m$$

As the number of members of the EMU increases, this condition becomes more likely to hold (be violated), provided that b_2 exceeds (is less than) $b_1 m^2$. In other words, when the priority one attaches to price stability exceeds the priority one attaches to reducing tax distorsions and the number of EMU countries is large, one always favours an independent ESCB over a non-cooperative EMU with a dependent ESCB, and vice versa.

Nevertheless, when one comes out in favour of a dependent ESCB, one should realize that macroeconomic policy coordi-

nation within the EMU may well be counterproductive when one restricts attention to discretionary outcomes (see Section 5.1). This is likely to occur when the advantages of cooperation in the form of lower inflation are outweighed by the disadvantages in the form of more tax distortions and lower levels of exhaustive public spending (see van der Ploeg (1988b)). Such a counter-example to the usefulness of macroeconomic policy coordination is easily constructed: when $d = -m$, the CD-outcome yields the same welfare as the I-outcome and, when $(b_2/b_1)\,(N - 3) < m^2(N - 1)$, the ND-outcome yields a higher welfare than the I-outcome and thus the CD-outcome.[43] Macroeconomic policy coordination destroys discipline and can thus be counterproductive!

4.4. Fiscal externalities under EMU

Now consider the EMU, more or less as envisaged by the Delors Committee, and ask what scope remains for the coordination of budgetary policies in Europe. To be quite clear, individual treasuries must finance their deficits by borrowing and cannot benefit from seigniorage revenues (except from those accruing through real growth), the ESCB is independent and pursues a stable price level, all bonds are assumed to be perfect substitutes, capital markets are fully liberalized, and the goods markets of Europe are fully integrated with each other but not with the rest of the world. In addition, assume that Europe as a whole is a small open economy relative to the rest of the world. Three externalities are briefly considered: spending by individual treasuries is a public good to Europe as a whole, international tax competition, and an externality arising from the common determination of the real exchange rate and current account of Europe.

4.4.1. National public spending is a public good under EMU

In view of the planned completion of the internal market for Europe, it seems reasonable to assume that countries care more and more about each others' levels of public spending on the environment, training of low-skilled workers, research and development, foreign aid (e.g. to Eastern Europe), infrastructure, museums, etc. Although each member country of the EMU benefits from a higher level of

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[43] Sufficient conditions are $d = -m$ and $N = 2$ or $N = 3$ or (b_2/b_1) is less than m^2, so that, when the higher costs of tax collection dominate the gains arising from lower inflation, cooperation is counterproductive. The counter-example is based on a restructuring of government debt in such a way as to remove the incentive to levy a surprise inflation in the cooperative outcome: the gains on real money balances are exactly offset by the losses on public assets.

public goods provided by other countries of the EMU, they do not have to pay the price in the form of higher taxes for it. Absence of the coordination of budgetary policies means that exhaustive public spending is not recognized as a public good for Europe as a whole and consequently its supply will be inadequate. The theory of clubs may serve as a useful guide in deciding on whether a subgroup of countries get together and specialize in the production of certain public goods.

A special case needs to be made for public investment, because this is in view of the developments in Eastern Europe, the bad state of the environment and the demand for infrastructure very much needed in Europe. There are two aspects of public investment that should be stressed: its international and its intertemporal nature. It is clear that, due to the fact that most of public investment is a public good for Europe as a whole, its supply will be deficient. Just as important, however, is the fact that public investment with a market rate of return increases the current level of exhaustive public spending, but leaves the permanent level of exhaustive public spending unaffected. The optimal response from the point of view of the theory of public finance is to leave tax rates alone, but borrow and increase the public sector deficit now in order to finance the investment outlays and to reap the benefits later on. Unfortunately, the Delors Committee recommends guidelines on public-sector deficits without making a reference to public investment or to permanent levels of public spending. Such a myopic view on the public-sector's finances is bound to harm public investment in Europe and should be avoided at all costs. Much better is to advocate the 'golden rule' of public finance: tax for permanent increases in exhaustive public spending, but borrow for temporary increases in current exhaustive public spending and for (temporary of permanent) increases in public investment with a market rate of return.

4.4.2. International tax competition and tax harmonization

If factors of production, goods and capital are highly mobile within Europe, it is clear that individual treasuries do not want their tax rates to diverge too much from their competitors' for otherwise they would lose all their revenues to their competitors.[44] Indeed convergence is a major objective, but it is not clear what one should converge to (the lowest, the highest of the average tax rate?) and whether one converges

to Pareto-efficient levels of tax rates or not. In fact, one must take account of the possibility that each member country of the EMU attempts to be a tax haven and have slightly lower tax rates than its competitors. In any case, treasuries will not want to diverge too much, because otherwise the mobile part of their labour force will prefer to migrate to the rest of the EMU and their consumers will prefer to buy their products from the rest of the EMU. One of the main concerns of Dutch macroeconomic policy is to bring marginal income tax rates and VAT rates down to the European average or, more specifically, German level. Such actions should be taken account of as well. If one takes account of these effects, international competition will drive down tax rates and levels of public spending in Europe below the levels that would prevail under European coordination of budgetary policies. The downward bias in tax rates arises from futile, beggar-thy-neighbour attempts to cut tax rates and increases when the number of EMU-countries increases. In general, when an individual treasury is faced with EMU-competitors who have a much lower need for revenues (due to lower permanent levels of exhaustive public spending), it is forced to cut tax rates and exhaustive public spending, and to allow private consumption to flourish, even though it is faced with a large need for public revenues. If EMU-countries have similar preferences, tax smoothing does not only occur over time, but also between EMU-competitors, even though their levels of public debt and desired exhaustive public spending differ. The main point is that the outcome under tax competition is likely to be inefficient, since all EMU-countries would be better off if they raised tax rates and levels of exhaustive public spending.[45]

Various studies on tax competition and on tax harmonization are now becoming available. One of the main findings is that the immobile factors of production (usually the poorer workers) are going to be the losers of uncoordinated tax competition and most heavily, since the mobile factors of production (such as capital) will find their way to tax havens and thus have a high price-elasticity and impose a high excess burden relative to the amount of revenues collected (Sinn (1989)). To a certain extent, consumers will gain as competition forces down VAT rates. Another set of results is that the residence principle leads to an inefficient world allocation of saving and that the source principle leads to an inefficient world allocation of investment. In addition, it can be shown somewhat surprisingly that in a market-clearing world with perfect capital mobility (and the interest rate determined on the world market) the residence principle is optimal and there are no gains from tax coordination (Razin

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[44] In fact, this statement is only true when lower taxes are not capitalized. If one country has lower taxes, then house prices may go up by exactly the same amount as the annuity value of the tax advantage.

[45] The point may be weakened somewhat if one allows countries to compete in the provision of public goods (e.g. an efficient legal system).

and Sadka (1989b and c)).[46] In addition, one could argue that tax distortions and evasion can be avoided through, say, basing taxes on nationality rather than on residence, but (given only too common attempts to evade taxes) by far the best method seems to be to go for a coordinated approach to tax harmonization (Sinn (1989)), which is what the Delors Committee seems to have in mind. Given the liberalization and integration of markets for capital, goods and services, there is more scope for individual European countries to impose adverse externalities on others, and thus there is a need for coordination of capital income taxation within Europe, starting with agreeing on a tax base and followed by setting minimum statutory rates (Tanzi and Bovenberg (1990)).

4.4.3. Europe's current account is a public good

Since the EMU is not a closed economy but an open economy relative to the rest of the world, one can think of a number of externalities to do with the fact that all EMU-countries share a common real exchange rate and current account vis-à-vis the rest of the world (see Cohen and Wyplosz (1989)). Budgetary policies of the various treasuries now jointly determine Europe's real exchange rate and current account. A budgetary expansion by any of the treasuries of the EMU raises the demand for European goods relative to those from the rest of the world, and thus induces an appreciation of Europe's real exchange rate and a deficit on Europe's current account. Absence of the coordination of budgetary policies in Europe means that Europe's real exchange rate and current account are not recognized as public goods and leads to inefficient outcomes when budgetary policies under the EMU are pursued in a competitive fashion.

Treasuries must satisfy their usual intertemporal budget constraints, but individual EMU-countries do not satisfy such an intertemporal constraint vis-à-vis the outside world directly. Instead, the EMU-countries face a joint intertemporal budget constraint vis-à-vis the countries outside the EMU. More precisely, when the EMU as a whole is solvent, the present value of the stream of the EMU's balance-of-trade surpluses must equal the outstanding net foreign debt of the EMU as a whole. The EMU's balance of trade is jointly determined, since it corresponds to the output produced by the whole of the EMU minus private and public consumption of the whole of the EMU. A budgetary expan-

sion by any of the EMU-countries raises public or private consumption and thus induces a deficit on Europe's current account. The associated appreciation of Europe's real exchange rate reduces the cost of goods imported from the rest of the world, and thus reduces the cost of living and boosts real income for all EMU-citizens.

When each treasury attempts to use budgetary policy to appreciate the real exchange rate of Europe and thus raise the real income of its citizens, it increases its tax rate and its level of public consumption. In the absence of European coordination of budgetary policies, the real exchange rate of Europe is undervalued whilst exhaustive public spending and tax rates are too low relative to the cooperative outcome. The reason is that spending by treasuries reduces the cost of living for all EMU-citizens and is thus a public good. In effect, each EMU-country is trying to pass the burden of appreciating the real value of Europe's currency on to its EMU-competitors (van der Ploeg (1990b)).

The EMU as a whole might have an explicit target value for its current account, perhaps a deficit because Europe wants capital from outside Europe to pour into Europe in order to rebuild Eastern Europe. If this is the case, each of the EMU-countries will try to shift the burden of loosening the fiscal stance to its EMU-competitors. The result is that public spending as a whole will be too low throughout Europe and capital inflows into Europe will not be high enough, relative to the outcome where all EMU-countries coordinate their budgetary policies.

So far, this part has assumed that guidelines for national public sector deficits are unnecessary and, perhaps, even undesirable. However, the externalities in this section suggest that it may be worth while to impose a requirement on the overall borrowing requirement for Europe. The point is that if EMU-countries only consider their own current account and not the current account of Europe, then such limits on borrowing from outside the European Community may act as a substitute for European coordination of budgetary policies. Hence, it may be desirable to allow individual governments to borrow what they want from European households and institutions, but to constrain or to encourage them in their borrowing from outside the European Community.

5. Counterproductivity of macroeconomic policy coordination

Most of the discussion so far gives the impression that international coordination of macroeconomic policies is always a good thing, given the particular exchange-rate regime

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[46] Other examples of the international coordination of tax policies in two-country general equilibrium models with a well-developed supply side can be found in Frenkel and Razin (1987; 1989), Frenkel et al. (1989), and Razin and Sadka (1989a). An example of the Pareto-improving effects of harmonization of VAT rates can be found in Keen (1989).

in force. However, there are a variety of situations under which international coordination worsens the welfare of the countries concerned. This section discusses three good reasons why international policy coordination may be counterproductive: (i) it worsens the discipline of central banks and thus leads to higher inflation; (ii) it may provoke an adverse response from third countries (such as the USA); and (iii) it can make the countries concerned worse off when there is uncertainty or disagreement about how the global economy functions. Since the move towards the EMU closely resembles international policy coordination under a float, these are in principle also three good reasons why the move towards the EMU may be undesirable.

5.1. Coordination destroys discipline: Rules versus discretion

The view that international policy coordination is never a bad thing is fallacious, because it can worsen the credibility problems of the central banks *vis-à-vis* private sector agents and can therefore be counterproductive. This paradox easily arises within the context of a Keynesian multi-country world with rational expectations in financial markets and nominal wage rigidity (Rogoff (1985)).[47] Central banks have an incentive to renege on previously announced plans by engaging in an unanticipated monetary expansion, because this leads to higher prices, erodes the real values of the wage and thus boosts employment and output. International policy coordination under a float destroys the discipline of central banks and thus leads, in equilibrium, to higher inflation and lower welfare for all countries concerned. The reason is that in the absence of cooperation, the depreciation of the exchange rate and associated inflation costs provide a disincentive to renege, which does not arise under a cooperative float. Another way of looking at the paradox is that coalition among a sub-set of players, the various central banks, can worsen the game with the remaining players, private sector agents.

This paradox does not only arise in a world plagued by widespread unemployment, but also occurs in a long-term world with full employment and all markets clearing (van der Ploeg (1988b)).[48] The time inconsistency now has a

public-finance rationale,[49] because individual governments may levy a surprise inflation tax and use the seigniorage revenues to cut distortionary taxes and increase spending on public goods, both of which increase welfare. An increase in taxes or public spending worsens foreign welfare.[50] In the absence of cooperation this externality is not internalized, so distortionary taxes will be too high and employment and private consumption will be too low whilst public spending will be too high. However, with international policy cooperation, a discipline device is destroyed (as the exchange rate is unaffected by a surprise inflation tax) and thus inflation will be higher and holdings of real money balances will be lower than under a non-cooperative float. Hence, international policy coordination is counterproductive when the adverse effects of excessive monetary growth on inflation arising from a worsening of monetary discipline outweigh the beneficial wielfare effects of less tax distortions and a more optimal provision of public goods. Another example of the counterproductivity of macroeconomic policy coordination under the EMU, based on using unanticipated inflation to wipe out the real value of nominal government debt, is already discussed at length in Section 4.3.2.

The point of the above three examples is that, when one restricts attention to the discretionary rather than to the rules outcome, international policy coordination under a float can be counterproductive, because it worsens credibility problems and thus increases the incentive to have an unanticipated increase in inflation.[51] However, it is important to realize that the EMS, and to a much greater extent the move towards the EMU, also destroys the discipline device that is prevalent under a non-cooperative float. Hence, the EMS and EMU worsen credibility problems of central banks *vis-à-vis* trade unions and other private sector agents and may therefore gradually lead to higher inflation rates throughout Europe. The move from a float, towards the EMS and eventually towards the EMU, is only desirable when central banks already have sufficient credibility and discipline in order for the private sector to believe that they will not succumb to the temptation to renege on announced policies.

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[47] One way to overcome the problem of time inconsistency is often thought to be to appoint conservative central bankers. In a two-country world this is particularly true for asymmetric shocks, but symmetric shocks weaken the case for conservative central bankers (Laskar (1989)).

[48] Here attention is focused on a monetary market-clearing model; Kehoe (1987; 1989) considers the counterproductivity of coordination of fiscal policies within the context of a real market-clearing model with capital accumulation.

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[49] The time inconsistency arises despite the fact that public and private preferences coincide. A related source of time inconsistency is when there is a conflict between a treasury and a central bank trying not to succumb to pressure from ministers and other politicians to finance public spending with seigniorage (see Section 4.2).

[50] This policy change leads to a trade surplus, which is choked off by an appreciation of the real exchange rate. Hence, foreign consumption of home goods falls and foreign welfare falls.

[51] However, it is important to realize that there exist counter-examples to the point that international policy coordination can be counterproductive.

This is a different way of saying that the Bundesbank and De Nederlandsche Bank with their excellent reputation for low-inflation policies must keep a major say in the operation of the EMU and the ESCB, and that the ESCB should be allowed to conduct an independent and autonomous policy.

Indeed, this is perhaps one of the main reasons why countries whose central banks are less disciplined (such as France, Italy or Ireland) chose to join the EMS. Membership of the EMS can provide such countries with a 'nominal anchor': by pegging their currencies to the German mark (and giving up an independent monetary policy) they buy the credibility of the Bundesbank and obtain a lower inflation rate than they would otherwise obtain (Giavazzi and Pagano (1988), Giavazzi and Giovannini (1986b), (1989a), Collins (1988), Melitz (1988a)). However, it can be argued that the reduction in inflation achieved by the EMS countries is not more spectacular than the ones achieved by other OECD countries and that the sacrifice ratios of some EMS countries are notably worse than those of other OECD countries (e.g. Dornbusch (1989)). The move towards the EMU may dilute the reputation of the Bundesbank and thus worsen credibility problems throughout Europe and increase inflation in Europe; if this is the case, the move from the EMS towards the EMU may well be undesirable from the point of view of the objective of inflation. The case of Ireland, however, suggests that the dramatic drop in inflation is a mixed blessing, because although it was successful as far as gaining credibility is concerned (Kremers (1989)), it has also led to the problems of high public debt, massive emigration and high unemployment (Dornbusch (1989)).

5.2. The EMU versus the rest of the world[52]

Consider the EMU versus the rest of the world, say the United States of America. There is one currency in the EMU, the ecu, whose value in terms of US dollars floats. There is a stable US and a stable European money supply, so attention is focused on the fiscal policy responses to a situation of stagflation caused by a world-wide adverse supply shock. Under a global, non-cooperative outcome, the USA exploits the smaller size of the EMU countries by having a looser fiscal stance and thus appreciating the real value of the US dollar vis-à-vis the ecu and exporting inflation to the countries of the EMU. However, when the countries of the EMU cooperate, they can be treated as a bloc of roughly the same size as the USA and the analysis is as under a float (see Section 3.2): right-wing (left-wing) treasuries have a too loose (tight) budgetary stance relatively

to the global, cooperative outcome. When the USA is faced with a coordinated EMU, it can no longer employ the tactic of appreciating the real value of the US dollar so that Europe has higher inflation when its fiscal policies are coordinated. However, the USA now must have a tighter fiscal stance and thus unemployment in both the USA and Europe will be higher. It follows that coordination of budgetary policies within the EMU can be counterproductive, especially when governments care a lot about unemployment.

The above is again a standard proposition in game theory: a coalition among a sub-group of players (countries of the EMU) can decrease the utilities of those players, because it may provoke an adverse response from other players (the USA).

5.3. Disagreement on the workings of the global economy

Various economists, particularly policy advisers in supranational organizations such as the IMF, argue that many countries are reluctant to participate in international policy coordination, because either they are uncertain on how the global economy functions and unsure about the nature of the interdependencies between their economy and other economies, or their view on these matters differs from the view of their partners in the EMS or summit meetings. For example, German officials have been known to argue that a budgetary expansion is bad for German employment, which is at variance with what most economists teach and have been taught and is probably at variance with what officials of other countries believe. Given that when you ask 10 macroeconomists to give an answer to a question they are likely to give 10 different answers, theorists must live in Cloud-cuckoo-land when they think that macroeconomists, let alone policy-makers, can agree on a common model. It is therefore no surprise that government officials disagree and quibble about the functioning of the global economy and thus a fortiori are likely to have the wrong view. Such lack of knowledge and disagreement on the functioning of the world economy can easily render international policy coordination counterproductive and make all countries concerned worse off (Ghosh (1986), Frankel (1988)). For example, using 10 multi-country models (e.g. Bryant et al. (1988)) as representing the views of the US Government and other governments, or the true world economy, out of 1 000 possible combinations monetary coordination perceptibly improved US welfare in only 546 cases and welfare of other industrialized countries in only 539 cases (Frankel and Rockett (1988)). Indeed, many have argued that this is the main barrier to successful international policy coordination. A less known result is that when countries have the wrong view on the nature of global interdependence and do not cooperate, they can be much better off than when they have

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[52] Details can be found in van der Ploeg (1989b).

the correct view on the nature of global interdependence and do cooperate. Hence, better information need not make countries better off when countries do not cooperate because this can worsen various forms of conflicts arising from international externalities (van der Ploeg (1989d)).

6. Conclusions

The main benefits of the EMU are well known and not directly related to the issues of macroeconomic policy coordination: (i) elimination of exchange-rate uncertainty and the costs of hedging against such risks; (ii) more economic use of international reserves for Europe as a whole; (iii) availability of a more efficient unit of account, medium of exchange and store of value, and the ecu is likely to become a 'vehicle currency'; (iv) saving on transaction and information costs; (v) less speculative flows of capital; (vi) political ambitions of an integrated Europe are achieved; and (vii) more power in G-3 summit meetings, particularly in matters of monetary policy.[53] The main costs are the loss of an independent monetary policy, possibly a weakening of monetary discipline, and a sub-optimal government revenue mix in the sense of too low (high) inflation rates and too high (low) tax rates for those countries with high (low) costs of tax collection. Since most of the benefits show non-rivalry in consumption and are 'public goods' whilst the disadvantages are more like 'private goods', the calculus of participation suggest that Europe may not move far enough in the direction of the EMU and small countries are likely to be 'free riders' in the efforts to move towards the EMU (Hamada (1985), Chapter 3). Hence, the impetus of the EMU must come from the larger countries of the European Community.

Most of this report is, however, concerned with the potential need of macroeconomic policy coordination during the various phases of economic and monetary integration in Europe. Taking the problems of stabilization policy in the face of European-wide stagflation caused by a common adverse supply-shock under alternative exchange-rate regime first, one finds that the EMU performs better than the EMS or a regime of floating exchange rates. The reason is that the futile competitive attempts to appreciate the currency and export inflation and the associated 'beggar-thy-neighbour' tightening of monetary policy are altogether impossible within the EMU. EMS-followers manage to disinflate away

an adverse supply-shock by appreciating their currency *vis-à-vis* the German mark at the expense of welfare in Germany, but would not be able to do this under the EMU. In fact, this is one of the few reasons why Germany may be keen to move to the EMU. As far as budgetary policy responses to European-wide stagflation are concerned, German hegemony in monetary policy under the EMS implies that Germany has a tighter fiscal stance than the other EMS-countries and thus Germany is unlikely to fulfil its role as 'locomotive engine of growth for Europe'. Both the EMS and the EMU are likely, especially as intra-European trade increases, to have a built-in deflationary bias in stabilization policies, unless budgetary policies are coordinated. When real wage rigidity and other forms of indexation are important phenomena, the particular exchange-rate regime in force is irrelevant for real outcomes and absence of international policy coordination is likely to lead to too tight budgetary policies as well.

However, when Europe is hit by country-specific shocks or shocks associated with switches in preferences, the EMU scores very badly on stabilization policy. The reason is, of course, that the currency cannot under the EMU appreciate in response to the excess demand. The EMU is therefore only likely to respond well to country-specific or switch shocks when either labour markets clear instantaneously (as in such a fanciful world stabilization policy is not needed), or labour mobility throughout Europe is high. To the extent that this is not likely, a strong case can be made for a European federal transfer scheme which transfers income from regions with overemployment to regions with unemployment and which should thus be budget-neutral on the Community level. Clearly, there are incentive problems with such a transfer scheme but they are reasonably well resolved on a national level and there is no reason to believe they cannot be resolved at a European level. Only giving benefits when the unemployed have the duty to take a job if offered, even if it is not in their field of training, and training programmes would help. If the people of Europe are not willing to introduce an EFTS, individual countries have a duty to pay much more attention to structural supply-side policies in order to ensure that national labour markets adjust more quickly to full employment.

Moving on to the public-finance aspects of moving from the EMS to the EMU, it is clear that a monetary union without an independent central bank leads, in the absence of coordination of the policies of the various fiscal and monetary authorities, to excessive inflation, too low tax rates and too high levels of public spending. The reason is that each treasury fails to internalize the adverse effects of grabbing more seigniorage from the common central bank on the inflation rate that is common to all countries of the union.

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[53] Original contributions to the theory of optimum currency areas are Mundell (1961), McKinnon (1963) and Kenen (1969) which, respectively, emphasize the criteria of factor mobility, openness, and diversification and fiscal integration. Surveys of the pros and cons of common currency areas are given by Ishiyama (1975) and by van der Ploeg (1989a) and others in WRR (1989).

When central bankers and ministers for finance can be relied upon not to succumb to the temptation to levy surprise inflation taxes, there is not much of a case for an independent ESCB. However, if one really wants to be sure that the monetary authorities are not going to give in to the demands of unions for higher wages or of ministers for finance for financing their deficits arising from high levels of public spending, the best strategy seems to be to appoint conservative central bankers to the board of the ESCB and to make sure that the status of the ESCB is autonomous and independent of political pressures. The price one pays for institutionalizing monetary discipline is a sub-optimal public revenue mix, inflation and thus seigniorage revenues being too low whilst tax rates are too high and the level of exhaustive public spending too low. Even though the inflation tax might disappear, some seigniorage revenues will accrue through real growth, and it will be a major political issue to decide how those will be distributed to the members of the EMU.

It is clear that the Delors Committee has come out strongly in favour of an independent ESCB based on the German model, but it is also clear that this implies a threat for the size of the public sector. Developments in Eastern Europe may lead to excess demand for German goods and an increase in German inflation and thus in European inflation. Together with the dilution of the German monetary discipline, caused by the appointment of less disciplined central bankers to the Council of the ESCB, this carries the seeds of a less successful EMU from the inflation point of view.

There are at least three fiscal externalities which also pose a danger to the size of the public sector in Europe, unless, of course, budgetary policies of the various treasuries are coordinated. The first is that, as Europe becomes more and more integrated, spending by national treasuries on items such as the environment, training, research and development, foreign aid (e.g. to Eastern Europe), and infrastructure, becomes more and more like a public good to all citizens of Europe, whose supply will be inadequate unless the treasuries coordinate their policies. The second is that international competition between the treasuries of Europe drives tax rates down and leaves less room for exhaustive public spending. The third is that treasuries may wish to loosen their fiscal stance in order to appreciate the real exchange rate of Europe and boost the real income of their citizens. Since such a policy also has beneficial effects on the rest of the EMU-countries, public spending will be too low

unless cooperation takes place. There does not seem to be a firm public-finance case for imposing upper limits on public sector deficits, as the Delors Committee recommends, but in view of this last externality it may be sensible to impose limits on borrowing by treasuries from outside the European Community for otherwise there may be insufficient control over the value of Europe's currency in international markets.

One can think of three reasons why macroeconomic policy coordination within Europe can be counterproductive. Firstly, it may provoke an adverse response from the USA leading to higher unemployment in Europe. Secondly, it may destroy the use of the exchange rate as a discipline device for central banks. Thirdly, conflicting views on how the global economy functions may render macroeconomic policy coordination counterproductive. The first can be countered by encouraging macroeconomic policy coordination between Europe and the USA which seems more likely as an integrated Europe is likely to become a more powerful negotiator in the G-3 summits. The second can be countered by ensuring that this ESCB has an independent and autonomous status and that the sole task of the ESCB is to preserve price stability. The third can be countered by more discussions involving politicians, economists and the public. Given that all three points against macroeconomic policy coordination can be countered, it should be no surprise that this report concludes with a strong plea for the coordination of budgetary policies in Europe in order to ensure that stablization policy is used effectively to fight widespread unemployment and, more generally, to safeguard the size of the public sector in Europe.

One can legitimately wonder whether the current size of the public sector in Europe is too large relative to the first-best outcome. Indeed, many people believe this is the case so that Europe is now in a second-best or third-best situation. Introducing distortions in a second-best world may be desirable, if this cancels the effect of other distortions. However, the experience of the USA suggests that the EMU may well pose a threat to the size of the public sector. In the long run, when the EMU is firmly established, Europe may have to get used to the problem of coping with a too small size of the public sector. In the medium run, the competitive setting of budgetary policies under the EMU may speed up the process of cutting the size of the public sector and taking Europe into the direction of the first-best optimum. People who believe that the current size of the public sector in Europe is too large should like this.

References

Aizenman, J. (1989), 'Competitive externalities and the optimal seigniorage', Working Paper No 2937, NBER, Cambridge, MA.

Barro, R. J. (1979), 'On the determination of the public debt', *Journal of political economy,* 87, 5, pp. 940-71.

Barro, R. J. (1983), 'Inflationary finance under discretion and rules', *Canadian journal of economics,* 41, 1, pp. 1-16.

Barro, R. J. and Gordon, D. B. (1983), 'Rules, discretion, and reputation in a monetary model', *Journal of monetary economics,* 12, pp. 101-21.

Basevi, G. and Giavazzi, F. (1987), 'Conflicts and coordination in the European Monetary System', in: Steinherr, A. and Weiserbs, D. (eds.), *Employment and growth: issues for the 1980s.* Dordrecht, Martinus Nijhoff.

Begg, D. and Wyplosz, C. (1987), 'Why the EMS? Dynamic games and the equilibrium policy regime', in: Bryant, R. and Portes, R. (eds.) (1987).

Branson, W. H. and Rotemberg, J. J. (1980), 'International adjustment with wage rigidity', *European economic review,* 13, pp. 309-22.

Bruno, M. and Sachs, J. D. (1985), *The economics of worldwide stagflation.* Oxford, Basil Blackwell.

Bryant, R. C. and Portes, R. (eds.) (1987), *Global macroeconomics, policy conflict and cooperation.* London, Macmillan.

Bryant, R. C., Henderson, D., Holtham, G., Hooper, P. and Symanski, S. (eds.) (1988), *Empirical macroeconomics for interdependent economies.* Washington DC, The Brookings Institute.

Buiter, W. H. and Marston, R. C. (eds.) (1985), *International economic policy coordination.* Cambridge, Cambridge University Press.

Calvo, G. (1978), 'On the time consistency of optimal policy in a monetary economy', *Econometrica,* 46, pp. 1411-28.

Canzoneri, M. B. and Gray, J. A. (1985), 'Monetary policy games and the consequences of non-cooperative behaviour', *International economic review,* 26, 3, pp. 547-64.

Canzoneri, M. B. and Henderson, D. W. (1987), *Strategic aspects of macroeconomic policymaking in interdependent economies* (Mimeo). Washington DC, Board of Governors of the Federal Reserve System.

Canzoneri, M. B. and Rogers, C. A. (1988), 'Is the European Community an optimal currency area? Tax smoothing versus the cost of multiple currencies', *American economic review,* forthcoming.

Chang, R. (1989), 'Financial integration with and without international policy coordination' (Mimeo). New York, New York University.

Cohen, D. and Wyplosz, C. (1989), 'The European monetary union: an agnostic evaluation', in: Bryant, R. C. *et al.* (eds.), *Macroeconomic policies in an interdependent world.* Washington DC, The Brookings Institute.

Cohen, D., Melitz, J. and Oudiz, G. (1988), 'The European monetary system and the franc-mark asymetry' (Discussion Paper No 245). London, Centre for Economic Policy Research.

Collins, S. (1988), 'Inflation and the European Monetary System', in: Giavazzi, F. *et al.* (eds.) (1988).

Cukierman, A. (1989), 'Discretion, precommitments and the prospects for a European central bank — fixed parities versus a commonly managed currency' (Mimeo). New Jersey, Princeton University.

De Cecco, M. and Giovannini, A. (eds.) (1989), *A European central bank? Perspectives on monetary unification after 10 years of the EMS.* Cambridge, Cambridge University Press.

Delors Committee (1989), *Report on economic and monetary union in the European Community.* Committee for the Study of Economic and Monetary Union, chaired by Jacques Delors.

Dornbusch, R. (1988), 'The European monetary system, the dollar and the yen', in: Giavazzi, F. *et al.* (eds.) (1988).

Dornbusch, R. (1989), 'Credibility, debt and unemployment: Ireland's failed stabilization', *Economic policy,* 8, pp. 173-210.

Drèze, J. H. and Wyplosz C. (1988), 'Autonomy through cooperation', *European economic review,* 32, pp. 353-62.

Drèze, J. H. *et al.* (1987), 'The two-handed growth strategy for Europe: autonomy through flexible cooperation' (Paper No 34). Brussels, Centre for European Policy Studies.

Driffill, J. (1988), 'The stability and sustainability of the European monetary system with perfect capital markets', in: Giavazzi, F., et al. (eds.) (1988).

Eijffinger, S. (1989), 'Het rapport-Delors nader beschouwd', Bank- en effectenbedrijf, August, pp. 14-18.

Fischer, S. (1982), 'Seigniorage and the case for a national money', Journal of political economy, 90, 2, pp. 295-313.

Fleming, J. M., (1962). 'Domestic financial policies under fixed and floating exchange rates', IMF staff papers, 9, pp. 369-79.

Frankel, J. A. (1988) Obstacles to international macroeconomic policy coordination. Princeton Studies in International Finance, No 64. New Jersey, Princeton University.

Frankel, J. A. and Rockett, K. E. (1988), 'International policy coordination when policymakers do not agree on the true model', American economic review, 78, 3, pp. 318-40.

Frenkel, J. A. and Razin, A. (1987), Fiscal policy and the world economy. Cambridge, MA, MIT Press.

Frenkel, J. A. and Razin, A. (1989), 'International effects of tax reforms', Economic journal (Supplement), 99, pp. 38-59.

Frenkel, J. A., Razin, A. and Symansky, S. (1989), 'International spillovers of taxation', Working Paper No 2927. Cambridge, MA, NBER.

Funabashi, Y. (1988), Managing the dollar: from the Plaza to the Louvre. Washington DC, Institute for International Economics.

Ghosh, A. (1986), 'International policy coordination when the model is unknown', Economic letters, 21, pp. 271-76.

Giavazzi, F. (1989), 'The exchange-rate question in Europe', in: Bryant, R. C. et al. (eds.), Macroeconomic policies in an interdependent world. Washington DC, The Brookings Institute.

Giavazzi, F. and Giovannini, A. (1986a), 'The EMS and the dollar', Economic policy, 2, pp. 456-85.

Giavazzi, F. and Giovannini, A. (1986b), 'Models of the EMS: is Europe a greater Deutschmark area?', in: Bryant, R. and Portes, R. (eds.) (1987).

Giavazzi, F. and Giovannini, A. (1989a), Limiting exchange rate flexibility: the European Monetary System. Cambridge, Cambridge University Press.

Giavazzi, F. and Giovannini, A. (1989b), 'Monetary policy interactions under managed exchange rates', Economica, 56, 222, pp. 199-214.

Giavazzi, F. and Pagano, M. (1988), 'The advantage of tying one's hands: EMS discipline and central bank credibility', European economic review, 32, 5, pp. 1055-82.

Giavazzi, F., Mocossi, S. and Miller, M. (eds.) (1988), The European monetary system. Cambridge, Cambridge University Press.

Goodhart, C. (1988), 'An approach to European currency unification', Financial Markets Group, London School of Economics.

Goodhart, C. (1989), 'The Delors Report. Was Lawson's reaction justifiable?', Special Paper No 15, Financial Markets Group, London School of Economics.

Grauwe, P. de (1989a), 'Is the European monetary system a DM-zone?', Discussion Paper No 297, Centre for Economic Policy Research, London.

Grauwe, P. de (1989b), 'The cost of disinflation and the European monetary system' (Mimeo). University of Louvain.

Grilli, V. (1988), 'Seigniorage in Europe', Working Paper No 2778. Cambridge, MA, NBER.

Gros, D. (1988), 'Seigniorage versus EMS discipline: some welfare considerations', Working Document No 38. Brussels, CEOS.

Gros, D. (1989), 'The EMS without capital controls: an optimistic view' (Mimeo). Commission of the European Communities.

Gros, D. and Lane, T. (1989), 'Monetary policy interactions within the EMS'. Research department WP/89/8. Washington DC, IMF.

Gros, D. and Thygesen, N. (1988), 'The EMS, achievements, current issues and directions for the future', Paper No 35. Brussels, Centre for European Policy Studies.

Hamada, K. (1976), 'A strategic analysis of monetary interdependence', Journal of political economy, 84, 1, pp. 677-700.

Hamada, K. (1985), The political economy of international monetary interdependence. Cambridge, MA, MIT Press.

Huizinga, H. (1989), 'A comparison of monetary policy under free floating, managed floating and fixed exchange rates' (Mimeo). Stanford University.

Ishiyama, Y. (1975), 'The theory of optimum currency areas: a survey', *IMF staff papers*, 22, pp. 344-83.

Jong, F. de and van der Ploeg, F. (1990), 'Seigniorage, taxes and government debt in the EMS' (Mimeo), Center, Tilburg University.

Keen, M. (1989),'Pareto-improving indirect tax harmonization', *European economic review*, 33, pp. 1-12.

Kehoe, P. J. (1987), 'Coordination of fiscal policies in a world economy', *Journal of monetary economics*, 19, pp. 349-76.

Kehoe, P. J. (1989), 'Policy cooperation among benevolent governments may be undesirable', *Review of economic studies*, 56, 2, pp. 289-96.

Kenen, P. B. (1969), 'The theory of optimum currency areas: an eclectic view', in: Mundel, R. and Swoboda, A. (eds.), *Monetary problems of the international economy*. Chicago and London, The University of Chicago Press.

Kenen, P. B. (1987a), 'Global policy optimization and the exchange-rate regime', *Journal of policy modelling*, 9, 1, pp. 19-63.

Kenen, P. B. (1987b), 'Currency unification, currency competition, and the private ecu'. Comments on Vaubel (1987).

Kenen, P. B. (1988), 'Exchange rates and policy coordination in an asymmetric model', Discussion Paper No 240, London, Centre for Economic Policy Research.

Kenen, P. B. (1989), 'The coordination of macroeconomic policies' (Mimeo). Princeton University.

Keynes, J. M. (1971), *A tract on monetary reform. The collected writings of John Maynard Keynes*. London and Basingstoke, Macmillan.

Kremers, J. J. M. (1989), 'Gaining policy credibility for a disinflation. Ireland's experience in the EMS', *IMF staff papers*, 36, 4.

Kydland, F. E. and Prescott, E. C. (1977), 'Rules rather than discretion: the time inconsistency of optimal plans', *Journal of political economy*, 85, pp. 473-99.

Laskar, D. (1989), 'Conservative central bankers in a two-country world', *European economic review*, 33, pp. 1575-95.

Lipschitz, L., Kremers J., Mayer, T. and McDonald, D. (1989), *The Federal Republic of Germany. Adjustment in a surplus country*. Occasional Paper 64. Washington DC, International Monetary Fund.

Mankiw, N. G. (1987), 'The optimal collection of seigniorage: theory and evidence', *Journal of monetary economics*, 20, pp. 327-41.

McKibbin, W. J. and Sachs, J. D. (1986), Coordination of monetary and fiscal policies in the OECD. Working Paper No 1800. Cambridge, MA, NBER. Forthcoming in: Frenkel, J. (ed.), *International aspects of political economy*. Chicago, The University of Chicago Press.

McKibbin, W. J. and Sachs, J. D. (1988), 'Comparing the global performance of alternative exchange rate arrangements', *Journal of international money and finance*, 18, 2, pp. 233-38.

McKinnon, R. (1963), 'Optimum currency areas', *American economic review*, 53, pp. 717-25.

Melitz, J. (1988a), 'Monetary discipline, Germany and the European Monetary System', in: Giavazzi, F. *et al.* (eds.) (1988).

Melitz, J. (1988b), 'The prospect of a depreciating dollar and possible tension inside the EMS', Discussion Paper No 97. London, Centre for Economic Policy Research. Also: *Revue suisse d'économie politique et de statistique*, 1.

Miller, M. H. and Salmon, M. (1985), 'Policy coordination and dynamic games', in: Buiter, W. and Marston, R. (eds.) (1985).

Molle, W. and van Mourik, A. (1988), 'International movements of labour under conditions of economic integration. The case of Western Europe', *Journal of common market studies*, 26, 3, pp. 317-39.

Mundell, R. A. (1961), 'A theory of optimum currency areas', *American economic review*, 51, pp. 657-64.

Mundell, A. (1968), *International economics*. New York, Macmillan.

Mussa, M. (1990), 'Exchange rates in theory and reality'. The Frank Graham Lecture. New Jersey, Princeton University.

Oudiz, G. and Sachs, J. (1984), 'Macroeconomic policy coordination among the industrial economies', *Brookings papers on economic activity,* 1, pp. 1-77.

Oudiz, G. and Sachs, J. (1985), 'International policy coordination in dynamic macroeconomic models', in: Buiter, W. and Marston, R. (eds.) (1985).

Phelps, E. S. (1973), 'Inflation in the theory of public finance', *Swedish journal of economics,* 75, pp. 67-82.

Ploeg, F. van der (1988a), 'International interdependence and policy coordination in economies with real and nominal wage rigidity', *Greek economic review,* 10, 1, pp. 1-48.

Ploeg, F. van der (1988b), 'International policy coordination in interdependent monetary economies', *Journal of international economics,* 25, pp. 1-23.

Ploeg, F. van der (1989a), 'Towards monetary integration in Europe', in: *De Europese monetaire integratie: vier visies.* The Hague, The Netherlands, The Netherlands Scientific Council for Government Policy.

Ploeg, F. van der (1989b), 'Fiscal aspects of monetary integration in Europe', Discussion Paper No 340. London. Centre for Economic Policy Research.

Ploeg, F. van der (1989c), 'Monetary interdependence under alternative exchange-rate regimes: A European perspective', Discussion Paper No 358, London, Centre for Economic Policy Research.

Ploeg, F. van der (1989d), *Macroeconomic policy coordination and monetary integration: a European perspective.* Working Document W42. The Hague, The Netherlands, The Netherlands Scientific Council for Government Policy.

Ploeg, F. van der (1990a), 'Capital accumulation, inflation and long-run conflict in international objectives', *Oxford economic papers.*

Ploeg, F. van der (1990b), 'Does economic and monetary union threaten the size of the public sector in Europe?', prepared for a Conference on Fiscal Aspects of European Integration, Yale University, 8 to 10 March.

Ploeg, F. van der (1990c), 'International coordination of monetary policies under alternative exchange rate regimes', in: van der Ploeg, F. (ed.), *Advanced lectures in quantitative economics.* London and San Diego, Academic Press.

PPC (1988), *After the Louvre: Promoting exchange rate stability.* Report of an international committee, chaired by Lord Croham. London, Public Policy Centre.

Razin, A. and Sadka, E. (1989a), 'Integration of the international capital markets: the size of government and tax coordination', Working Paper No 2863. Cambridge, MA, NBER.

Razin, A. and Sadka, E. (1989b), 'International tax competition and gains from tax harmonization', Working Paper No 37, Foerder Institute for Economic Research, Tel Aviv University.

Razin, A. and Sadka, E. (1989c), 'Capital market integration: issues of international taxation'. Working Paper No 40, Foerder Institute for Economic Research, Tel Aviv University.

Rogoff, K. (1985), 'Can international monetary policy cooperation be counterproductive?', *Journal of international economics,* 18, pp. 199-217.

Roubini, N. (1987a), 'Leadership and cooperation in the EMS' (Mimeo), Cambridge, MA, Harvard University.

Roubini, N. (1987b), 'Leadership and cooperation under alternative exchange rate regimes: a simulation approach' (Mimeo). Cambridge, MA, Harvard University.

Sachs, J. D. and Sala-i-Martin X. D. (1989), 'Federal fiscal policy and optimum currency areas' (Mimeo). Cambridge, MA, Harvard University.

Sinn, H. W. (1989), 'Tax harmonization and tax competition in Europe', (Mimeo). University of Munich.

Steinherr, A. (1984), 'Convergence and coordination of macroeconomic policies: some basic issues', *European Economy,* 20.

Tanzi, V. and Bovenberg, A. L. (1990), 'Is there a need for harmonizing capital income taxes within EC countries?' Working Paper WP/90/17, Washington DC, International Monetary Fund.

Vaubel, R. (1987), 'Currency unification, currency competition and the private ecu: second thoughts', presented to the Workshop on the international monetary system, the ecu and plans for world monetary reform. Florence, European University Institute.

WRR (1989), *De Europese monetaire integratie: vier viesies.* The Hague, The Netherlands. The Netherlands Scientific Council for Government Policy.

Wyplosz, C. (1990), 'The swinging dollar. Is Europe out of step?', in: Gerlach, S. and Petri, P. (eds.), *The dollar cycle.* Cambridge, MA, MIT Press.

8. Monetary union and fiscal policy discipline

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1. Introduction

This paper investigates two key policy questions which emerge when a monetary union (henceforth MU) among the European Community countries is contemplated. First, is there any presumption that, when the MU is established, rules must be adopted to limit national fiscal policy independence? Second, does the MU require an EC-wide fiscal policy?

These issues are often subsumed under the code-name of fiscal discipline. It is then asked whether the MU will strengthen, or instead weaken, member governments' incentives to adopt 'reasonable' fiscal policies. It is not clear, however, what reasonable, or indeed disciplined, fiscal policies really are. The approach taken here is to ask which fiscal policy actions may endanger the MU. This leads us to consider two different sets of issues. First, does the existence of an MU affect the various trade-offs faced by national member governments as they set fiscal policies? For example, it is sometimes feared that the MU may relax budget constraint, i.e. discourage discipline. Second, does an MU increase the externalities that one country's fiscal policies impose on its partners? It is conceivable that the MU could exacerbate existing externalities, or indeed produce new externalities, among national fiscal policies.

Thinking about how fiscal policy could operate in a European MU is difficult for several reasons, First, there is no real precedent. A number of federal States exist, but the expenditure and income shares of the central government are always large, normally at least as large as the share of local governments (Table 8.1). This is not currently the case within the European Community where the 'federal' budget remains close to one per cent of total GDP.

Second, the macroeconomic theory of fiscal policy is in a state of flux. The older models in the Keynesian tradition are no longer accepted as they often postulate behaviour neither theoretically justified nor well backed empirically. An example is the sensitivity of savings to interest rates, another is the determination of interest rates, both key building blocks in the IS-LM framework. Unfortunately, a replacement workhorse is not yet at hand; the alternative theories are still crude, analytically cumbersome, and in search of empirical validation.

Third, it is not clear how to capture the non-monetary aspects of an MU. We wish to retain elements of national differences such as price levels or interest rates as well as trade among several States, yet full goods and financial markets integration urges us to erase these differences. The realities of the European Community suggest that we should start from a model of trade with imperfect competition. Yet the integration of fiscal policy in such models does not seem to have been achieved. As a result, the present study is better seen as a tentative guess at what might emerge after much more research, both theoretical and empirical, is performed.[2]

The structure of the study is as follows. The next section provides a general discussion of the channels of transmission of fiscal policy. This discussion prepares the ground for the central issue: whether fiscal discipline is enhanced or relaxed as we move from the current system of fixed and adjustable exchange rates to an MU. The discipline issue is broken down in two different components: the effect of the MU on national budget deficits (Section 3) and on externalities between member countries (Section 4). Then, in Section 5, it is asked whether the role of fiscal policy will be enhanced in an MU. The answer is largely positive, and the section explores the need for an MU-wide insurance mechanism. The last section concludes.

For the most part, the paper abstracts from 'short-term' effects, mainly income transmission, which are taken up in another contribution (van der Ploeg, Study No 3). Accordingly, it is assumed that relative prices (and real wages, when they are introduced) are flexible and output is at the full employment level. As a result, the EMS (European Monetary System) is not essentially different from a flexible exchange-rate system. Indeed in both regimes, over the horizon under consideration here, changes in relative prices can be achieved through exchange-rate adjustments. The MU stands apart because it is the only regime where relative price changes require prices to do all the work. The importance of this distinction will appear more clearly in context.

For simplicity, growth is also assumed away, although an important issue concerns the juxtaposition of countries with different potential growth rates.

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[2] This is an exercise which academic economists tend to avoid. It is indeed frustrating to make assertions which, one knows very well, are quite likely to be proved wrong. It is equally frustrating to see the rapid progress towards an MU being shaped without input from this side of the profession. In the end, the choice is whether we should stay out of the debate because we know full well that we do not know enough, or whether we should jump in the water and provide what the current state of knowledge allows.

Table 8.1.

Government disbursements as a percentage of GDP/GNP

	1960		1987	
	State and local government	General government	State and local government	General government
Austria	8,6	34,4	1,5	47,7
Belgium	3,5	27,8	5,4	46,6
Canada	14,0	25,7	30,4	39,5
Finland	9,7	29,7	17,2	39,8
France	4,0	34,5	8,0	49,3
Germany	14,2	35,0	16,9	44,4
Greece	3,9	21,1	5,2	38,0
Ireland	9,4[1]	35,3[1]	12,7[2]	43,1[2]
Italy	5,3[1]	28,4[1]	12,1	39,3
Japan	9,4[1]	20,6[1]	13,4	33,2
Netherlands	12,1[1]	42,0[1]	16,8	53,4
Norway	15,5[3]	48,7[3]	16,9	53,7
Portugal	1,5[4]	30,5[4]	1,9[2]	37,6[2]
Spain	1,6[5]	18,5[5]	7,3[2]	35,0
Sweden	18,7[1]	46,6[1]	23,6	61,8
Switzerland	11,4	23,3	18,2	34,6
United Kingdom	7,0	29,9	10,9[2]	41,3[2]
United States of America	8,8	26,3	13,3	32,2

[1] 1970.
[2] 1986.
[3] 1975.
[4] 1977.
[5] 1964.

Source: OECD *Main economic indicators.*

2. Long-term channels of externalities

2.1. A framework

This section outlines the channels through which one country's fiscal actions affect the other members of the union. It serves as the frame of reference for the policy analyses of subsequent sections, and can be skipped by the reader impatient with technical aspects. An appropriate point of departure is the model developed by Frenkel and Razin (1987). The full model is presented in the appendix, and only the key results are summarized here. Because budget deficits represent the government's dissaving, explicit intertemporal considerations are unavoidable. This brings about the necessity of describing the agent's own saving choice, hence explicit treatment of intertemporal decisions and of expectations. Expectations are best treated as rational, if only because of the arbitrariness of any alternative scheme.

As is well known, in models with intertemporal optimization and rational expectations, budget financing—i.e. tax pol-

icy—is irrelevant unless we introduce explicity a mechanism for it to matter. By now, the so-called Ricardian proposition has been repeatedly disproved empirically[3] so that we do not want to start from a model which accepts it by assumption. A convenient way out is to recognize that agents with finite horizons face the possibility of not paying the taxes which will eventually be levied to finance current public borrowing. Then public debt is (partly at least) private wealth. Conversely, because agents may die before fully paying out their debts, they face interest rates which are higher than those applicable to never-dying institutions such as the State.[4]

An appealing feature of the model of Frenkel and Razin is that it separates out time in between the present (period $t = 0$) and the indefinite future (t not shown), where all variables

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[3] For a recent survey, see Bernheim (1987).
[4] There are other ways of eliminating Ricardian equivalence within models which accept rational expectations and intertemporal optimization: distortionary taxes, limited liabilities, credit rationing, etc. The finite lifetime approach has been made tractable by Blanchard (1985).

assume their present discounted value. This allows us to consider the effects of current policy actions on both the 'present' and the 'future.' The 'present' actually extends beyond the standard Keynesian short-term period. It covers a period over which prices adjust and the economy returns to equilibrium employment. Steady state occurs in the 'future', in period t: it is the horizon over which all stock variables (wealth, debt, etc.) stabilize.

We start with the one-country case which will make it easier to introduce the two-country version. The key equations of the model are:[5]

$$W_0 = A_0 + Y_0 - T_0 + \frac{\gamma R}{1 - \gamma R} (Y - T) \qquad (1)$$

$$(1 - \beta \gamma) W_0 + G_0 = Y_0 \qquad (2)$$

where A_0 is initial financial wealth, Y_t and T_t real output and taxes in period t and G_t represents real public spending. The parameter γ ($0 \leq \gamma \leq 1$) is the probability of being alive next period and $R = 1/(1 + r)$ is the average interest factor. Similarly $\beta = 1/(1 + \delta)$ where δ is the rate of time preference. In (1) total wealth W_0 is the sum of financial wealth and human capital, itself the present value of net-of-taxes income, discounted at a higher rate than $r = (1 - R)/R$ given the above-noted implication of finite lifetime.

Equation (2) is the goods market equilibrium condition in period $t = 0$. Private spending is proportional to wealth, the usual permanent income feature of intertemporal models.[6] The coefficient of proportionality again reflects the finite lifetime assumption (if life were to end for sure in period $t = 0$, with $\gamma = 0$ all wealth should be consumed right away).

If B_0 is the initial public debt in real terms, the government budget constraint is

$$B_0 \leq (T_0 - G_0) + (R/(1 - R))(T - G) \qquad (3)$$

Because the government lives for ever, its interest factor does not include the premium γ. This is why budget financing matters: government borrowing cannot be substituted away one-for-one by the private sector.

The MU is characterized by the equality of nominal and real interest rates across countries. This characterization is the consequence of three assumptions: first, there is full capital mobility; second, over the horizon relevant here, inflation rates are the same across countries; and third, systematic, continuing, relative price level changes are ruled out. It may be useful to briefly justify the last two assumptions. There is no doubt that inflation rates may differ in an MU. This, however, cannot be sustained as a permanent feature. In a model which overlooks the short term, it makes sense to simply assume inflation differentials away. If unexpected real shocks occur, they require relative price (or real wage) adjustments. Such changes are seen here as one-shot effects, which, while spread over time, occur entirely within the period under consideration. Under these conditions, fiscal action by one country will affect the interest rate across the whole MU, and the one-country model may be seen as representing the whole union.

2.2. Interest-rate linkages

2.2.1. Principles

The interest-rate effect of fiscal policy depends on whether the fiscal action is temporary or permanent. When it is temporary, the direction is unambiguous: a temporary fiscal expansion which boosts demand raises the interest rate. The reason is clear. With fixed output (recall that prices are flexible), excess demand must be brought down, which requires the interest rate to rise in order to reduce private wealth and spending. This is true for any fiscal expansion, whether it is an increase in government spending or a tax cut, and whether it is financed (when need be) by borrowing or taxes. (What is missing here is the role of money. If the nominal money stock is held constant, a price increase would also reduce private wealth and spending, thus alleviating, but not eliminating altogether, the pressure on interest rates. If the central bank accommodates the price increase, we are back in the no-money case.)

The result is robust to alternative specifications.[7] In particular, it extends to a multi-country model: the world interest rate rises, although obviously the extent of the increase will depend on the relative size of the country taking action.

When the fiscal policy change is permanent, the interest-rate effect is ambiguous. A permanent expansion necessarily takes the form of a permanent increase in public spending,

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5   By Walras's law, we need only one of the two periods' equilibrium conditions.

6   More precisely, permanent income implies that consumption is just a function of wealth. The fact that it is proportional to wealth results from the particular specification (logarithmic and time separable) of the utility function.

7   It does not always survive, though, in Keynesian models where output can rise. Even then, for the interest rate to decline, financial markets must be imperfectly integrated, and quite significantly so. For an example, see Sachs and Wyplosz (1984).

which must eventually be financed by taxes. The effect is ambiguous because private wealth, which must fall to eliminate the excess demand for goods, is already reduced by higher expected taxes. The question is whether it is reduced just enough to restore goods market equilibrium (in which case the rate of interest remains unchanged), or not enough (the interest rate rises) or too much (the interest rate falls). The result depends both on the timing of tax increases and on the relationship between the interest rate, the rate of time preference, and the parameter measuring the death rate (γ).[8] That we are unable to derive an unambiguous presumption should not be surprising. What does a permanent fiscal expansion really mean? In the very long-term horizon under consideration here, and with the need to balance the government budget constraint, it merely represents an increase in the size of the government, both on the expenditure and receipt sides.

2.2.2. Empirical evidence

The lack of supporting empirical evidence linking interest rates to budget deficits is troublesome.[9] Many reasons have been advanced. First comes the usual difficulty of disentangling in the data different effects which may occur at the same time. As stressed above, macroeconomic theory is too unsettled to provide an undisputed guide to solving this econometric identification problem. Second, measuring or estimating the real interest rate requires making assumptions about the expected rate of inflation. Similarly, the important distinction between permanent and temporary fiscal actions requires an assessment of the private sector's perceptions in this regard. Both requirements are currently beyond our means of investigation.

Clearly, there is no attempt here to produce new original empirical results on an already much-researched subject. More modestly, Graph 8.1 presents some data on industrial countries. The sample is determined by the availability of data on net public debts, since this is the proper theoretical concept.[10] The graph relates the level of the net public debt, and its change over the period 1981-89, to the *ex-post* real interest rate in 1989.[11] This horizon is chosen so as to

coincide with the 'present' of the Frenkel-Razin model. This allows us to include in the sample countries with different exchange-rate regimes, i.e. both countries on a flexible exchange-rate regime and EMS members. As suggested earlier, over this horizon, it is assumed that the two systems do not behave in a fundamentally different manner, while the MU would. That the assumption is not innocuous is probably exemplified by the Spanish case.

The data visually suggest a (weak) positive association between the two variables—especially when we consider changes in debt levels—and this is confirmed by the correlations. Why changes should matter more than levels is of course totally unclear. Given the many observation and interpretation difficulties mentioned above, it is probably fair to conclude that the link between a temporary fiscal expansion and higher interest rates is robust. Quantifying precisely such effects is, as stressed above, unfortunately beyond current knowledge.

2.3. Relative price effects

2.3.1. Internal prices

The previous section assumes that there exists only one good throughout the union. A natural extension consists in introducing two traded goods in order to study the effects of fiscal policy on the terms of trade. To do so, we consider a two-country version of the above model. This also allows us to explicitly assume that the two countries belong to an MU. With Equation (1) also holding for the other country (represented by starred variables), the two good market clearing conditions for period $t = 0$ are

$$\alpha(1-\beta\gamma)W_0 + \alpha^*(1-\beta\gamma)p_0 W_0^* + G_{1,0} + G_{1,0}^* = Y_0 \quad (4a)$$

$$(1-\alpha)(1-\beta\gamma)W_0/p_0 + (1-\alpha^*)(1-\beta\gamma)W_0^* + G_{2,0} + G_{2,0}^* = Y_0^* \quad (4b)$$

Where α and α^* represent, respectively, the home and foreign propensity to buy the domestically produced good (indicated by a subscript 1, a subscript 2 denotes the good produced abroad). The relative price of foreign relative to home good prices is $p_t = P_{2,t}/P_{1,t}$. The two market clearing conditions are shown in Graph 8.2.

A temporary domestic fiscal expansion, financed by domestic borrowing, which requires a higher interest rate in both countries as seen in the previous section, brings us from

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8   For example, if the increase in public spending is entirely financed by a temporary tax increase, the condition for an increase in the interest rate is $R < \beta\gamma$. If we assume that the rate of time preference is about equal to the interest rate $(R = \gamma)$ we have a decline in the interest rate.

9   See e.g. Blanchard and Summers (1987).

10   The existence of credit rationing may justify dealing with gross debts.

11   The net debt figures are from the OECD, *Economic outlook*. The real interest rate is the difference between government bonds rates and CPI growth, for the latest observations available on the International Financial Statistics tape.

GRAPH 8.1: **Debt levels and real interest rates (1989)**

Real interest rate

10 ─

● Spain (at ~9, net debt ~30)

8 ─

6 ─
● Netherlands
● Belgium

● Denmark
● France
● Italy

● Canada
Germany
●
● USA

2 ─
● Japan
● United Kingdom

| | | | | | | |
| 0 | 20 | 40 | 60 | 80 | 100 | 120 | 140 |

Net debt (% of GDP)
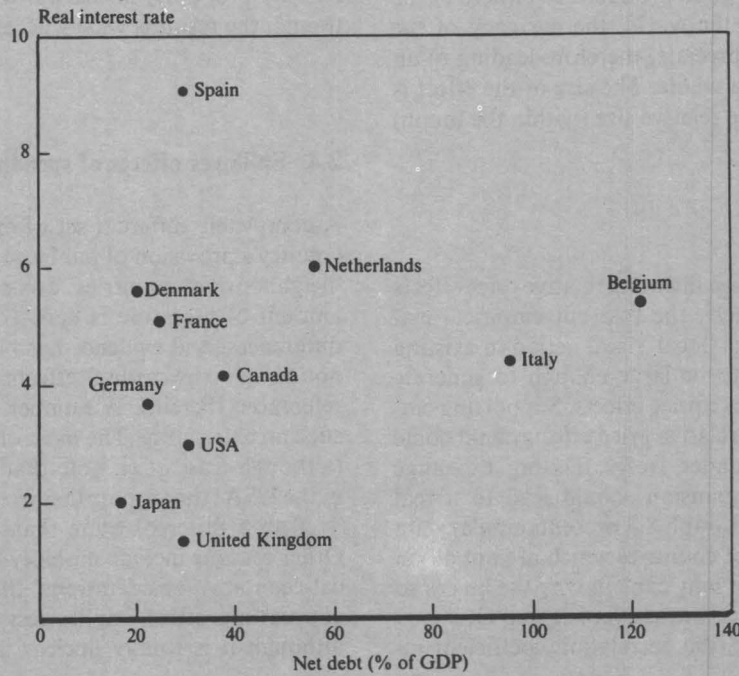
GRAPH 8.2: **Effects of fiscal policy on terms of trade**

p_0

Good 2 $_{(t)}$

Good 2 $_{(t=0)}$

B ●   ● A

Good 1 $_{(t=0)}$

Good 1 $_{(t)}$

R
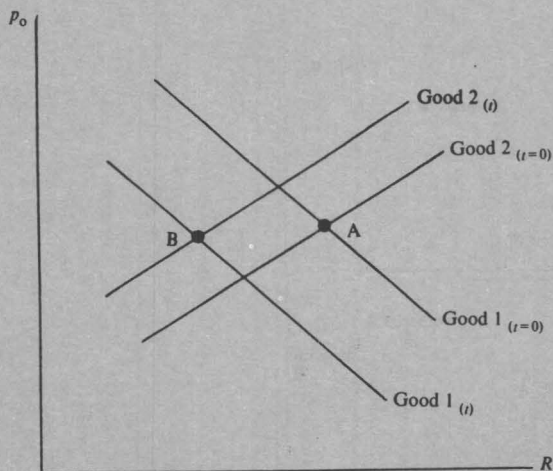
point A to point B. The effect on the terms of trade p_0 in period $t = 0$ is a priori ambiguous. If we assume a 'preference habitat' behaviour, i.e. if $\alpha > \alpha^*$, the outcome is normally[12] as drawn: the expanding country's terms of trade improve (p_0 falls). With a permanent change, the initial shift of each schedule is ambiguous, so that no presumption arises for the terms of trade.

2.3.2. External prices

It is possible to reinterpret the previous result with the home country representing the MU as a whole while the foreign country represents the rest of the world. Then a temporary fiscal expansion in one member country of the MU normally leads to a real exchange appreciation (an improvement in the terms of trade) for the MU. Of course, the magnitude of the effect is proportional to the size of the country taking action relatively to the MU as a whole.

The exact channel at work is different in this case, however. Within the union, the terms of trade of the expanding

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[12] The exact condition is $(\alpha - \alpha^*)(1 - \beta\gamma)W_0^* < (Y_0 - G_{2,0} - G_{2,0}^*)$ $[\alpha(Y - T) + \alpha^* p_0 (Y^* - T^*)]$.

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country improve because the price of the good domestically produced—and preferred for domestic consumption—rises relatively to the price of the good produced elsewhere in the union. *Vis-à-vis* the rest of the world, the currency of the expanding country must appreciate, therefore leading to an appreciation of the MU as a whole. The size of the effect is of course proportional to the relative size (within the union) of the expanding country.

2.3.3. Empirical evidence

We are mostly interested in documenting relative price effects within an MU. Unfortunately, the relevant empirical evidence is likely to be scarce as 'local' fiscal action in existing federal States is not likely to be large enough to generate empirically measurable relative price effects. Supporting empirical evidence for external relative price effects could come from countries operating under freely floating exchange rates: a temporary fiscal expansion should lead to a real exchange-rate appreciation. Graph 8.3 presents similar data to Graph 8.1 for a number of countries which are not all on a flexible exchange rate. This may explain why the link is so weak. Eliminating the EMS countries, yet keeping Germany to represent the EMS block, the correlation coefficient in-

creases from 0,11 to 0,32, still not a powerful piece of evidence. Much as for the interest-rate effect, and for similar reasons probably, no hard evidence has turned up yet, although the result is widely accepted.

2.4. Spillover effects of spending and taxing levels

A completely different set of externalities occurs when one country's provision of public goods, or taxation level, affects 'neighbouring' countries' decisions. In the USA, a sizeable amount of literature is devoted to the study of inter-State differences, and evidence has been produced to support the notion of 'copycatting' effects (see Case *et al.* (1989) and references therein). A number of reasons can account for such an externality. The most obvious one is labour mobility (although Case *et al.* note that labour mobility is low even in the USA: they report that in 1985 only 8,7% of Americans lived in a different State than they did five years earlier). Other reasons include mobility of establishments and political economy considerations. In all cases, the existence of a copycatting effect implies less fiscal policy independence, although it is totally unclear in which direction the effect

GRAPH 8.3: **Changes in net debts and in real exchange rates (1981-89)**
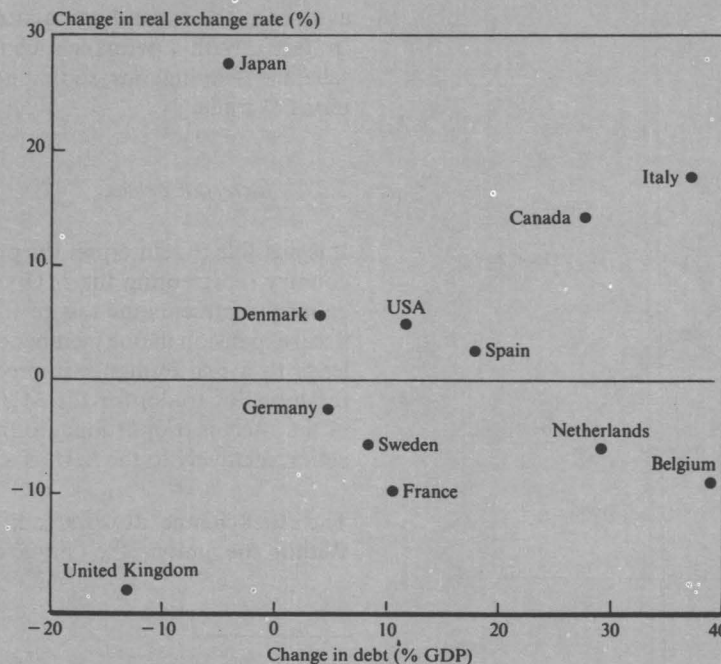
influences the size of governments.[13] On one hand, there might be competition in the provision of public goods and services, thus pushing towards higher than optimal government sizes. On the other hand, there might be competition for low tax rates, with the opposite effect on the size of governments.

Is such an effect at work in Europe as well? More to the point, would the existence of an MU alter the copycatting effect? Theory is of little help here as many different factors have been identified above as potentially leading to copycatting. This is why we turn directly to the facts. A number of summary statistics, based on data on government disbursements presented in Table 8.1, are shown in Table 8.2. When all OECD countries in the sample are included, the variability of government spending is higher among different countries than within the US monetary union.[14] This would tend to show that an MU does increase the copycatting externality. However when the comparison is with the European Community countries, we find less variability than in the USA. The comparison between the old Community members and the new Community definition points either towards geographical proximity (and hence mobility of goods enbancing mobility of establishments) or towards similarity in levels of economic development, or maybe towards cultural similarities affecting the electoral process.[15]

2.5. Summing up: the MU effect

Over the horizon considered here, fiscal policy effects mostly operate through real interest rates and relative prices. How are these effects affected by the existence of an MU? An MU introduces an important change as it forces the equality of real exchange rates and pushes terms-of-trade changes on to prices.

As far as interest rates are concerned, in a non-EMU, fiscal policy effects can be 'bottled up' in the country of origin. The expanding country faces higher *(ceteris paribus)* real rates, matched by a real appreciation. In an MU, the effect is absorbed by the MU-wide interest rates, in proportion of course to the relative size of the country of origin: the terms-of-trade effects substitute for interest-rate effects. Not only should terms of trade be larger over the horizon considered here,[16] but the absence of the exchange-rate mechanism within an MU forces in the shorter run prices and wages to adjust, with potentially larger income flows.

The taxing and public spending level externality is well documented in the US literature, but still in search of a complete interpretation. Mobility of establishments is likely to be an explanatory factor. The removal of exchange risk in an MU could reinforce this effect.

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[13] Naturally, it is not related to the fiscal stance, although one can imagine demonstration effects. As an example, we can wonder whether the fiscal consolidation which occurred in many European Community countries in the 1980s has not spread through such an effect.

[14] The comparison with the USA should be interpreted with some caution. The national data concern spending-GDP ratios while the data on US states concern absolute levels of spending per capita.

[15] Case *et al.* (1989) find that the main criterion of proximity is the proportion of Blacks in the state. This could suggest that levels of income might indeed be at work, although they reject this interpretation on empirical grounds. The cultural aspect is common to both findings.

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[16] It bears emphasizing that we do not consider the shorter-term Keynesian horizon. Over the business cycle, the higher (nominal and real) interest-rate variability is matched, under flexible rates, by wider (nominal and real) exchange-rate fluctuations, as exemplified by the US dollar and yen swings over the last decade.

Table 8.2.

Dispersion of general government disbursements 1987 (% of GDP/GNP)

	Mean	Standard deviation	Minimum	Maximum	Coefficient of variation (%)
All countries	42,8	8,0	32,2	61,8	18,7
EC [1]	45,3	4,8	39,3	53,4	10,7
EC [2]	42,8	5,7	35,0	53,4	13,4
US States	—	—	—	—	16,3

[1] Belgium, France, Germany, Ireland, Italy, Netherlands, UK.
[2] As in [1] plus Spain, Portugal and Greece.
Source: As Table 8.1, except US States from Case *et al.* (1989).

3. The budget constraint

3.1. Deficits and fiscal discipline

The first instance when fiscal policy can be deemed undisciplined occurs in the presence of budget deficits. However, not all deficits are necessarily unwarranted (much as government spending and taxing is not always 'bad'). What is required are criteria separating good from bad policies.[17]

Budget deficits may arise because of cyclical conditions, either endogenously as the result of a reduced take-up in taxes, or exogenously to counter cyclical fluctuations. Such short-term aspects are not considered here as they do not have a longer-term impact if the budget is cyclically balanced. The question then is whether there exist valid reasons to run deficits beyond the business cycle horizon. A number of reasons have been advanced in the literature and are now reviewed.

3.1.1. 'Good' deficits and debts

The oldest argument (Diamond, 1965) concerns the effectiveness of the capital stock in the long run. If the ultimate objective of an economic system is to ensure the highest possible level of per capita consumption, there exists an optimal level of per capita productive capital.[17] Levels of capital above this so-called golden rule level are deemed inefficient because it is possible to raise simultaneously per capita consumption for both current and future generations simply by reducing saving temporarily. The situation is different when the golden rule level exceeds the existing capital stock. This is the efficient case because further capital accumulation requires the current generation to reduce its consumption (i.e. welfare) for the benefit of future generations. As a result, the situation perpetuates itself forever if no generation is willing to incur the transitory cost. Such an intertemporal externality calls for government intervention. Diamond shows that, by building up the public debt level, the government can bring the economy (closer) to the golden rule.

Yet another rationale for changing the public debt structure — not necessarily increasing its level — has been offered by

Lucas and Stokey (1983) and Persson *et al.* (1985). The externality concerns the succession of different governments. If each government feels free to depart from the rules adopted by its predecessor, the public's attempt to protect itself from future taxes, including the inflation tax, results in further distortions. It can be shown that there exists an optimal structure of public claims and debts which makes it undesirable for future governments to depart from the path set by the current one. This is not a case for public deficits and debts.[19] It is, however, another indication that debts and deficits may serve a useful purpose.

Stiglitz and Weiss (1981) have shown how imperfect information easily leads banks to ration the volume of credit offered to their customers. Credit rationing of this sort is the socially inefficient outcome of a perfectly competitive banking system. This situation does not call for government borrowing in steady state or in presence of permanent adverse distrubances. Indeed, in the latter case, the optimal response is to reduce private spending, not to raise private borrowing in order to sustain unsustainable consumption levels. In the presence of transitory adverse disturbances, however, it is optimal for affected agents to borrow now and repay later. Credit-rationed agents may be unable to do so, which opens up the case for budget deficits.[20]

More generally, market failures which have an intertemporal implication often call for socially desirable deficit spending. This includes externalities linked to the imperfect protection of patents, for which governments may invest in the development of new technologies, or the discovery of natural resources when private ownership cannot be efficiently protected, or else investment in the building-up of human capital which generates non-appropriable externalities.[21]

In conclusion, budget deficits — possibly even long-lasting ones — do not necessarily form an indication of fiscal laxity. There exist a large number of reasons which make public deficits and debts socially desirable. Of course, this is not to say that any deficit is desirable.

3.1.2. The budget constraint

When the budget constraint (Equation (3)) is not respected, the government is technically insolvent. However, this criterion is not easily made operational. The reason is that the constraint is fundamentally intertemporal: currently ob-

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[17] Much of the discussion on public spending and taxing rests on the assessment of the effectiveness of the provision of public goods as well as on equity issues. This avenue will not be pursued further here as it belongs to different strands of theory: public choice and fiscal federalism. We only note that the size of government (spending and taxing) is not either a criterion of fiscal discipline or laxity.

[18] This statement needs to be qualified in the presence of exogenous technological change, but the principles laid out in the text remain valid.

[19] This view has some implications for MU to which we return below in Section 3.5.

[20] This can be seen as a rationale for Keynesian-type counter-cyclical fiscal policies.

[21] Another obvious case concerns war efforts. Historically, this is when public debts have been most conspicuously bullt up. Of course, this is not to suggest that wars are Pareto superior outcomes.

Table 8.3.

Solvency limits: some simple examples (% of GDP)

| | Maximum acceptable steady-state primary budget surplus (assuming a 5% real interest rate) | | | | | |
| | 3% | | 5% | | 10% | |
	No growth	3% growth	No growth	3% growth	No growth	3% growth
Limit debt + primary deficit	60%	150%	100%	250%	200%	500%

served deficits $(G_0 - T_0)$ and debt levels B_0 need to be compared to future levels of spending and taxes. What matters is whether the path of possible present and future levels (as a percentage of GNP) of public spending and tax collections are compatible with the constraint (Equation (3)). Limits on spending relate to what is politically acceptable and to commitments already made in terms of retirement benefits, social health, export credits, etc. Similarly, limits on taxes are determined by distortionary and political considerations.

Putting precise numbers on such spending and taxing limits is an impossible task. Yet, before considering how the existence of an MU affects the budget constraint, it is informative to explore in a simple way what could be an acceptable steady-state budget surplus. Table 8.3 provides some simple back-of-the-envelope calculations based on the budget constraint. Realism requires us to allow for real GNP growth. This is done by rewriting Equation (3)

$$b_0 + (g_0 - t_0) \leq (r - v) \cdot (g - t) \qquad (3')$$

end-of-period debt   steady-state
                          primary surplus
                          (or present value)

where lower-case variables represent ratios of the upper-case variables to the GNP, and v is the real GDP's growth rate. Table 8.3 shows for steady-state surpluses $((g - t)$ in the right-hand side of (3′)) ranging from 3 to 10% of GNP, the maximum possible level of current end-of-period debt (the sum of current debt b_0 and current budget deficit $(g_0 - t_0)$, i.e. the left-hand side of (3′)). The calculations are made assuming a real interest rate (r) of 5%, and real GNP growth rates (v) of 0% and 3%. It would seem that a reasonable, rather conservative, limit would be in the 150−250% range.[22]

Table 8.4.

Net public debt plus primary budget deficit, 1989 (% of GDP/GNP)

	Total	Net public debt	Primary deficit
Belgium	119,8	122,3	−3,4
Denmark	17,2	20,6	−3,4
France	23,8	24,7	−0,9
Germany	19,8	22,1	−2,3
Greece[1]	84,8	76,1	8,7
Ireland[1]	122,2	126,0	−3,8
Italy	97,1	95,0	2,1
Netherlands	56,2	56,4	−0,2
Spain	29,5	29,8	−0,3
United Kingdom	24,7	28,9	−4,2

[1] Gross public debt, which makes the figures hardly meaningful.
Source: OECD, *Economic outlook*, 46, December 1989.

How serious are these limits? Table 8.4 provides some indication. It shows 1989 values of the current debt plus primary deficit levels — i.e. $b_0 + g_0 - t_0$ — in the European Community countries.[23] Some countries are close to the dangerous region. What is reassuring is that those with the highest debt levels have already switched to sizeable primary surpluses. This would suggest that the budget constraint is taken seriously among most, if not all, Community countries.

3.2. The MU fiscal discipline connection

In this section it is asked whether the existence of an MU provides incentives for larger public deficits, and whether it

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[22] For reference, one of the highest (gross) public debt levels ever recorded for an industrialized country is Britain's 300% level at the end of World War II.

[23] The actual debt figures underestimate a variety of implicit government commitments (e.g. future retirement benefits). For a thorough discussion of these issues and an attempt at quantification, see Buiter (1985).

introduces a bias towards monetary financing rather than debt financing. To answer these questions, we review the implications of the various effects described in Section 2.

The interest-rate linkage has a number of implications for an MU. While much of the linkage arises because of financial integration, the creation of an MU alters its nature. As long as currencies differ, real interest rates can differ by the amount of expected real depreciation. Thus, in a country which undertakes a fiscal expansion — not money-financed — the real interest rate can increase because an immediate exchange-rate appreciation generates the expectation of a future real depreciation, the well-known overshooting principle.[24] In an MU, however, over the longer-term horizon adopted here, nominal and real interest rates must be equalized for the same class of assets.

3.2.1. Default risk

We consider first the case when there exist good reasons to believe that the budget constraint, Equation (3) or (3'), is not satisfied *ex ante*. For the time being, the option of monetizing the debt is excluded. Then, three options, and only three, are open. The first one is default, i.e. a tax levy on bondholders. The second one is an increase in the path of present and/or future taxes. The last one is a reduction in the path of public expenditures. The last two options imply that default is avoided, but if it is not known *ex ante* which solution will be adopted the public will form expectations with non-zero probabilities assigned to each of the three options.

To see what happens we return to the model of Section 2. First, we note that in Equation (1), initial financial wealth is

$$A_0 = B_0 + F_0 \tag{5}$$

where B_0 and F_0 are, respectively, the initial public debt and external net asset position. Second, the violation of the government budget constraint is written as

$$B_0 > (T_0 - G_0) + (R/(1-R))(T - G) = \bar{B}_0 \tag{6}$$

To restore (3), it is enough for the government to default on its debt from B_0 to $\bar{B}_0$. While default might mean eliminating the debt altogether, it is assumed that the bare minimum (cancellation by an amount $B_0 - \bar{B}_0$) may occur with prob-

ability a. Similarly, it is assumed that with probability b, taxes may be raised forever by

$$\Delta T = \frac{1 - R}{R} (B_0 - \bar{B}_0)$$

Finally, the last possibility, expected to occur with probability $(1 - a - b)$, is to cut G by the amount $\Delta G = \Delta T$. Then, the expected wealth level is $\bar{W}_0$ such that

$$W_0 - \bar{W}_0 = (B_0 - \bar{B}_0) [a + \frac{b\gamma (1-R)}{1 - \gamma R}] > 0 \tag{7}$$

In a closed economy, the fall in private wealth implies a reduction in consumption in both periods. As a result, the real interest rate must fall to restore goods market equilibrium. The fall in interest rate occurs only because, in the closed economy with no capital, there is no alternative asset available. With other assets available, if $a + b = 1$, so that no spending cut is anticipated, private rates remain unaffected by the direct threat of default. The direct effect on the public bond rate is an increase of the real interest rate to $r \cong r^* + a\psi$, where $\psi = (B_0 - \bar{B}_0)/B_0$. There is a secondary effect, though: private interest rates must decline from the level implied by the direct effect to maintain goods market equilibrium. The end result is an increase in public bond rates and a decline in private borrowing rates.

If $a + b < 1$, it matters which taxes may increase. If post-tax rates of return may be affected — through personal income taxes or corporate profit taxes — the direct effect on private borrowing must be an increase. Thereafter, all interest rates fall to restore goods market equilibrium as described above.

In an open economy, foreign assets provide the benchmark return ascribed to domestic private assets in the previous case. The existence of an MU makes a difference, however. In a non-MU, we obtain a combination of a post-tax private interest rate decline and an adverse shift in the terms of trade (real depreciation), possibly in the form of higher pre-tax interest rates. In an MU, pre-tax interest rates must be equal within the union — for the same risk class — if asset-holders are taxed by their country of residence. Then public bonds become riskier if $a + b = 1$; if $a + b < 1$ stocks too become riskier as future dividends stand to decline if corporate profits are affected, as is likely. Depending upon the possible distribution of the stabilization burden, all domestic rates are likely to increase somewhat as the result of the direct effect. The burden of maintaining goods market equilibrium falls primarily on the terms of trade.

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24 This characterization also applies to the EMS since fluctuation within the band and realignments allow for non-zero expectations of exchange-rate changes.

The conclusion is that an MU is likely to lead to a specific increase in public bond rates, the more so, the less easy it becomes to tax resident households and corporations. This means a tighter budget constraint.

3.2.2. Monetization

Much the opposite conclusion is reached when the monetization option exists. In a non-MU, monetization means inflation and depreciation, a loss in terms of trade which affects all residents. In an MU, monetization must affect the whole union. The outcome depends on the rules that the MU adopts for the operation of its monetary authorities.

If national central banks continue to operate freely, it is well known that no equilibrium exists. Each bank has an incentive to free-ride and issue the MU's currency, forcing the other banks to absorb the excess liquidity created. As a result, the budget constraint is relaxed and binding rules are necessary. It is important to note that such rules do not concern fiscal policy *per se,* only the monetization of deficits.

The Delors report seems to reach a different conclusion as it proposes to tighten up fiscal discipline to avoid the free-riding problem. One interpretation is that the report wishes to remove one key incentive for excessive money creation, implicitly assuming that, otherwise, national central banks are likely to behave in a concerted way. A superior solution, it seems, would be to agree on money creation rules,[25] leaving national fiscal authorities free to set domestic fiscal policies. As noted above, except for monetization, an MU implies a tighter fiscal constraint.

3.2.3. Debts as a tool to constrain future governments

It has been noted above that a government may constrain future governments to a given path of policies by bequesting them a particular mix of liabilities and assets (maturity, nominal/real). The following has not been demonstrated but seems to be a reasonable conjecture. Because an MU implies restraints on monetary policy and seigniorage, it may alleviate the need of existing governments to engage in the build-up of the required liability/asset position. Given that the establishment of such a portfolio, while theoretically possible, is likely to be practically overly complex, substitute arrangements may be desirable.

The implication for discipline is not immediate but an intuitive insight arises. Changes in the political persuasion of successive governments[26] may be harmful if only because they introduce a supplementary source of uncertainty in fiscal policies. If the MU is indeed a substitute for complex constraints on fiscal policy, it may alleviate the time-inconsistency difficulties encountered so far. Put differently, an MU may well turn out to foster stability — not necessarily discipline under this argument — in the pursuit of national fiscal policies.

3.3. The MU-tax connection

This section asks whether an MU imposes a restriction on the ability of governments to raise taxes. Such a restriction may be seen as discipline if matched by a reduction in spending to satisfy Equation (3). Alternatively, it may have the worrying implication of leading to a violation of Equation (3). In the case of the European Community, it is reasonable to assume that a decline in taxing power implies a decline in the size of governments.

3.3.1. Taxes on capital income

Through competition among tax systems, capital mobility tends to result in the reduction of national taxing abilities (Giovannini, 1989). One solution is an international agreement either on tax rules and rates, or on the reporting of capital incomes to the relevant tax authorities. Such an agreement, already ambitious for the European Community countries as a whole, is outright illusory if all countries in the world are to be included. Thus, capital liberalization implies tax revenue losses. On the other hand, tax evasion implies costs for the evaders in the form of reduced access to their assets. If tax havens are widespread and located in countries with which much trade is going on, the costs are limited. If tax havens are pushed out to remote islands, tax evasion becomes more conspicuous and more costly.

Is the problem of tax evasion more acute under an MU? The triggering factor is the liberalization of capital movements. The existence of an MU enhances capital mobility within the union because the exchange risk is eliminated. Outside the union nothing much is changed at first glance. Yet 'overseas' financial institutions may more readily offer accounts free of exchange risks in ecus rather than in the various currencies of the non-MU countries. This would deepen tax evasion. On the other hand, a wide MU may find it easier to negotiate tax agreements with the other major financial centres.

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[25] This opens up another issue, beyond the scope of this study namely the desirability of maintaining national central banks in an MU. The presumption is that this is an unstable solution.

[26] The literature on this is critically reviewed in Alesina (1989).

Indeed, a threat of forbidding capital outflows is more credible when coming from a zone wide enough to have little to lose in terms of risk diversification and where individual countries' needs for external borrowing and lending are susceptible of being satisfied within the zone. This point is made clear in Table 8.5 and Graph 8.4. Table 8.5 shows OECD countries' current accounts (as a percentage) of GDP over the period 1960-88. Of interest is the standard deviation, i.e. how much individual countries — or blocks of countries — use the current account to smooth out disturbances. Graph 8.4 plots these standard deviations against country sizes (relative to OECD GDP in 1980). The negative link[27] is confirmed by the following cross-section regression (t-statistics in parentheses)

$$\log \sigma \, (CA/GDP) = 0.67 - 0.016 \, (GDP/GDP \; OECD)$$
$$\qquad\qquad (6.41) \qquad (-4.06)$$

These results support the view that the larger the currency area, the less the current account used to face disturbances. Put differently, it is less costly for larger zones to forego external capital mobility. Thus, a European MU is in a better position to negotiate, with the traditional support of the USA on this matter, an agreement with tax havens to reduce tax avoidance activities.

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[27] The link between country size and current accounts has been pointed out by Sachs (1981). It is related to the Feldstein-Horioka 'puzzle'.

Table 8.5.

Current accounts: 1960-88 (% of GDP)

	Mean	Standard deviation
Belgium	0,02	1,9
Denmark	− 2,8	1,3
France	0,3	1,0
Germany	1,1	1,5
Greece	− 3,0	1,8
Ireland	− 4,4	4,3
Italy	0,2	1,6
Netherlands	1,3	1,8
Portugal	− 2,8	5,1
Spain	− 0,4	1,9
United Kingdom	− 0,3	1,6
Austria	− 0,4	1,2
Norway	− 2,3	4,5
Sweden	− 0,7	1,4
Switzerland	2,1	2,8
Australia	− 2,6	1,96
Canada	− 1,3	1,1
Japan	1,0	1,6
United States of America	− 0,2	1,3
European Community	0,2	0,8
OECD Europe	0,1	0,7
OECD Total	0,1	0,5

Sources: OECD, NIA.

GRAPH 8.4: **Current account (standard deviation) and country size (Relative GDP sizes in 1980; standard deviation of CA/GDP over period 1960-88)**
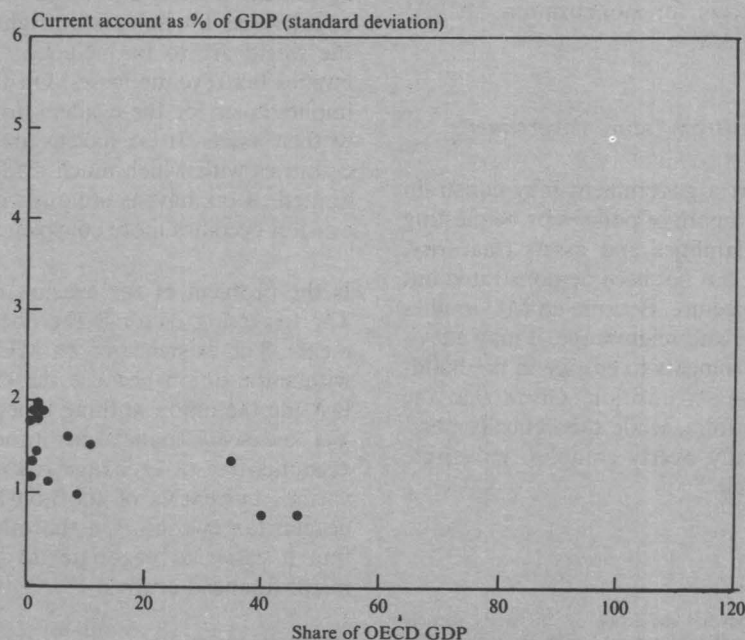
3.3.2. *Taxes on goods, corporate and labour income*

Different VAT rates open up the scope for arbitrage, mostly in border areas and through catalogue sales. Different rates of taxation of labour income may provide incentives to resettle in jurisdictions with more favourable tax treatment. The same appplies to decisions on the location of production.[28] The key effect of an MU relevant for this issue is the elimination of the exchange risk. For EMS member countries, already accustomed to a great deal of exchange-rate stability, the MU effect is likely to be trivial.

This tendency is mitigated by general equilibrium considerations, which are briefly listed. First, if lower corporate tax receipts are offset by higher labour income taxes, labour costs may rise. Second, pre-tax labour costs adjust endogenously as a result of the resulting changes in labour demand, with similar effects on land prices. Whether the offset is complete, more than complete, or less than complete, is an empirical matter which would require detailed analysis. Third, if public spending is reduced to match lower tax receipts, the effect of less public goods on firms' location decisions needs to be assessed.

3.3.3. *Assessment*

Tax competition exists with or without an MU. The interesting question is whether the presumption that the elimination

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28 What really matters are taxes net of subsidies. There exist numerous incentives offered by regions or States to attract foreign investments.

of exchange risk strengthens a country's taxing independence. The US experience is a natural test bed for Europe. Table 8.6, borrowed from Eichengreen (1990), shows that tax pressures differ less among US States than among European Community countries. Along with exchange risk, this pattern may be explained by the lower intra-EC labour mobility. That taxes differ across US States suggests that the MU effect on tax competition, while undeniable, may remain quite limited, except of course for highly cosmopolitan financial assets. The direction of change, on the other hand, does not seem to be ambiguous.

4. Externalities

A very different reason to raise the question of discipline arises because fiscal actions by one country affect other countries. The existence of such externalities implies that reckless behaviour by one country may become unacceptable to its partners. This is true of course independently of the existence of an MU. Once again, the question is what difference it makes within an MU. What must be understood clearly at the outset, though, is that, in this sense, discipline may require that a country adopts a fiscal policy which may well be sub-optimal from its own viewpoint.

The potential list of externalities is analysed in Section 2, and they are considered one by one in the rest of this section. Presumably, the level of externalities depends upon how tightly linked the different countries are. As the European Community countries move towards tighter links, it is en-

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Table 8.6.

Taxes in US States (% of personal income)

	Effective individual income tax rate	Effective corporation tax rate	Sum of effective individual and corporate rates	Total tax revenue
New England	0,022	0,009	0,030	0,067
Middle Atlantic	0,027	0,006	0,033	0,065
East North Central	0,020	0,006	0,026	0,065
West North Central	0,020	0,004	0,024	0,063
South Atlantic	0,018	0,004	0,022	0,070
East South Central	0,011	0,004	0,016	0,069
West South Central	0,005	0,001	0,006	0,068
Mountain	0,015	0,003	0,018	0,076
Pacific	0,022	0,007	0,030	0,098
Mean	0,018	0,005	0,023	0,071
Standard deviation	0,006	0,002	0,008	0,010
Coefficient of variation	0,345	0,427	0,346	0,141

Source: Eichengreen (1990).

tirely reasonable that this issue be raised. The general point is that externalities lead to sub-optimal outcomes in the absence of some coordinating mechanism.[29] As coordination is often too complex to be organized on a case-by-case basis, i.e. to be negotiated when the need arises, it may take the form of binding rules, Such rules, indeed, must be binding to avoid two sorts of undesirable side-effects. They could, at times, lead to clearly inferior outcomes, for example when particular disturbances occur. Then, even if on average they do well, rules may be questioned, and dropped.[30] The other problem concerns the possibility that some countries be tempted to free-ride, i.e. to take advantage of the fact that other countries apply the rules to obtain particular advantages.

4.1. Interest-rate externalities

A temporary fiscal expansion by one union member implies higher interest rates for all union members (Section 2.1). The magnitude of the effect is of course related to the relative size of the country initiating fiscal action. In a non-MU, the transmission may be blocked by real appreciation, and accompanied by a higher interest rate. Thus, each union member country will tend to overlook the burden imposed on the other members, hence an inefficiently higher tendency to run expansionary fiscal policies. Except in the unlikely instance where default is threatening, discipline amounts to imposing a constraint more severe than Equation (3) on grounds external to each individual country.[31]

4.2. Terms of trade externalities

The terms of trade externalities, both internal and external, imply that a government will tend to overlook the impact on other countries of its fiscal policy actions. This does not mean, however, that expansionary changes are any more problematic than restrictive ones. The correct implication is that any national fiscal policy action tends to underestimate the implications for other countries. It is a case, therefore, for coordination or for less independent action. This very general remark applies independently of the exchange-rate regime. What matters here is the difference that an MU

makes in this respect. The key is the channel through which relative prices change.

For relative prices within the zone of interest, the result is immediate. In a non-MU, the most likely channel is the exchange rate. In an MU, it can only be through prices. Thus, given the complexity of adjusting the whole array of a country's prices,[32] the inefficiency costs of an MU are higher than in a non-MU. The conclusion is that, on this criterion, more attention indeed should be devoted to fiscal policy coordination. Lacking coordination, however, there is no presumption that it would be desirable to limit the extent of fiscal policy actions.

For relative prices between the zone and the rest of the world, the exchange-rate channel remains unaffected. This does not eliminate the externality, however. What happens in an MU is that a country's fiscal action changes the real exchange rate of the whole union, hence its current account. In a non-MU, the effect would be limited to the country initiating the fiscal action. Hence, once again, we find an externality which suggests the increased need for fiscal policy coordination.

The recommendation that externalities call for coordination is unfortunately quite vague. We would like to know whether there is a tendency for externalities to call systematically for fiscal restraint or activism. As has been made clear by Canzoneri and Gray (1985), to answer that question requires much more precise knowledge on: (1) the sign of transmission effects and (2) the nature of the shocks which call for fiscal correction. In general, nothing more definite can be said. In the following section, an attempt is made at progressing somewhat, with more emphasis on the shorter-term horizon so far eliminated from the analysis.

4.3. A shorter-term view on the terms of trade[33]

The terms of trade externalities work through two different channels: a depreciation improves one country's current account at the expense of its partners; an appreciation lessens the inflation pressure, also at the partners' expense. This decomposition is an illustration of the general ambiguity

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[29] In game-theoretic terms, we reach a Nash equilibrium. It is always possible to have all countries better off by imposing a judicious form of cooperation, even if it imposes additional constraints. Of course, there is always the risk of imposing mistaken constraints.

[30] A classic example is the recourse to tariffs and competitive devaluations in the 1930s. While free trade was recognized as generally superior, interest groups could appeal to the gravity of the situation to obtain the abandonment of the principle.

[31] A distinction between discipline and reputation in the case of monetary policy is developed along these lines in Wyplosz (1989).

[32] This complexity has been Friedman's central argument in favour of flexible exchange rates. The EMS, inasmuch as it allows for realignments, satisfies Friedman's criterion.

[33] This section follows Cohen and Wyplosz (1990). The arguments are developed there for the general case, not the particular case of an MU. It seems that there is no particularly stronger case for coordination implied by the MU, except maybe that integration is likely to develop further, or that it may be a good time to aim at a more ambitious form of coordination.

which emerges regarding the bias likely to emerge in the absence of coordination. In this section, we bring more content to bear and consider the case of a supply-side shock.

A country faced with an adverse supply shock will want to worsen its terms of trade (depreciate in a non-MU) in order to support output, and to avoid inflation. If the relative effect of the terms of trade on the current account is large (respectively, small) relative to the effect on inflation, the country will want to achieve a real depreciation (respectively, a real appreciation). If all members are hit by the same shock, they cannot achieve a terms of trade advantage—in whatever direction turns out to be desirable from the domestic point of view—*vis-à-vis* each other: as they engage in such efforts, they keep undermining each other, which results in an inefficient outcome. It remains, however, that they can jointly act *vis-à-vis* the rest of the world.

Cooperation means forfeiting terms of trade advantages within the MU, but jointly setting monetary and fiscal policies in order to achieve the desired terms of trade effect *vis-à-vis* the rest of the world. If, for example, the inflation effect is stronger, the MU should seek a joint real appreciation, hence a policy mix including fiscal expansion and tight money.[34] If, within the MU the current account effect dominates, and is larger than the inflation effect *vis-à-vis* the rest of the world, coordination requires larger deficits than individual countries would seek spontaneously. Of course, with a different ranking of the size of terms of trade effects, the opposite conclusion will emerge: coordination would call for fiscal restraint.

If we consider the case where the shock hits asymmetrically (positive in some countries, negative in the others), the conclusions are exactly reversed: fiscal restraint is needed when the terms of trade externality dominates the inflation externality within the MU and relatively to the rest of the world fiscal activism must be encouraged with the opposite ranking of terms of trade effects.[35]

4.4. Conclusion

The existence of externalities means that each member country has a right to wish to control its partners' actions. If high real interest rates are undesirable, there is some support for the view that members of an MU which must share the

same rate will want to limit expansionary policies elsewhere in the union. The implication of the terms of trade externality does not provide any presumption that fiscal activism, or simply budget deficits, should be curtailed. The first best would be policy coordination, with discretion applied as to what should be the proper coordinated response to particular shocks.

However, fiscal policy coordination is known to be hard to design and implement in pratice. When faced with this observation, two possible conclusions emerge. The first one would be against any attempt at establishing fiscal policy rules within the framework of an MU, rather opting for soft and flexible forms of coordination, such as surveillance. The second conclusion would be to favour full policy coordination, as would occur within a federal budget. This seems to be an instance where the extremes dominate intermediate conclusions.

5. New fiscal policy needs in a monetary union

5.1. Adjustment without exchange rates

There is a general perception that fiscal policy will assume an increased role in an MU. This view rests on the observation that the monetary policy instrument being lost, all of the burden will fall on the fiscal policy instrument. Given that the two instruments are not interchangeable — in any usual model — it is not clear what to make of this observation.

A useful starting point is to ask: what difference does it make to operate under rigidly fixed exchange rates? What are the functions which are lost? Exchange-rate changes are required to modify the relative prices of broad categories of goods (domestically produced versus foreign, traded versus non-traded), or of assets (by country or currency of issuers). If goods and asset prices were perfectly flexible, nothing would be lost in giving up the exchange rate. As asset prices typically are as flexible as exhcange rates, the usefulness of exchange rates arises from price rigidities. Importantly, because price rigidities are only a transitory phenomenon, there cannot be permanent effects of exchange-rate changes. In passing, we note that the exchange-rate is a poor substitute for price flexibility as: (1) it affects broad categories of relative prices; and (2) it affects broad categories of asset prices which may not need to change.

This is well known, of course, and recalled here to introduce the next question: how can we substitute for the functions of the exchange rate lost in an MU? There exist, in principle, some combinations of taxes and subsidies which would

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[34] This can be seen as a rationalization of the Volker-Reagan policy in the early 1980s.

[35] The intuitive explanation is that, with asymmetric shocks, countries are pulled apart and do not internalize the fact that non-coordinated policy actions will further pull them in opposite directions.

exactly replicate the function of the exchange rate, but such policies are normally forbidden under European Community rules. Consequently, fiscal policy can only alleviate some of the most undesired effects of the lack of the exchange-rate instrument.[36]

For example, if shifts in productivity or tastes result in excess supply of some domestically produced goods, quantities will adjust first in the presence of price rigidities. Much the same occurs in the presence of an exogenous increase in domestic costs of production. An exchange-rate depreciation helps, but imperfectly as it is unlikely to affect only, and in the right proportion, the goods in question. On the other hand, disturbances resulting in an excess demand for some goods are more quickly met by price increases. Thus, an important asymmetry arises, which suggests that an MU is likely to penalize more heavily countries undergoing adverse demand and supply disturbances. The implication is that fiscal policy will be needed to reduce the effects of temporary deviations of relative prices from their equilibrium levels.

5.2. Endogenous price and wage flexibility?

There remains the possibility that the creation of an MU may soften the degree of rigidity of prices. There is no agreement, in general, on the source of price rigidities (even on the existence of such rigidities). This is not the place to review the literature, theoretical and empirical. A recurrent theme concerns the price-wage mechanism and the key role of expectations regarding the monetary validation of increases. Under this view, a non-accommodative monetary policy may well speed up the adjustment of prices and wages towards their equilibrium levels. If individuals (firms and unions) know that they will bear the costs of quantity adjustments because of the lack of monetary adjustments, they internalize (some of) the costs of their actions. Whatever the institutional form of the MU's monetary authority, it is bound to be less responsive to individual countries' idiosyncrasies, and thus to promote some internalization of resistance to relative price adjustments. In that case, the need for stabilizing fiscal action may turn out to be lessened, rather than enhanced as is usually presumed.

5.3. The insurance role of 'federal' fiscal policies

5.3.1. The need for insurance

Consider the case of a country hit by an adverse shock, such as a productivity shock or a shift of resources away from

its domestically produced goods and services. From what precedes, two implications should be clear. In the long run, its terms of trade will have to decline, and this is true independently of belonging to an MU. In the shorter run, the relative price effect is likely to cause some firms to scale down (or even go bankrupt) and some additional unemployment to emerge. Thus, a number of agents will be directly hurt by the loss of the exchange-rate instrument. Facing such a risk, agents normally would buy an insurance. Because insurance of this kind typically does not exist, it is usually provided by the State. This transfers the cost, and the risk, at least partly to the other domestic agents. They, in turn, require an insurance. This is one role of monetary and/or fiscal policies.

Those externalities which lead to price and wage rigidities provide the rationale for government intervention. Unless the MU has a very strong effect on the wage and price-setting mechanism, fiscal policy will see its role as a stabilizing instrument increased. The loss of the exchange-rate instrument may further force adjustments away from relative prices and on to quantities. The apparent asymmetry which results in slower downward than upward price adjustment implies that adversely hit countries may face a more severe contraction than the expansion in favourably affected countries. An important task for fiscal policy is to eliminate circumstances when a country would have an incentive to break away from the MU. Presumably, an MU carries with it welfare gains — this is a complex issue beyond the scope of this study which assumes that an MU is desirable. Care must be taken, however, that the implied costs do not exceed the benefits, since the option of leaving the MU will always exist.[37]

What is required, therefore, is a mechanism whereby fiscal policy acts as a substitute — albeit very imperfect — for the exchange-rate instrument. This role should be understood as follows. First, it must correspond to the additional risk generated by the existence of an MU, no more. Second, it must be an insurance targeted at those agents whose situation is made worse. Third, it should respect the essential principle of subsidiarity, as formulated in the Padoa-Shioppa report. To recall, this principle holds that public measures should be implemented at the most decentralized level possible. In the following, some guiding principles are laid out.

5.3.2. Principles

First, it is important to emphasize that the insurance scheme should cover the risks — more precisely the portions of the

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[36] Given the traditional view that policy instruments are scarce (in the sense of Tinbergen), fiscal policy cannot even be entirely devoted to this task.

[37] There could be non-negligible (political) fixed costs in leaving the MU, but one can always imagine sufficient costs of remaining within the MU to offset the benefits and the fixed costs of exit.

risks — due to the existence of the MU, not the risks which would have occurred to the same extent in the absence of the MU. Of course, this is easier said than done. Identifying the risks to be insured, and the proper level of coverage is an impossible task. So, we should recognize that a perfect scheme is out of reach and concentrate instead on avoiding the more obvious pitfalls.

Second, we need to recognize that it is individuals who are hit, not States or regions. Unfortunately, identifying the individuals one by one is impossible. One way out could be to decentralize the insurance functions to States or regions, on the ground that identification is easier at the more decentralized level. This is one merit of the subsidiarity principle.

Third, the scheme should be clearly seen as an insurance: premiums are paid against occasional and contractual payments to cover hardships. The systemic nature of the risks to be covered — those due to the existence of the MU — implies a pooling of resources at the union level and a clear redistribution scheme.

Fourth, the insurance scheme must be intertemporally efficient. The corresponding fund does not have to balance its budget every period (month, quarter, year or decade), since disturbances may not occur evenly over time. One solution is the constitution of a fully endowed fund, but such a fund would imply a transfer across generations which does not seem warranted. More appropriate redistributions can be organized through successive surpluses and deficits financed by borrowing.

Fifth, we need to face the moral hazard aspect of insurance schemes. Potential beneficiaries should not have an incentive to act in a way which increases their chances of being net recipients. Similarly, there exists an adverse selection risk, whereby 'well-behaved' participants refuse to join the scheme if they perceive that it can be manipulated by higher-risk participants. Capture by interest groups needs to be avoided.

5.3.3. The United States of America's example

It is useful, at this stage, to draw some lessons from the closest approximation to the European monetary union, namely the case of the USA.

Recent work by Eichengreen (1990), and Sachs and Sala-i-Martin (1989) establishes the following points. First, unemployment rates — an important measure of quantity adjustments in the presence of price and wage rigidities — differ across US States and tend to be persistent. In Europe, they differ even more across States, and are even more persistent. This observation has two implications: a monetary union like the USA with a large federal budget does not eliminate quantity adjustments; even a high degree of labour mobility is not enough to eliminate regional imbalances. Second, inter-State transfers in the USA amount to about 2% of the USA GNP, about 20% of States' and 40% of local spending. Third, when a US region undergoes a decline in its income, about 40% of the loss is compensated for through the federal budget, mainly through the progressivity of the income tax system. Eichengreen puts this figure at 1% for the European Community.

Fourth, the US system of fiscal federalism works along two routes: federal matching grants channel funds to States and local governments, while progressive federal income taxes and welfare payments operate at the individual level. As is well known, the US system is far from perfect, with considerable politicking involving State and local governments. In contrast, transfers organized around individuals are remarkably free of controversies, beyond the inevitable amount of fraud which surrounds any tax and transfer system.

5.3.4. Implications for a blueprint

(a) Priority should be given to operations through the tax system, especially its progressive aspects.

(b) Once tax revenues are increased, public outlays must rise commensurably.

(c) The subsidiarity principle suggests to channel spending to existing national transfer systems.[38]

(d) In all cases, spending should be directed in priority towards individuals affected by the adverse implications of the MU. Examples of programmes are: unemployment benefits,[39] educational grants,[40] health programmes.

(e) The size of the fund will, realistically, have to increase progressively. As it starts on a small scale, its effectiveness will require a steeper progressivity than when the steady-state size is reached.

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[38] If these systems are deemed ineffective, this might be a propitious time to envision overhauls.
[39] This has been advocated by Bean et al. (1990).
[40] For a similar proposal see Danthine et al. (1990).

5.3.5. *Comments*

The mere emulation of US fiscal federalism would imply a fund of about 2% of the union's GNP. But the European Community is not the USA. Labour mobility is considerably lower, and should not be increased, at least in the coming years, as it would entail major welfare costs. The same cultural and historical reasons which hamper labour mobility are bound to affect the attachment to a monetary union, i.e. to reduce the costs of breaking away in the event of a major adverse shock. Finally, initial conditions differ more in the European Community than in the USA. It is reasonable to expect varying degrees of adjustment to disturbances, and potentially more diverse disturbances too. The implication is that the insurance fund should be of a significantly larger size than the US inter-State transfers.

Since many such transfer systems already exist in all European Community States, transferring some resources to the federal level should not add to the fraud problem. As for the moral hazard problem it is best dealt with through incentive schemes such as matching supports: individuals and/or States receiving support bear clearly identifiable portions of the insured risk. As for adverse selection, participation in the scheme, be it at the individual or national level, should be made compulsory, much like taxes.

The risk of capture by political interests is considerable. This is why transfers from agents to agents are of paramount importance. In this respect, the existing structural Funds do not provide an adequate insurance channel. Their logic is different and should be clearly kept separate from the need for insurance. Indeed, the building up of an *esprit de corps* requires a feeling of equity. As the MU imposes the severe constraint of abandoning the exchange-rate instrument, the need for social cohesion within the union may grow. Given the existing disparities in terms of per capita income, levels of infrastructure, or quality of education — to take some of the most obvious examples — some form of redistribution of opportunities is bound to be required to maintain popular support, even though such transfers raise the old question of trading off allocative and productive efficiency.

6. Conclusion

The creation of a monetary union in Europe will seriously affect the conduct of national fiscal policies. The Delors report points out the need to restrict them, setting a binding ceiling on budget deficits, presumably on the ground that discipline is jeopardized. The present study finds cases where indeed some such risk exists. Yet, there are numerous instances where fiscal discipline may actually be enhanced.

Under two separate definitions of what discipline may really mean, it appears that extreme caution should be exercised before setting binding rules. On the other hand, everything points towards the heightened need for coordination in the area of fiscal policy.

Without the exchange-rate instrument, fiscal policies may well be called upon to provide a substitute way of dealing with national shocks. The guiding principle suggested is that of an insurance programme, linking individual agents throughout the union. Over time, this calls for the devolution of a number of national taxes and transfer programmes.

Appendix

The Frenkel-Razin model

The key feature of this model in the tradition of Blanchard (1985) is to derive aggregate behaviour from the individual behaviour of mortal agents. Each period is born a cohort of size normalized to one. Each individual has a probability γ of living to the next period. Thus at time $t > s$, the size of the cohort is, by the law of large numbers, γ^{t-s}. The total size of the population is

$$\sum_{s=-\infty}^{t} \gamma^{t-s} = \frac{1}{1-\gamma}$$

A1. Individual behaviour

Each individual can borrow or lend at the market interest rate r. If a_t is his/her financial wealth at time t, his/her expected wealth at time $t+1$ is $E_t a_{t+1} = \gamma a_{t+1}$. If income, taxes and spending are, respectively, y_t, τ_t and c_t, the budget constraint is

$$\gamma a_{t+1} = (1+r_t)(a_t + y_t - \tau_t - c_t) \tag{A1}$$

With a logarithmic utility function the agent's problem is to maximize

$$E_0 \sum_{t=0}^{\infty} \beta^t \ln(c_t) = \sum_{t=0}^{\infty} (\beta\gamma)^t \ln(c_t)$$

subject to (A1). The first order condition is

$$c_{t+1} = \beta(1+r_t)c_t \tag{A2}$$

Repeated substitutions of (A1) and (A2) yield

$$a_t + y_t - \tau_t + c_t + \sum_{j=1}^{\infty} \frac{y_{t+j} - \tau_{t+j} + c_{t+j}}{(1+r_t) \dots (1+r_{t+j-1})} = 0 \qquad \text{(A1$'$)}$$

$$c_t = \frac{c_{t+1}}{\beta(1+r_t)} \qquad \text{(A2$'$)}$$

If we define human wealth as follows

$$\gamma h_{t+1} = (1+r_t)(h_t - y_t + \tau_t)$$

(A1$'$) and (A2$'$) yield:

$$c_t = (1 - \beta\gamma)w_t \qquad \text{(A3)}$$

where total wealth $w_t = a_t + h_t$ follows the following

$$\gamma w_{t+1} = (1+r_t)(w_t - c_t) \qquad \text{(A4)}$$

A2. Aggregate behaviour

Each individual can be indexed by the date of birth s of the cohort to which he/she belongs: $c_{s,t}$ and $w_{s,t}$. Aggregate values are therefore

$$C_t = \sum_{s=-\infty}^{t} \gamma^{t-s} c_{s,t} \quad \text{and} \quad W_t = \sum_{s=-\infty}^{t} \gamma^{t-s} w_{s,t}$$

Asuming that per capita income y_t is constant, aggregate income is $Y = y/(1-\gamma)$ and we have

$$C_t = (1 - \beta\gamma)W_t \qquad \text{(A5)}$$

together with

$$W_t = A_t + H_t \qquad \text{(A6)}$$

$$A_{t+1} = (1+r_t)(A_t + Y_t - T_t - C_t) \qquad \text{(A7)}$$

$$\gamma H_{t+1} = (1+r_t)(H_t - Y_t + T_t) \qquad \text{(A8)}$$

Note that aggregate financial wealth accumulates at the rate $(1+r_t)$, in contrast with individual financial wealth and aggregate human capital which accumulate at the rate

$(1+r_t)/\gamma$. The reason is that while those who die indeed see their wealth, financial and human, lost, newborns, who receive no financial wealth when they arrive are endowed with the same human capital as those who died.[1]

A3. Time aggregation

We now lump together periods $t=1$ through ∞ by assuming that all exogenous variables remain constant. With $Y_t = Y$ and $T_t = T$, it is clear from (A8) that H_t remains constant and

$$H = \frac{Y-T}{1-R\gamma} \quad \text{where } R = 1/(1+r) \qquad \text{(A9)}$$

and $H_0 = Y_0 - T_0 + \dfrac{\gamma R}{1-\gamma R}(Y-T)$

This gives the value of period $t=0$ wealth W_0 in Equation (1) in the text. Substituting (A5), (A7) and (A8) into (A6), we obtain

$$W_{t+1} = (1+r_t)\beta\gamma W_t + (1-\gamma)H_{t+1} \qquad \text{(A10)}$$

If we divide (A10) by $\prod_{j=0}^{t}(1+r_j) = 1/R^{t+1}$ and sum up

$$\sum_{t=0}^{\infty} R^{t+1}W_{t+1} = \beta\gamma \sum_{t=0}^{\infty} R^t W_t + (1-\gamma) \sum_{t=0}^{\infty} R^{t+1}H_{t+1}$$

Since for $t \geq 1$, $H_t = H = (Y-T)/(1-R\gamma)$, we get

$$(1-\beta\gamma)\sum_{t=1}^{\infty} R^t W_t = \beta\gamma W_0 + (1-\gamma)\frac{R}{1-R}\frac{Y-T}{1-R\gamma}$$

This equation can be used with (A5) to obtain the second aggregate period $t \geq 1$ good market equilibrium condition

$$\beta\gamma W_0 + (1-\gamma)\frac{R}{1-R}\frac{Y-T}{1-R\gamma} = \frac{R}{1-R}(Y-G) \qquad \text{(A11)}$$

under the assumption that $G_t = G \ \forall t \geq 1$.

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1   Blanchard (1985), and Frenkel and Razin (1987) provide a different interpretation in terms of a life insurance.

References

Alesina, A. (1989), 'Politics and business cycles in industrial democracies', *Economic policy*, 8, April, pp. 55-98.

Bean, C., Malinvaud, E., Bernholz, P., Giavazzi, F. and Wyplosz, C. (1990), 'Policies for 1992, the transition and after', CEPR Paper No 42.

Bernheim, B. D. (1987), 'Ricardian equivalence: an evaluation of theory and evidence', *NBER macroeconomic annuals*, pp. 263-316.

Blanchard, O. (1985), 'Debts, deficits, and finite horizons', *Journal of political economy*, April, pp. 223-47.

Blanchard, O. and Summers, L. (1987), 'Hysteresis and the European unemployment problem', *Macroeconomic annuals*, 1, pp. 15-78.

Buiter, W. (1985), 'A guide to public sector debts and deficits', *Economic policy*, 1.

Canzoneri, M. B. and Gray, J. A. (1985), 'Monetary policy games and the consequences of non-cooperative behaviour', *International economic review*, 26 (3), pp. 547-64.

Case, A., Hines, J. R. and Rosen, H. (1989), 'Copycatting: fiscal policies of States and their neighbors', NBER Working Paper No 3032, July.

Cohen, D. and Wyplosz, C. (1990), 'Price and trade effects of exchange rate fluctuation and the design of policy coordination', CEPR discussion paper, April.

Danthine, J.-P., Bean, C., Bernholz, P. and Malinvaud, E. (1990), 'European labour markets: a long run view', Economic Papers No 78, February.

Diamond, P. (1965), 'National debt in a neoclassical growth model', *American economic review*, 55, pp. 1126-1150.

Eichengreen, B. (1990), 'One money for Europe? Lessons from the US currency union', *Economic policy*, 10, April.

Frenkel, J. and Razin, A. (1987), *Fiscal policies and the world economy*, MIT Press.

Giovannini, A. (1989), 'National tax systems versus the European capital market', *Economic policy*, 9, October, pp. 345-86.

Lucas, R. and Stokey, N. (1983), 'Optimal monetary and fiscal policy in an economy without capital', *Journal of monetary economics*, 12, July, pp. 55-93.

Persson, L., Persson, T. and Svensson, L. (1985), 'Time consistency of monetary and fiscal policy' (Mimeo).

Sachs, J. (1981), 'The current account and macroeconomic adjustment in the 1970s', *Brookings papers on economic activity*, 1981:1, pp. 201-82.

Sachs, J. and Sala-i-Martin, X. (1989), 'Federal fiscal policy and optimum currency areas' (Mimeo).

Sachs, J. and Wyplosz, C. (1984), 'La politique budgétaire et le taux de change réel', *Annales de l'INSEE*, 53, mai-juin, pp. 63-92.

Stiglitz, J. and Weiss, A. (1981), 'Credit rationing in markets with imperfect information', *American economic review*, June.

Wyplosz, C. (1989), 'EMS puzzles' (Unpublished), December.

Part IV

Shocks and adjustments in a monetary union

9. EMU and asymmetries and adjustment problems in the EMS — Some empirical evidence

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1. Introduction

This empirical paper aims at analysing adjustment problems and asymmetries in the present European Monetary System (EMS) with special reference to their implications for the creation of the economic and monetary union (EMU). Of course, any empirical work can only be related to the past performance of the EMS and may be of little relevance for the future EMU system if the 'Lucas critique' holds, since according to the 'Lucas critique' the structure of econometric models changes whenever policy is changed. This is likely to be especially true in the case of a fundamental policy change such as the introduction of a monetary union. However, it is beyond the scope of this study to make quantitative predictions about the effects of policies under the EMU as opposed to the present EMS system. Instead, the study attempts to evaluate some of the standard assumptions underlying those theoretical macro-models of the EMS, which are used here to assess the possible costs of moving to a monetary union.

The main point to be taken up below concerns adjustment and convergence problems, which in recent times have frequently been addressed in the context of whether or not shocks are asymmetrical (country-specific). The argument here is that predominantly symmetric shocks facilitate a faster convergence of the economic performances of EMS Member States' economies and that therefore the additional costs of moving to a monetary union can be expected to be smaller the more EMS economies have already converged. This is true for both internal and external shocks. Secondly, external symmetric shocks are likely to have a similar influence on the economic performances of EMS countries participating in the exchange-rate mechanism (ERM)[1] and those

outside the ERM, which would facilitate a convergence of economic performances between ERM and non-ERM countries. It may therefore be stated that under predominantly symmetrical external shocks the transition phase from the present EMS to EMU is likely to be shorter. This is of relevance because during the transition process, which according to the Delors report should precede the irrevocable fixing of nominal bilateral exchange rates, the participation in the ERM is to be extended to all EMS currencies and the fluctuation bands of exchange rates are to be reduced to a narrow range, whilst at the same time realignments are to be made less frequent. However, under asymmetrical external shocks and divergent economic performances the economic costs of this transition period and hence the incentives to participate in a monetary union may differ drastically between the two groups of EMS countries. Finally, note that asymmetrical shocks, regardless of whether internal or external, are not optimally dealt with by a monetary union since they require an asymmetrical policy response. Under predominantly asymmetrical shocks the loss of realignments as the prime asymmetrical monetary policy instrument may therefore imply high economic costs, despite the fact that in a monetary union asymmetrical fiscal policies can potentially substitute for realignments. To evaluate the relevance of these arguments the performance of key economic variables in EMS countries is studied empirically. However, it should be kept in mind that the nature of shocks to the system may also be heavily regime-dependent and may therefore change fundamentally with the move to economic and monetary union.

The study is organized as follows: asymmetries in the shocks to economic variables are discussed and quantified empirically in the first section for those countries participating in the ERM of the EMS from the beginning. A summary of these findings and some suggestions for further research conclude the study.

2. Are shocks asymmetrical and exogenous?

A crucial question related to the transition from the present EMS to the EMU concerns the length of the transition period. In this context the merits of moving immediately to a monetary union with internal exchange-rate fixity have to be contrasted with those from the scenario of the Delors report. In the study by David Begg, which analyses the dynamics of output, prices, wages and interest rates under both the present EMS with partial exchange-rate accommodation and the EMU with exchange-rate fixity, it is argued that the answer as to which scenario is preferable depends on the nature of the shocks to the system: firstly, note that monetary union optimally deals with symmetrical shocks,

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[1] At the onset of the EMS in March 1979 the ecu currency basket included, with the December 1989 relative weights indicated in brackets, the currencies from the EMS countries Belgium (7,6%), Denmark (2,45%), France (19,0%), the Federal Republic of Germany (30,1%), Ireland (1,1%), Italy (10,15%), Luxembourg (0,3%) and The Netherlands (9,4%), as well as that of the United Kingdom (13,0%), which was a member of the European Community, but did not participate in the ERM of the EMS. In September 1984 the ecu basket was expanded to include the Greek drachma (0,8%) and in September 1989 the Spanish peseta (5,3%) and Portuguese escudo (0,8%). Of these three countries only Spain currently participates in the ERM.

since such shocks — to the extent that they have some degree of persistance — require a symmetrical policy response which may take the form of a coordinated aggregate policy for the fixed exchange-rate zone as a whole. Conversely, to smooth out the effects of predominantly asymmetrical persistent shocks an asymmetrical policy response is preferable. In fixed but adjustable exchange-rate systems like the EMS a prominent form of such an asymmetrical monetary policy response is a realignment, which in the EMS has primarily been used to incompletely compensate for cumulated inflation differentials. Note that under a monetary union with irrevocable exchange-rate fixity the nominal exchange-rate is lost as an adjustment instrument and differential (asymmetrical) monetary policy is not defined. In this case differential fiscal policy will have to supplement relative price variability to ensure that more than one type of asymmetrical shock can optimally be dealt with.

In attempting to provide empirical evidence on the relative importance of asymmetrical versus symmetrical shocks in the EMS, Cohen and Wyplosz (1989) apply the Aoki factorization of domestic variables (y_t) and foreign variables (y_t^*) into independent $(+)$ and $(-)$ systems, and estimate the variabilities of the transitory and permanent components of the asymmetrical $(y_t - y_t^*)$ and the symmetrical $(y_t + y_t^*)$ system in order to determine which type of shock has dominated in the past. Looking at real GDP, real wages and price levels in France and Germany, Cohen and Wyplosz (1989) conclude that shocks are predominantly symmetrical and that symmetrical shocks tend to be more permanent than transitory. This suggests that the nature of shocks found in these time series from France and Germany are not inconsistent with the rationale of a monetary union between these two countries.

Before presenting any estimates on the relative importance of asymmetrical versus symmetrical shocks some remarks on the problems related to such evidence are in order. Firstly, since shocks are typically defined as the unpredictable component of a time series, results may differ substantially depending on which model is used for quantifying the predictions. However, much of these differences between the residuals of alternative prediction models may cancel out when these residuals are aggregated over time by calculating their standard deviations, which in the present study are used to compare the relative size of shocks. Furthermore, there are in general no substantial qualitative differences between the results derived from using standard deviations of residuals and standard deviations of the actual variables, given that the underlying series are stationary or transformed to achieve stationarity. This simply reflects the fact that less erratic time series (low variance) are more easily predicted (low error variance). I therefore follow Cohen and Wyplosz (1989)

in using the standard deviations of the sums and differences of selected economic variables as proxies for the variability of symmetrical and asymmetrical shocks. Secondly, it is important to note that an asymmetrical policy response to perfectly symmetrical external shocks, such as the oil-price shocks which hit all countries alike, may also account for the asymmetrical behaviour of macroeconomic time series.[2] In this context a monetary union which eliminates differential monetary policies in responses to common symmetrical shocks is likely to eliminate the asymmetrical behaviour of these time series. Finally, Cohen and Wyplosz (1989) argue that the only variable which is delivered optimally in a monetary union is the price level (or the inflation rate). The immediate benefits from monetary union are therefore likely to be small if price level (or inflation) shocks are predominantly symmetrical and prices (or inflation rates) have already converged to a large extent during the EMS period. In addition, the immediate economic costs of irrevocably locking parities may also be minor under predominantly symmetrical exchange-rate shocks. These two propositions will be discussed first before turning to asymmetries in shocks to other economic variables which may be potentially relevant for the transition to monetary union.

2.1. Asymmetries in exchange-rate shocks

In order to judge the importance of asymmetric nominal exchange-rate shocks two concepts of exchange-rate variability are distinguished. Internal variability is related to the variability of exchange rates between ERM currencies (Group 1). Note that the exchange-rate mechanism (ERM) with its bilateral parity grid, intervention limits and divergence indicator precisely aims at eliminating this source of exchange-rate variability. An important second definition of exchange-rate variability is related to external variability and here I make a distinction between the variability of exchange rates between ERM countries and other European Community (EC) but non-ERM countries (Group 2), on the one hand, and non-EC countries on the other (Group 3). In comparing the variability of exchange rates between countries in these groups it should be possible to identify whether exchange-rate shocks are symmetrical or asymmetrical and whether they are likely to be internal or external.

In drawing inference on the internal/external issue I concentrate on the short-term variability of exchange rates, as reflected in the month to month variations in exchange rates.

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2   It is argued in Fischer (1988) that the post-1979 recessions in the United States of America and Europe as opposed to Japan may be attributed to a differing degree of monetary accommodation of the common oil-price shock.

Since exchange rates typically follow non-stationary time paths, I use the standard deviation of the change (Δ_1) in the logarithm of the exchange rate relative to the month before as a measure of such short-term fluctuations. Note that if bilateral nominal exchange rates follow random walk time series processes, as frequently postulated in the empirical literature, this measure of exchange-rate variability serves as a proxy for short-term unexpected exchange-rate movements, as stressed by Ungerer et al. (1986). Such short-term unexpected fluctuations of exchange rates are of importance since they may — as discussed in the study by Richard Baldwin in this issue — involve serious real costs, despite the fact that some of the risk involved can be hedged.

2.1.1. Asymmetries in nominal exchange-rate shocks

The nominal exchange-rate stabilization effects of the EMS have been frequently studied in the literature. Early studies, for example Van Ypersele (1984) or Ungerer et al. (1983, 1986), have found that the unconditional variances of various definitions of nominal exchange rates, both bilateral and effective, were much lower within the group of ERM countries than for countries outside the ERM. In addition, Ungerer et al. (1983) report that exchange-rate variability declined among ERM currencies, but increased among non-ERM currencies as well as between ERM and non-ERM currencies. A similar conclusion was reached by Rogoff (1985) using conditional variances of nominal exchange rates and by Artis and Taylor (1988), using a variety of statistical procedures and exchange-rate definitions. Lately these findings were supplemented by Wyplosz (1989b) using effective (MERM) and nominal exchange rates. He concludes that effective exchange-rate variability did not, on average, decline more for ERM currencies than for the non-ERM ones.

In the empirical analysis I focus on 16 OECD countries, which, as indicated above, constitute three groups: the first group (G1) consists of the countries which had been participating in the ERM from the onset of the EMS (Germany, France, Italy, The Netherlands, Belgium/Luxembourg, Denmark and Ireland), while the second group (G2) includes the remaining EC member countries (United Kingdom, Greece, Spain, Portugal), some of which joined the ERM at a later point in time (Spain). Finally I consider a number of non-EC countries, both smaller European countries (Switzerland, Austria) and three major non-European countries (United States of America, Canada, Japan), which are summarized as a third group (G3).

The results for short-term exchange-rate variability are shown in Table 9.1, which reports the standard deviation of the change in the logarithm of the nominal bilateral spot

exchange rates relative to the month before. The estimates for the bilateral rates in the upper part of the table are supplemented by unweighted averages of these variability measures for each currency with respect to the currencies of the three groups (G1, G2, G3) in the lower part of the table. The numbers below the diagonal in the upper part of Table 9.1 suggest a clear rating of the degree of short-term exchange-rate variability during the EMS period:[3]

(a) changes in the bilateral nominal exchange rate exhibit the lowest variance within the ERM group. The variability measure declines for all but two bilateral exchange rates, which are the Dutch guilder's (HFL) rate relative to both the Belgian-Luxembourg franc (BFR) and the Danish krone (DKR). Note that since these three currencies participated together with the German mark in the pre-EMS snake arrangement, the onset of the EMS in March 1979 did not represent a fundamental policy regime switch. This view is supported by two facts: firstly, the pre-EMS variability of exchange rates amongst these countries was already very low, and secondly, the identical fluctuation margins of 2,25% in both systems implied no additional stabilization effects. Another strong result in Table 6.1 is that the decline in variability of intra-ERM exchange rates is statistically significant at the one per cent level for all currencies with the exception of the Irish pound/Italian lira (IRL/LIT) rate.[4] The only statistically significant increase in the variance of medium-term exchange-rate changes is found for the HFL/BFR rate. Again this result is not surprising given that the Benelux countries, during the early snake arrangement, adopted a narrower bilateral fluctuation margin of 1,5%, which in March 1976 was expanded to 2,25%. Finally, exchange-rate variability relative to the average of ERM currencies falls for all ERM countries, with the smallest decline being found for the Belgian/Luxembourg franc. Summarizing these findings, it can be stated that asymmetric exchange-rate shocks appear to be of minor importance for

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[3]   In order to test the significance of the change in the variance of exchange rates between the pre-EMS and the EMS policy regime with the Goldfield-Quandt (1965) homoscedasticity F-test, the sample has to be subdivided into two equally long subsamples. The pre-EMS phase (August 1971 to February 1979) starts with the closing of the gold window at the US Treasury in August 1971, which formally ended the Bretton Woods system. The corresponding sample period chosen for the EMS (February 1982 to August 1989) explicitly allows for a transition period by omitting some of the early EMS observations, which at the same time serves to accentuate any differences in the variances of both regimes.

[4]   This result is dominated by the two large unilateral realignments of the Italian lira in July 1985 ($-7,7\%$ of ecu parity) and the Irish pound in August 1986 ($-6,8\%$ of ecu parity).

Table 9.1.

Standard deviation of changes in the logarithm of the bilateral nominal exchange rate relative to the same month of the previous year (average monthly spot exchange rate)

	D	F	I	NL	B/L	DK	IRL	UK	GR	E	P	USA	C	J	CH	A
D		**3,4***	**3,8***	**1,1***	**1,5***	**1,7***	**3,5***	3,5	**2,8***	**4,5**	**4,9***	3,8*	4,8*	3,8	**3,2***	**0,8***
F	2,0		**2,7***	**3,2***	**3,0***	**2,6***	**3,7***	3,7	3,9	**4,0***	**4,5***	4,3*	5,4*	**4,4***	**3,6***	**3,3***
I	1,5	1,7		**3,3***	**3,2***	**3,4***	2,0	**0,7***	3,0	**4,0***	**4,5***	4,4*	5,5	**4,1***	**3,6***	**3,7***
N	0,3	2,0	1,6		**0,9***	1,4	**3,1***	3,1	**2,2***	**4,1***	**5,1***	3,4*	4,5*	**3,0***	**3,2***	**0,8***
B/L	2,1	1,2	1,6	2,2		**1,4***	**3,0***	**3,0***	**2,4***	**4,3***	**5,0***	3,4*	4,6*	3,5	**3,1***	**1,2***
DK	1,3	1,1	1,4	1,4	1,1		**3,7***	3,7	**2,7***	3,4	**4,2***	3,3*	4,2*	**4,1***	**3,0***	1,4
IRL	1,9	1,6	2,1	1,9	2,3	1,7		**0,0***	**2,9***	**5,0***	**5,8***	4,3*	5,5	3,8	**3,7***	**3,4***
UK	3,9	3,5	3,9	3,9	4,0	3,6	2,9		**2,9***	**5,0***	**5,8***	4,3*	5,5	3,8	3,7	3,4
GR	4,2	4,4	3,8	4,2	4,6	4,2	4,0	3,9		**4,3**	**5,0***	2,6*	3,7	4,2	4,1	**2,5***
E	3,9	2,8	3,1	3,8	3,3	3,4	2,9	3,6	3,5		**4,0***	4,7*	4,9*	5,7	5,2	4,4
P	3,7	2,7	3,1	3,6	3,2	3,3	2,9	4,0	3,8	2,0		5,2*	4,8*	7,1*	5,9*	**4,8***
USA	6,7	7,1	6,6	6,9	7,4	6,8	6,2	6,0	5,2	6,8	7,4		2,0	4,6*	4,5*	3,5*
C	6,6	6,9	6,3	6,7	7,1	6,6	6,1	5,5	4,3	6,4	6,8	2,1		5,8	5,6	4,6*
J	3,1	3,2	2,8	3,3	3,0	2,8	3,3	4,3	5,0	4,6	4,8	6,6	6,4		3,9	**4,1***
CH	1,7	3,0	2,9	1,8	3,1	2,4	2,9	4,5	4,6	4,7	4,4	7,1	7,0	3,4		**3,1***
A	0,1	2,0	1,6	0,4	2,1	1,3	1,9	3,9	4,1	3,9	3,7	6,7	6,6	3,1	1,7	
G1	**2,5**	**3,1**	**3,2**	**2,2**	**2,2**	**2,4**	**3,3**	3,3	3,4	**4,9**	**5,7**	4,5	5,8	**4,6**	**4,1**	**2,4**
	1,5	1,6	1,7	1,6	1,8	1,3	1,9	4,3	4,9	3,9	3,8	8,0	7,7	3,6	3,0	1,6
G2	3,9	**4,0**	**3,8**	3,6	3,7	3,5	**3,4**	3,4	**3,1**	**3,3**	3,7	4,2	4,7	**5,2**	4,7	3,8
	3,9	3,4	3,5	3,9	3,8	3,6	3,2	2,9	2,8	2,3	2,5	6,4	5,8	4,7	4,6	3,9
G3	4,1	4,7	4,7	3,9	3,8	3,9	4,5	4,5	3,5	5,1	5,7	2,2	2,6	3,5	4,7	4,1
	5.5	5,7	5,2	5,6	5,8	5,4	5,2	5,3	4,8	5,9	6,3	2,9	2,8	4,3	5,8	5,5

All numbers are standard deviations (× 100). Columns contain the nominator currencies and rows the denominator currencies of the respective bilateral exchange rates, calculated as cross rates from the bilateral US dollar exchange rates. Standard deviations for the pre-EMS period (August 1971 to February 1979) and an equally long EMS interval (February 1982 to August 1989) are reported above and below the diagonal in the upper part of the table. Numbers in bold face characterize a higher variance of the series prior to the EMS and asterisks indicate the significance of the F-test on a change in the variance between regimes at a one per cent level. The lower part of the table presents unweighted averages of the standard deviations (first pre-EMS, then EMS) of each country's exchange rates relative to the remaining countries in the ERM group (G1), the EC but non-ERM group (G2), and the group of three non-European countries (G3).

the intra-ERM exchange rates and are almost eliminated in the EMS period for the HFL/DM bilateral exchange rate.

(b) The variability of exchange rates between the ERM countries and the remaining EC countries in Table 6.1 is systematically higher than the variability within the ERM. A decline in the variance of medium-term exchange rate changes is only found for the Spanish peseta (PTA) and the Portuguese escudo (ESC) which were subject to extreme fluctuations prior to the EMS. In the latter case all variance reductions are significant at the one per cent level. For the British pound sterling (UKL) and the Greek drachma (DR) the variance of bilateral ERM exchange rates increases during the EMS period, for the latter significantly in most cases. This divergence of exchange-rate performances of ERM and non-ERM currencies points towards potentially high costs in the transition period to monetary union. Furthermore, given that non-ERM exchange-rate variablity during the EMS is — on average — higher than the pre-EMS exchange-rate variability of the ERM currencies, the transition period may endure for some time.

(c) The variance of ERM currencies with respect to the US dollar (USD) increases significantly during the EMS period in all cases. This is largely due to the Federal Reserve's policy of 'benign neglect' for the exchange rate, but also reflects the fact that for the ERM currencies emphasis was placed primarily on internal as opposed to external exchange-rate stabilization. Due to its close link with the US dollar the above result also applies for the majority of exchange rates relative to the Canadian dollar (CAD). With respect to the Japanese yen (YEN), Swiss franc (SFR) and Austrian schilling (OS) the variance of ERM exchange rates declines in many cases, frequently significantly. For the latter two countries these results may be explained by the close links which these countries traditionally have to Germany and, for Austria, by the existence of implicit exchange-rate targets relative to the German mark. For the Japanese yen the decline in exchange-rate variability relative to ERM currencies may partly be attributed to the increased coordination of foreign exchange market interventions among G7-countries after the Plaza agreement.

Table 9.1 therefore strongly supports the view that the EMS over the past decade was successful in reducing internal medium-term exchange-rate variability, whilst at the same time not systematically affecting the external variability of ERM currencies. With respect to the issue of asymmetrical shocks it can be argued that for nominal intra-ERM exchange rates asymmetrical shocks are less important during the EMS period as opposed to the pre-EMS period. This is not true for the four non-ERM currencies of the EMS, where for the United Kingdom and Greece the size of asymmetrical exchange-rate shocks is found to have increased significantly.

A second important issue with respect to exchange rates is whether or not the EMS has recently tightened, in which case nominal exchange rates should have been stabilized significantly in the more recent EMS period. The results for nominal exchange-rate variability are presented in Table 9.2, where the estimates of the short-term variability of bilateral rates above the diagonal are supplemented by the results for the medium-term variability, defined as the change of the logarithm of the spot exchange rate relative to the same month of the year before, and reported below the diagonal. The upper (lower) numbers indicate the unconditional standard deviation of exchange-rate changes in the early (late) EMS) for a subdivision of the sample into two equally long

subsamples (79M3 to 84M5, 81M6 to 89M8). It is found that short-term exchange-rate variability is significantly reduced for all combinations of bilateral rates between Germany, France, The Netherlands and Belgium. Furthermore, an increased short-term variability is reported for most bilateral exchange rates involving Italy, Denmark and Ireland, whereby only for Ireland is this increase statistically significant. Note that this result depends largely on the massive devaluation of the Irish pound in the January 1987 realignment. Medium-term exchange-rate variability is significantly reduced for all bilateral exchange rates between Germany, France, The Netherlands, Belgium and Denmark, but increases insignificantly for most Italian rates and significantly for all Irish bilateral exchange rates. Thus, with the exception of the Irish case, the hypothesis that the EMS has recently tightened is not rejected by the data.

2.1.2. Asymmetries in real exchange rate or competitiveness shocks

Eliminating nominal exchange-rate shocks, as achieved under a monetary union, will also tend to eliminate the variability of real exchange rates if asymmetrical price variability is of minor importance. The evidence on the stabilization effects of the EMS on real exchange rates, calculated

Table 9.2.

Standard deviations of changes in logarithms of bilateral nominal exchange rates, first and twelfth differences (average monthly exchange rates).
Sample periods: 79M3 to 84M5 and 84M6 to 89M8

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		4,2 2,4**	4,1 3,1*	1,9 0,6**	4,4 1,3**	3,7 4,1	3,4** 6,4
France	2,2 1,1**		3,8 3,3	4,3 2,5**	4,7 2,5**	4,5 4,2	3,4** 6,0
Italy	1,2 1,3	1,5 1,7		4,0 3,3	4,8 3,1**	4,2 4,9	3,5** 6,5
Netherlands	0,6 0,2**	2,2 1,2**	1,4 1,4		4,4 1,3**	4,0 4,2	2,8** 6,4
Belgium	2,2 0,5**	1,3 0,9**	1,7 1,3**	2,4 0,5**		4,1 4,1	4,5** 6,3
Denmark	1,5 0,8**	2,2 0,9**	1,6 1,5	1,6 0,9**	2,0 0,5**		4,1** 7,2
Ireland	1,4** 2,1	1,3 1,2	1,3** 2,3	1,3** 2,1	1,9 1,8	2,0 1,8	

The numerical values are standard deviations of changes in bilateral nominal exchange rates relative to the previous month (above the diagonal) and relative to the same month of the previous year (below the diagonal). The first (second) standard deviation in each row applies to the early (late) EMS, with the sample being split in May 1984. The asterisks indicate the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels, respectively.

by using monthly consumer price indices, is reported in Table 9.3 for a medium-term variability measure, defined as the standard deviation of bilateral real exchange rates relative to the same month of the previous year.[5] Compared to the results for nominal bilateral exchange rates in Table 9.1, these findings are more homogeneous within the ERM group, although the reduction of real exchange-rate variability is again not significant for some of the pre-EMS snake participants and increases significantly for the intra-Benelux rate. With respect to the non-ERM ecu currencies in Group 2 and the non-EC currencies in Group 3 the reduction of real as opposed to nominal exchange-rate variability is less frequently statistically significant. This suggests that under the EMS asymmetrical internal competitiveness shocks were considerably smaller than prior to the EMS, whilst for the bilateral rates with respect to the United Kingdom, the United States of America, Canada and Japan such a reduction in the variability of asymmetrical competitiveness shocks is not found.

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[5] This stationarity transformation was chosen to ensure the independence of the results from cross-country differences in the seasonality patterns of the monthly price data.

2.2. Asymmetries in inflation shocks

The empirical evidence on asymmetrical inflation shocks, as measured by the standard deviation of relative consumer price inflation rates $(\pi_t - \pi_t^*)$, is summarized in Table 9.4. The decline in the variability of relative inflation shocks between ERM countries during the EMS period is significant at the one per cent level in all cases. However, as reported earlier by Rogoff (1985), Ungerer et al. (1986) or Collins (1987), there is little difference between ERM and non-ERM countries, and most inflation differentials have declined significantly. Secondly, it is obvious from Table 9.4 that, unlike in the case of nominal and real exchange rates, the standard deviations of these asymmetrical inflation shocks vary considerably among ERM currencies, suggesting that at least part of the inflation shocks are country specific.

This hypothesis is investigated more formally by applying the Aoki factorization of national inflation rates into sums $(\pi_t + \pi_t^*)$ and differences $(\pi_t - \pi_t^*)$ and testing for the significance of the reduction of the variances of both components. These results are reported in Table 9.5 using quarterly instead of monthly consumer price inflation data. Inflation shocks are found to be predominantly symmetrical

Table 9.3.

Standard deviation of changes in the logarithm of the bilateral real exchange rate relative to the same month of the previous year (average monthly exchange rates and consumer price indices).
Sample periods: 72M8 to 79M2 and 82M2 to 89M8

	D	F	I	NL	B/L	DK	IRL	UK	GR	E	P	USA	C	J	CH	A
D		3,4*	3,6*	1,4*	2,2*	1,8*	4,6*	4,0	4,0*	3,6*	3,9	4,0*	4,8	2,9	3,2*	1,2*
F	1,6		2,6*	3,0*	2,8*	3,0*	6,0*	3,2	5,1*	4,0*	3,9*	4,0*	5,1	3,9	3,1*	3,2*
I	1,2	1,9		2,8*	2,4*	3,1*	5,0*	2,2*	4,4*	3,6	4,2*	3,6*	4,9	3,5	3,9*	3,2*
NL	0,5	1,7	1,4		1,2*	1,3	4,3*	3,4	3,7	3,2	3,2	3,2*	4,1	3,0	3,3*	0,9*
B/L	1,9	1,3	1,9	2,1		1,3	4,3*	3,0*	4,0	3,5	3,4*	3,1*	4,1	3,1	3,2	1,4
DK	1,2	1,2	1,5	1,3	1,1		4,1*	3,8	3,1	3,1	3,3*	4,2	3,1	2,8*	1,1	
IRL	2,5	2,1	2,6	2,4	2,9	2,5		4,5*	2,7	4,3*	4,7*	4,3	5,0	4,5	5,0*	4,1*
UK	4,0	3,6	4,2	4,1	4,1	3,9	3,0		4,3	4,4*	4,3	3,4*	4,9	3,7	4,0	3,7
GR	3,0	3,2	2,9	3,1	3,6	3,0	3,3	3,7		3,8*	4,3*	3,4*	4,3	4,1	4,8*	3,6*
E	3,6	2,9	3,4	3,6	3,4	3,3	2,7	3,1	2,9		3,8*	3,9*	4,5	3,6	4,1	3,4
P	3,1	2,3	3,0	3,1	2,9	2,7	2,6	3,6	2,8	1,7		4,0*	4,1*	5,2*	4,2	3,3
USA	6,5	6,4	5,9	6,6	6,8	6,6	5,1	5,8	5,3	5,2	5,5		1,9*	3,5*	4,5*	3,4*
C	6,3	6,5	5,8	6,5	6,8	6,4	5,3	5,5	4,8	5,3	5,6	2,0		4,5*	5,3*	4,2*
J	3,2	3,0	2,8	3,4	2,7	2,8	3,7	4,6	4,3	4,0	3,8	6,6	6,6		3,5	3,1
CH	1,6	2,3	2,3	1,5	2,7	2,1	3,0	4,5	3,4	4,2	3,7	7,0	6,8	3,6		3,1
A	0,5	1,5	1,2	0,5	1,7	1,1	2,5	4,1	3,1	3,5	3,0	6,6	6,5	3,1	1,5	
G1	2,8	3,5	3,3	2,3	2,4	2,5	4,7	4,0	4,6	4,2	4,5	4,3	5,4	4,0	4,1	2,5
	1,5	1,6	1,8	1,6	1,9	1,5	2,5	4,5	3,7	3,8	3,3	7,3	7,3	3,6	2,6	1,5
G2	3,9	4,1	3,6	3,4	3,5	3,5	4,1	3,3	3,1	3,0	3,1	3,7	4,5	4,2	4,3	3,5
	3,4	3,0	3,4	3,5	3,5	3,2	2,9	2,6	2,4	1,9	2,0	5,5	5,3	4,2	4,0	3,4
G3	3,9	4,3	4,0	3,4	3,4	3,5	4,6	4,0	3,9	4,0	4,4	1,8	2,1	2,7	4,4	3,6
	5,3	5,3	4,8	5,5	5,4	5,3	4,7	5,3	4,8	4,8	5,0	2,9	2,9	4,4	5,8	5,4

All numbers are standard deviations (× 100). Columns contain the nominator currencies and rows the denominator currencies of the respective bilateral exchange rates, calculated as cross rates from the bilateral US dollar exchange rates. Standard deviations for the pre-EMS period (August 1971 to February 1979) and an equally long EMS interval (February 1982 to August 1989) are reported above and below the diagonal in the upper part of the table. Numbers in bold face characterize a higher variance of the series prior to the EMS and asterisks indicate the significance of the F-test on a change in the variance between regimes at a one per cent level. The lower part of the table presents unweighted averages of the standard deviations (first pre-EMS, then EMS) of each country's exchange rates relative to the remaining countries in the ERM group (G1), the EC but non-ERM group (G2), and the group of three non-European countries (G3).

with the exception of the German-Italian case in the pre-EMS period (71Q3 to 78Q4), where asymmetrical shocks slightly dominate the symmetrical ones. Furthermore, with the exception of the Danish-French and Danish-Italian cases, the variance of asymmetrical inflation shocks has been significantly reduced under the EMS regime. At the same time, however, the variance of symmetrical inflation shocks declined significantly only for inflation differentials relative to Ireland and increased significantly in the French-German case. The success of the EMS countries in reducing inflation differentials, as reported in Table 9.3, can therefore largely be attributed to their success in reducing the variability of asymmetrical inflation shocks. Finally, Tables 9.4 and 9.5 reveal that during the EMS period asymmetrical inflation shocks have been smaller in size between Germany, The Netherlands, Denmark and Belgium than between these countries and France, Italy or Ireland, implying that further monetary integration between the former snake participants is likely to involve smaller economic costs.

2.3. Asymmetries in money demand and money supply shocks

An issue closely related to the above relative inflation shocks is that of relative monetary shocks. Tables 9.6 and 9.7 report the results for relative money supply shocks, approximated by the monetary base growth differentials, and relative money demand shocks, approximated by real money growth (M1/P) differentials.

A first result from Table 9.6 is that with the exception of Denmark[6] the variance of asymmetrical money supply shocks has been significantly reduced between all ERM countries during the EMS period. This also applies to the

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[6] This result for Denmark is due to the fact that the data used in this study are not adjusted for the institutional changes in Danish monetary policy in recent years. See also Fratianni and von Hagen (1989c) on this point.

Table 9.4.

Standard deviation of changes in the logarithm of the consumer price index relative to the same month of the previous year (average monthly consumer prices, twelfth differences of logarithms of levels).
Sample periods: 72M8 to 79M2 and 82M2 to 89M8

	D	F	I	NL	B/L	DK	IRL	UK	GR	E	P	USA	C	J	CH	A
D		11,5*	22,8*	5,8*	11,8*	13,5*	43,6*	22,1*	27,6*	24,0*	32,2*	11,4*	10,9*	19,7*	8,8*	4,8
F	9,2		14,0*	10,6*	8,2*	8,5	39,1*	17,5*	23,3*	17,7*	22,5	4,4*	4,9*	17,6*	16,6*	9,1
I	14,8	7,8		20,6*	15,7*	14,5*	33,9*	18,7	26,3*	18,3*	19,8	16,2	16,7*	21,0*	27,3*	19,6*
N	4,0	7,3	13,0		8,5*	14,1*	42,8*	18,3*	28,7*	24,8*	31,1*	11,9*	11,2*	19,2*	11,7*	3,8
B/L	6,5	9,1	14,2	6,3		12,8*	39,6*	14,6	26,1*	23,3*	26,9*	10,6	10,1	15,9*	15,1*	8,1
DK	6,4	7,3	11,6	6,0	9,6		36,3*	22,7*	22,8*	14,6	23,5	9,5*	10,2*	17,0*	17,1*	11,9*
IRL	18,9	12,4	10,2	17,4	19,4	15,6		45,4*	29,9*	37,3*	40,0*	41,8*	29,0*	43,7*	41,0*	
UK	13,0	13,0	14,9	12,8	17,4	10,4	15,7		30,8*	29,2*	27,7	19,3*	18,1*	24,3*	26,3*	19,2*
GR	12,8	13,8	16,4	11,7	13,1	12,9	23,1	17,3		24,8	29,7	22,4*	23,4*	18,4*	28,0*	26,4*
E	17,1	10,4	9,3	15,5	15,8	15,2	9,6	17,6	20,7		20,4*	18,5	18,4	26,4*	29,0*	23,2*
P	22,9	20,3	24,0	21,9	19,3	23,7	24,5	28,8	26,0	18,4		23,0	24,1	29,7	35,8*	30,3*
USA	9,9	11,1	14,4	9,7	14,7	8,0	16,0	5,9	15,3	17,2	27,4		4,1*	17,8*	15,7*	10,4*
C	6,4	8,4	13,2	6,1	10,0	6,1	18,2	12,7	12,5	17,9	25,6	9,3		19,4*	16,3*	9,9*
J	5,9	11,1	15,3	5,9	9,7	7,8	19,7	11,3	11,8	18,0	25,2	8,2	8,8		17,9*	17,6*
CH	3,8	11,7	17,2	6,0	7,1	8,6	21,3	15,5	13,1	19,7	23,6	12,1	7,8	7,5		10,6*
A	4,9	10,6	16,2	4,4	6,7	8,4	20,4	15,0	11,9	18,1	22,3	11,5	8,6	5,9	5,3	
G1	18,2	15,3	20,3	17,1	16,1	16,6	39,2	26,6	30,8	26,7	32,8	17,3	17,6	23,2	23,4	16,4
	10,0	8,9	11,9	9,0	10,9	9,4	15,7	16,2	17,3	15,5	26,1	14,0	11,4	12,6	12,6	11,9
G2	26,5	20,3	20,8	25,7	22,7	20,9	38,3	21,9	21,3	18,6	19,5	20,8	21,0	24,7	29,8	24,8
	16,5	14,4	16,2	15,5	16,4	15,6	18,2	15,9	16,0	14,2	18,3	16,5	17,2	16,6	18,0	16,8
G3	14,0	9,0	18,0	14,1	12,2	12,2	36,9	20,6	21,4	21,1	25,6	7,3	7,8	12,4	16,6	12,6
	7,4	10,2	14,3	7,2	11,5	7,3	18,0	10,0	13,2	17,7	26,1	5,8	6,0	5,7	9,1	8,7

All numbers are standard deviations (× 100) of changes in inflation rates between the countries in the corresponding rows and columns. Standard deviations for the pre-EMS period (August 1971 to February 1979) and an equally long EMS interval (February 1982 to August 1989) are reported above and below the diagonal in the upper part of the table. Numbers in bold face characterize a higher variance of the series prior to the EMS and asterisks indicate the significance of the F-test on a change in the variance between regimes at a one per cent level. The lower part of the table presents unweighted averages of the standard deviations (first pre-EMS, then EMS) of each country's inflation differential relative to the remaining countries in the ERM group (G1), the EC but non-ERM group (G2), and the group of three non-European countries (G3).

Table 9.5.

Standard deviations of symmetrical and asymmetrical shocks to consumer price inflation rates (quarterly data).
Sample periods: 71Q3 to 78Q4 and 82Q1 to 89Q2

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		**1,2***	*2,3***	**0,6***	**1,2***	**1,4***	**4,4***
		1,3**	2,2*	1,3	1,7	1,5	4,8**
France	0,8		**1,4***	**1,0***	**0,8***	0,8	**3,9***
	2,1		3,1	1,5	2,3	2,2	5,3**
Italy	1,1	0,6		**2,1***	**1,6***	1,5	**3,4***
	2,4	3,1		2,6	3,3	3,3*	6,3**
Netherlands	0,4	0,7	1,0		**0,9***	**1,4***	**4,3***
	1,6	2,3	2,6		2,0	1,6	4,9**
Belgium	0,7	0,5	0,6	0,6		**1,3***	**4,0***
	1,9	2,6	3,0	2,1		2,3	5,4**
Denmark	0,5	0,8	1,1	0,5	0,7		**3,7***
	1,6	2,3	2,6	1,7	2,0		5,6**
Ireland	1,4	0,9	1,0	1,3	1,0	1,4	
	2,7	3,4	3,7	2,9	3,2	2,8	

The lower (upper) numbers are standard deviations of sums (differences) of changes (Δ_4) in the logs of variables for the countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the shocks between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

majority of symmetrical money supply shocks, which have been reduced drastically. As a result, money supply shocks, which prior to the EMS were relatively large and predominantly symmetrical have become relatively small and predominantly asymmetrical during the EMS. Note that a monetary union, which would eliminate these asymmetrical money supply shocks, may therefore be desirable on these grounds.

According to Table 9.7 the variance of both symmetrical and asymmetrical real money demand shocks has been significantly reduced in the German-Italian case and in all cases involving France and Ireland, which exhibited relatively large variances prior to the EMS. Furthermore, there is no significant change in the variability of relative money demand shocks between the former snake participants Germany, The Netherlands, Belgium and Denmark. Finally, during the EMS the variabilities of asymmetrical and symmetrical money demand shocks are almost equally high in most cases, suggesting that the asymmetrical effects of money supply shocks have been largely offset by the symmetrical effects of relative price shocks. Again, a monetary union, which would render national currencies perfect substi-

tutes and eliminate the asymmetrical component of money demand shocks, may thus be desirable.

2.4. Asymmetries in nominal and real interest rate shocks

The above evidence on asymmetrical monetary shocks, which have important implications for medium-term conduct of monetary policy, has to be supplemented by evidence from interest rates, through which short-term monetary policy is operated. Both relative shocks to short-term money market rates and long-term government bond yields are considered.

For short-term call money interest rates, Table 9.8 reports a significant reduction in the variability of both symmetrical and asymmetrical interest rate shocks for all countries except France and Ireland, where the decline in variability is not significant in some cases. Table 9.8 also indicates that nominal interest rate shocks between ERM countries have been predominantly symmetrical prior to the EMS, with the only exception being the German-Italian and German-Danish interest rate differentials. During the EMS period all interest

Table 9.6.

Standard deviations of symmetrical and asymmetrical shocks to monetary base (M0) growth rates (quarterly data).
Sample periods: 71Q3 to 78Q4 and 82Q1 to 89Q2

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		5,6* 9,5**	6,4** 4,5*	4,3** 5,7**	3,6** 5,5**	8,7** 8,8**	5,1** 5,1**
France	3,5 3,1		8,9** 4,9	7,5** 6,0**	5,9** 7,1**	11,5* 7,9**	7,2** 6,4**
Italy	2,4 2,2	2,8 3,7		4,0** 4,0**	4,0** 2,9**	6,9** 9,4**	3,4** 4,7**
Netherlands	2,6 1,9	3,2 3,4	2,3 2,3		2,4* 3,0**	7,0** 8,8**	3,8** 3,1**
Belgium	1,8 1,8	3,2 2,6	2,0 1,4	1,8 1,7		7,6** 7,7**	2,9** 2,7
Denmark	17,7 17,5	16,2 19,2	17,1 18,1	17,9 17,2	17,9 17,2		7,9** 8,0**
Ireland	2,4 2,5	2,9 3,8	2,0 2,8	2,4 2,5	1,9 2,0	17,3 18,0	

The lower (upper) numbers are standard deviations of sums (differences) of changes (Δ_4) in the logs of variables for the countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the shocks between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) of 1%(**) levels.

Table 9.7.

Standard deviations of symmetrical and asymmetrical shocks to real money (M1/P) growth rates (quarterly data).
Sample periods: 71Q3 to 78Q4 and 81Q3 to 89Q1

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		2,8** 2,4**	1,5** 1,5**	1,1 1,8	1,0 1,3	1,2 1,9	2,1** 2,8**
France	1,0 1,0		2,7** 2,6**	2,7** 2,7**	2,4** 2,7**	2,8** 2,7**	3,1** 3,5**
Italy	0,8 1,0	0,9 0,9		1,7 1,6	1,1 1,5**	1,6 1,9	2,2** 2,8**
Netherlands	1,2 1,6	1,5 1,4	1,5 1,3		1,3 1,5	1,3 2,1	2,0* 3,0**
Belgium	0,9 1,1	0,9 1,1	1,0 0,9	1,4 1,5		1,2 1,7	2,0** 2,7**
Denmark	1,3 1,4	1,3 1,4	1,2 1,4	1,7 1,7	1,4 1,4		1,9 3,2**
Ireland	1,0 1,4	1,2 1,3	1,1 1,3	1,5 1,8	1,3 1,3	1,6 1,6	

The lower (upper) numbers are standard deviations of sums (differences) of changes (Δ_4) in the lqgs of variables for the countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the shocks between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

rate shocks are predominantly symmetrical, and asymmetrical shocks are found to be relatively small in size in most cases. The elimination of the asymmetrical component of interest rate shocks under a monetary union may therefore be expected to affect the overall behaviour of short-term interest rates to only a limited extent.

For long-term nominal interest rates in Table 9.9 the variance of asymmetrical shocks in relation to Germany has been reduced for all ERM countries, and with the exception of France this reduction is statistically significant. A significant increase in the variability of asymmetrical shocks to long-term interest rates is found for the Dutch-French and Dutch-Belgian interest rate differentials, whilst at the same time asymmetrical shocks relative to Germany almost disappear. A second important result from Table 9.9 is that the variability of symmetrical shocks to long-term interest rates declines in none of the cases significantly, but increases significantly in eight cases, mostly in relation to Italy, Belgium and Denmark. Both results together imply that during the EMS period shocks to long-term interest rate differentials are predominantly symmetrical for all countries. Again, the elimination of the asymmetrical component of these shocks may have only minor effects on the overall

behaviour of long-term interest rates, in particular since shocks to long-term rates are more symmetrical than shocks to short-term interest rates.

With both nominal interest rates and inflation rates being dominated by symmetrical shocks during the EMS period, real interest rates, approximated here by the difference between a three-month interest rate and the inflation rate over this time span, may also be expected to be dominated by symmetrical shocks. However, Table 9.10 reveals that during the EMS period this has not been the case in Ireland with respect to shocks to real interest rates, which are found to be predominantly asymmetrical.[7] This asymmetry is likely to be caused by the sharp Irish post-1982 deflation in excess of the nominal interest rate decline. This may also be seen from the highly significant decline in the variances of both symmetrical and asymmetrical real interest rate shocks, which again is more marked for Ireland than for the remaining ERM countries.

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[7] This strong asymmetry in real interest rates between Ireland and the remaining EMS member countries is also reported in Dornbusch (1989), Fig. 6, p. 187.

Table 9.8.

Standard deviations of symmetrical and asymmetrical shocks to nominal short-term interest rates (quarterly data). Sample periods: 72Q1 to 78Q4 and 82Q4 to 89Q3

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		*2,5***	*5,4***	**3,4***	**3,2***	*5,2***	3,0
		*4,7***	*4,8***	**5,5***	**4,2***	*5,0***	5,0*
France	1,6		**3,3***	2,6	1,5	**3,6***	2,3
	2,8		**6,1**	**5,6***	4,7	**6,0***	5,1
Italy	2,4	1,2		**4,3***	**2,8***	**3,9***	**4,2***
	3,6	4,9		**6,6***	**6,3***	**7,5***	6,1
Netherlands	0,6	2,0	2,8		**2,2***	**4,3***	2,7
	1,6	2,4	3,2		**5,7***	**6,6***	**6,1***
Belgium	1,3	1,1	1,6	1,5		**3,7***	2,3
	2,5	3,7	4,5	2,2		**5,9***	5,0
Denmark	2,2	1,8	2,2	2,5	1,7		**4,8***
	3,1	4,2	5,0	2,7	4,0		5,6
Ireland	2,8	2,2	2,1	3,0	2,1	2,1	
	3,6	4,7	5,6	3,3	4,5	5,2	

The lower (upper) numbers are standard deviations of sums (differences) of the levels of the variables for the countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the shocks between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

Table 9.9.

Standard deviations of symmetrical and asymmetrical shocks to long-term interest rates (quarterly data).
Sample periods: 72Q1 to 78Q4 and 82Q3 to 89Q2

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		**1,7**	**4,1****	**1,3****	*1,8**	*2,5***	**2,7****
		2,1	2,2**	**2,3**	*1,7***	*2,1*	3,3
France	1,4		**2,5****	0,6**	0,6	1,2	**1,9***
	2,9		3,5*	1,9*	*1,7***	2,5*	3,4
Italy	2,6	1,5		**2,8**	**2,3***	2,2	**2,6**
	4,1	5,4		3,2	3,5	4,1	4,8
Netherlands	0,2	1,3	2,5		0,7*	1,4	**1,9**
	1,9	3,1	4,3		1,6*	2,4	**3,4**
Belgium	1,2	0,7	1,7	1,1		1,2	**2,0***
	2,8	4,0	5,2	2,9		2,3*	3,3
Denmark	1,7	1,2	2,0	1,5	1,3		**2,1****
	2,9	4,2	5,3	3,0	4,0		3,8
Ireland	1,7	1,3	2,4	1,6	1,3	1,5	
	2,9	4,1	5,2	3,0	4,0	4,1	

The lower (upper) numbers are standard deviations of sums (differences) of the levels of the variables for the countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the shocks between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

Table 9.10.

Standard deviations of symmetrical and asymmetrical shocks to three-month real interest rates (quarterly data).
Sample periods: 71Q3 to 78Q4 and 81Q3 to 88Q4

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		**3,5****	*5,2***	**4,0**	**4,0****	n.a.	*14,3***
		3,9**	*4,3***	6,6**	5,0**	n.a.	*13,4***
France	2,2		**4,3****	**4,3***	**3,6****	n.a.	13,5**
	2,2		7,2**	4,3**	5,1*	n.a.	13,7**
Italy	1,9	2,2		**5,6****	**3,5****	n.a.	12,1**
	2,7	2,5		6,0**	5,9**	n.a.	15,6**
Netherlands	*2,9*	2,7	2,7		**4,3***	n.a.	*14,4***
	2,7	3,0	3,1		6,6**	n.a.	*14,1***
Belgium	1,7	2,2	2,3	2,9		n.a.	13,5**
	3,1	2,8	3,0	3,3		n.a.	14,3**
Denmark	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.
	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.
Ireland	*3,6*	*4,4*	*3,9*	*3,9*	3,7		
	3,1	*2,8*	*3,0*	3,3	4,0		

The lower (upper) numbers are standard deviations of sums (differences) of the levels of the variables for the countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the shocks between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

2.5. Asymmetries in domestic demand and supply shocks

Tables 9.11 and 9.12 report the results for relative supply shocks, approximated by the differentials in the growth of industrial production indices, and relative demand shocks, approximated by the differentials in the growth of retail sales volume indices.

A first result from Table 9.11 is that there is a significant decline in the variability of symmetrical relative supply shocks in the majority of cases (18 out of 21), which reflects the general decline in output growth rates in the 1980s relative to the 1970s also reported in Baxter and Stockman (1989). Furthermore, the variability of asymmetrical relative supply shocks increases in two cases (France-Netherlands and Germany-Ireland) and declines significantly in eight cases (mostly relative to Italy and Belgium). Finally Table 9.11 indicates that relative supply shocks between ERM countries have been predominantly symmetrical both prior to the EMS and during the EMS.[8] Note that this dominance of symmetrical relative supply shocks does not

indicate any immediate need for asymmetrical fiscal stabilization policies under a monetary union.

In Table 9.12 the variability of the proxy for symmetrical domestic aggregate demand shocks declines significantly in eight cases and increases significantly only in one case (Germany-Netherlands). Furthermore, the variability of asymmetrical demand shocks declines in 12 cases and increases in three cases (France, Belgium and Denmark relative to Germany). Finally, during the EMS period aggregate demand shocks are — with the exception of The Netherlands — predominantly asymmetrical in relation to Germany and predominantly symmetrical between the remaining ERM countries. The existence of such asymmetrical domestic demand shocks may therefore require asymmetrical fiscal stabilization policies under a monetary union.

2.6. Asymmetries in real fiscal expenditure shocks

Since in a monetary union the only potentially asymmetrical policy is fiscal policy, it is of interest to analyse to what extent fiscal policy over the past has been dominated by symmetrical or asymmetrical shocks, here approximated by changes in real government expenditure. Table 9.13, which contains the evidence on this point, reveals that the decline

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[8] This result holds for all countries except Denmark, where due to data problems the production index used is defined for animal products only (Source: *OECD Main economic indicators*), whilst for all other countries the index of total industrial production is used.

Table 9.11.

Standard deviations of symmetrical and asymmetrical shocks to industrial production growth rates (quarterly data).
Sample periods: 71Q3 to 78Q4 and 82Q2 to 89Q1

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		1,1	**2,3***	**1,3**	**1,5**	2,3	**1,2****
		4,2**	5,4**	3,7*	4,6**	2,6	4,4**
France	1,3		**1,9***	0,9**	**1,2****	2,6*	1,7
	1,9		5,7**	4,1**	4,9**	2,8**	4,4**
Italy	1,6	1,3		**2,3***	1,9	3,7*	**2,7***
	2,6	2,2		5,2**	6,0**	3,9**	5,5**
Netherlands	1,1	1,6	1,7		1,3	2,3	2,0
	2,7	1,7	2,6		4,5**	2,3	3,9
Belgium	1,1	0,8	1,4	1,3		*3,1***	2,0
	2,1	1,5	2,2	2,0		*3,0***	4,8**
Denmark	*2,0*	*1,8*	*2,6*	*2,2*	*1,8*		2,4
	1,9	*1,3*	*1,5*	*1,8*	*1,4*		3,2**
Ireland	2,2	2,0	2,0	2,2	1,9	*3,0*	
	2,8	2,5	3,2	2,9	2,6	*1,9*	

The lower (upper) numbers are standard deviations of sums (differences) of changes (Δ_4) in the logs of variables for the countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the series between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

Table 9.12.

Standard deviations of symmetrical and asymmetrical shocks to retail sales growth rates (quarterly data).
Sample periods: 71Q3 to 78Q4 and 82Q2 to 89Q1

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		1,0**	1,7	1,2	0,9**	1,3*	1,4
		1,1	**1,8***	1,2*	**1,4**	1,7	1,4
France	*1,6*		1,7**	**1,1**	1,2**	1,4**	1,3*
	1,3		2,0*	1,5*	**1,4**	1,7	1,6**
Italy	*1,9*	0,7		1,8**	1,9**	1,6**	1,7**
	1,3	1,4		2,0**	1,9*	2,5**	2,3**
Netherlands	1,4	0,9	1,0		**1,2**	1,5	*1,7***
	1,6	1,0	1,2		**1,6**	1,9*	*1,4*
Belgium	*1,8*	0,7	0,8	0,9		1,5**	*1,8***
	1,2	1,2	1,4	1,1		1,9	*1,4*
Denmark	*1,9*	0,8	0,9	1,2	0,7		1,8**
	1,3	1,4	1,5	1,2	1,5		1,9
Ireland	1,6	1,0	1,0	1,1	1,0	1,0	
	1,6	1,3	1,5	1,3	1,4	1,5	

The lower (upper) numbers are standard deviations of sums (differences) of changes (Δ_1) in the logs of variables for the countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the shocks between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

in variability of both symmetrical and asymmetrical fiscal shocks during the EMS period is only significant in some of the cases involving Italy or Ireland. Furthermore, predominantly asymmetrical fiscal shocks are found only between Germany on the one side and France and Italy on the other, but the degree of asymmetry between the latter countries and the remaining ERM countries is also relatively high. In absolute numbers, fiscal shocks in relation to France are thereby relatively small, but relatively large in relation to Italy, Belgium and Ireland. For these countries, further fiscal stabilization, that is, a reduction of government spending which largely reduces the need for future tax revenues and inflationary finance, may therefore be called for in the transition to monetary union.

2.7. Asymmetries in real wage and unemployment shocks

The relative developments of national labour markets during the EMS period are examined in Table 9.14 for real wage growth differentials, and in Table 9.16 for unemployment differentials.

In Table 9.14 the variability of asymmetrical real wage shocks between ERM countries has declined significantly in 15 (out of 21) cases and increased significantly in four cases. On the other hand, the variability of symmetrical real wage shocks has declined significantly in 10 cases and increased significantly in three cases. At the same time, a significant increase in the variance of both symmetrical and asymmetrical real wage shocks is found in the German-French, German-Belgian and French-Belgian cases. A combination of national differences in the degree of automatic wage-indexation (Belgium), price controls (France) and trade union bargaining behaviour (Germany) is likely to account for this divergence of real wages. This view is supported by the fact that real wage shocks during the EMS period are predominantly asymmetrical between France, Italy and Belgium on the one side and Germany as well as Ireland on the other. Also note that the only cases where asymmetrical real wage shocks are small both in absolute size and in relation to symmetrical real wage shocks are given by the German-Dutch-Danish combinations of real wage growth differentials. This suggests that the wage-price mechanisms of these three countries are similar in structure, and that for

Table 9.13.

Standard deviations of symmetrical and asymmetrical shocks to real government expenditure growth rates (quarterly data).
Sample periods: 71Q3 to 78Q4 and 81Q3 to 88Q4

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		**2,0**	**5,7**	2,0	4,1	n.a.	**4,5**
		2,2	**6,6****	3,2	4,4	n.a.	**7,4****
France	*1,9*		**5,7**	1,8	3,6	n.a.	**5,5****
	1,8		**6,0****	2,0*	3,9	n.a.	**6,1**
Italy	*3,8*	3,0		**5,5***	***7,2***	n.a.	**6,2****
	3,5	3,4		**6,6**	***6,6***	n.a.	**9,8****
Netherlands	2,2	2,1	3,4		***4,3***	n.a.	**5,2****
	3,3	2,2	4,2		***3,9***	n.a.	**6,8***
Belgium	4,2	4,1	5,1	4,3		n.a.	**6,4***
	4,8	4,3	5,4	5,0		n.a.	**7,3**
Denmark	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.
	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.
Ireland	3,6	3,2	3,8	2,9	4,2	n.a.	
	3,9	3,4	5,3	4,7	6,1	n.a.	

The lower (upper) numbers are standard deviations of sums (differences) of changes (Δ_4) in the logs of variables for the countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the shocks between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

Table 9.14.

Standard deviations of symmetrical and asymmetrical shocks to real wage growth rates (quarterly data).
Sample periods: 71Q4 to 78Q4 and 82Q1 to 89Q1

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		**0,9****	**1,7***	**1,2****	**0,7***	***1,6****	**5,1****
		0,5**	**1,7****	1,4	**0,6****	*1,5*	**4,8****
France	*1,6*		**1,6**	1,2	0,7*	1,2*	**4,7****
	1,1		**1,8**	1,4	0,8**	1,9	**5,2****
Italy	*1,3*	1,4		**2,1****	**1,5****	**2,0****	**4,6****
	1,0	1,4		***1,9****	**1,8****	**2,4****	**5,7****
Netherlands	0,6	1,3	1,1		***1,6****	**1,3****	**5,1****
	1,4	1,3	1,1		***0,9***	**2,3****	**5,0****
Belgium	*1,2*	1,1	1,0	1,0		*1,6***	**4,8****
	1,0	1,5	1,2	1,0		***1,5***	**5,1****
Denmark	0,8	1,4	1,3	0,8	1,2		**4,6****
	1,7	1,6	1,3	1,5	1,3		**5,6****
Ireland	1,2	*2,0*	*2,0*	1,5	*1,8*	1,6	
	2,1	*1,8*	*1,5*	1,8	*1,6*	2,0	

The lower (upper) numbers are standard deviations of sums (differences) of the changes (Δ_4) in the logs of variables for the countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the shocks between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

the remaining ERM countries asymmetries in wage-price adjustments may increase as the EMS moves toward monetary union.

Since real wages — together with real interest rates — are important from the point of view of optimal currency area theory, it may be informative to check whether the symmetrical or asymmetrical real wage behaviour is 'Granger caused' by symmetrical or asymmetrical monetary or fiscal policies. Empirically such 'Granger causality' tests are carried out by running three vector autoregressions for the differences (or sums) of real wage growth w_t of the form

$$w_t = a_0 + \sum_{i=1}^{n} a_i w_{t-i} \qquad (1)$$

$$w_t = a_0 + \sum_{i=1}^{n} a_i w_{t-i} + \sum_{j=1}^{s} a_j m_{t-j} \qquad (2)$$

$$w_t = \beta_0 + \sum_{i=1}^{n} \beta_i w_{t-i} + \sum_{j=1}^{s} \beta_j f_{t-j} \qquad (3)$$

and computing F-tests or likelihood-ratio tests for the joint significance of the differentials (or sums) of the changes in monetary (m_t) or fiscal (f_t) policy variables in the second or third regression equation. Since the distributions of these test statistics are well known, their corresponding marginal significance levels can be calculated from the F-distribution or the χ^2-distribution, respectively.

The evidence from these vector autoregressions of changes in real wages on four own lags ($n=4$) and four lags ($s=4$) of a monetary policy variable (change in real base money growth) or a fiscal policy variable (change in real government expenditure) is reported in Table 9.15 and may be summarized as follows: asymmetrical real wage behaviour be-

tween France on the one side and Germany and The Netherlands on the other is 'Granger caused' by both asymmetrical fiscal and monetary policy, whilst between Italy and the latter countries only asymmetrical fiscal policy matters. Asymmetrical fiscal policy also significantly contributes to explaining asymmetrical real wage behaviour in the German-Belgian case, and for most cases in relation to Denmark asymmetrical monetary policy matters. The latter result may be explained by the fact that the Danish monetary policy reforms in 1985 coincided with a strong government interference in the two-year wage negotiations by enforcing strict upper limits for wage increases. With respect to European monetary integration, Table 9.15 suggests that the elimination of asymmetrical monetary policies under a monetary union may contribute to reducing some of the real wage asymmetries between ERM countries. However, in the French, Italian and Belgian cases relative to Germany a further harmonization of fiscal policies appears to be at least equally important in order to reduce real wage asymmetries.

The above evidence on labour market asymmetries as reflected in real wage asymmetries is supported by the evidence from Table 9.16 regarding relative unemployment shocks between ERM countries. Note that unemployment shocks, which between all countries were predominantly symmetrical prior to the EMS, have remained symmetrical between the former snake participants Germany, The Netherlands, Belgium and Denmark, but have become primarily asymmetrical between these countries and France, Italy and Ireland. This is due to the fact that in the former snake group the variability of both asymmetrical and symmetrical unemployment shocks has been reduced significantly. However, for the remaining countries only the variance of symmetrical unemployment shocks has been reduced significantly, whilst the variances of asymmetrical unemployment shocks have remained unchanged or have increased significantly. Therefore, to the extent that political action in response to unemployment shocks is considered to be desirable, the above results may point towards a need for asymmetrical fiscal stabilization policies in a monetary union.

Table 9.15.

Granger causality test results for real wage growth dependence on monetary policy shocks (changes in real base money) or fiscal policy shocks (changes in real government expenditure) (quarterly data) 71Q1 to 88Q2, $m = n = 4$

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		**0,988***	**0,021**	0,664	**0,887**	0,981*	0,336
		0,984*	**0,981***	0,284	**0,982***	n.a.	0,620
France	**0,922**		0,985*	0,996**	0,914	1,00**	**0,262**
	0,985*		0,694	0,979*	0,869	n.a.	**0,654**
Italy	**0,912**	0,214		0,741	0,793	0,794	**0,360**
	0,607	0,998**		0,988*	0,707	n.a.	**0,641**
Netherlands	0,532	0,416	0,341		0,721	0,994**	0,748
	0,997**	0,171	0,026		0,574	n.a.	0,641
Belgium	**0,927**	0,390	0,458	0,554		1,00**	**0,111**
	0,707	0,111	0,908	0,895		n.a.	**0,289**
Denmark	0,988*	0,947	0,995**	0,998**	0,998**		1,00**
	n.a.	n.a.	n.a.	n.a.	n.a.		0,874
Ireland	0,722	**0,345**	**0,936**	0,243	**0,436**	0,874	
	0,651	**0,739**	**0,824**	0,884	**0,862**	n.a.	

The numerical values are the marginal significance levels of the likelihood-ratio tests. λ_1 for the differences (above the diagonal) and λ_2 for the sums (below the diagonal) test the joint significance of four lagged changes (Δ_1) of the policy variables in the AR (4) autoregression of real wage growth (Δ_4). The upper (lower) likelihood-ratio tests are for the monetary (fiscal) policy shocks of the two countries in the rows and columns. Asterisks indicate the significance of these tests at 5%(*) or 1%(**) levels, respectively. Bold numbers mark predominantly asymmetrical real wage behaviour from Table 9.14.

Table 9.16.

Standard deviations of symmetrical and asymmetrical shocks to standardized unemployment rates (quarterly data).
Sample periods: 71Q3 to 78Q4 and 81Q3 to 88Q4

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		0,6**	1,2	0,4**	**1,2**	**1,4***	3,2
		2,3**	1,8**	2,9**	**3,4***	**3,9***	5,7**
France	1,3		**0,8**	0,8**	1,2*	1,7	3,5**
	1,3		1,6	2,6**	3,2**	3,6**	5,4**
Italy	*1,5*	0,6		1,3*	1,7	2,3	4,1**
	1,3	2,1		2,1**	2,8**	3,1**	4,9*
Netherlands	0,7	*1,8*	2,0		0,9*	**1,2***	2,9
	1,8	*1,2*	1,0		3,7**	**4,2***	6,0**
Belgium	0,9	*1,7*	1,9	0,7		0,9	2,6
	1,4	*0,9*	0,7	1,9		4,8**	**6,5***
Denmark	0,9	*1,9*	2,0	0,6	0,8		2,1**
	1,6	*0,8*	0,8	2,0	1,7		**7,0***
Ireland	2,7	1,8	1,8	*3,3*	*3,3*	3,4	
	3,0	3,7	3,8	*2,6*	*2,4*	2,3	

The lower (upper) numbers are standard deviations of sums (differences) of the levels of the variables for the two countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks, bold numbers mark a reduction in the variability of the shocks between the first and the second subperiod, and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

2.8. Asymmetries in external balance or current account shocks

The final point to be considered here concerns relative external balance or current account shocks between ERM countries. The evidence for differentials of current account indices (71Q2 = 100) in Table 9.17 suggests that during the EMS period the variability of both symmetrical and asymmetrical shocks to external balances has significantly increased. Furthermore, whilst current account shocks in the majority of cases are predominantly asymmetrical in the pre-EMS period, they tend to be more symmetrical during the EMS period. This is due to the fact that, on average, the variance of symmetrical current account shocks increased by a larger proportion than the variance of asymmetrical shocks. This increased variability and divergence between the external accounts of ERM countries represents a potential source of instability within the ERM and realignments in the period up to monetary and economic union may be crucial for the reversal of the process. This is supported by the fact that both real exchange-rate (competitiveness) shocks and relative domestic supply shocks are found to be predominantly symmetrical and therefore unlikely to contribute to a reversal of current account developments.

3. Summary and conclusions

In this study it has been argued that in the transition period to economic and monetary union the loss of the nominal exchange rate as a policy instrument is of major importance only to the extent that relative shocks are predominantly asymmetrical. The relevance of this proposition for the present EMS system has been examined empirically by applying the Aoki factorization of domestic and foreign variables into independent systems of sums and differences of their national counterparts for a variety of macroeconomic time series. The findings from this analysis are summarized below.

Firstly, the behaviour of nominal and real exchange rates, nominal interst rates, relative inflation rates and current accounts has been dominated by symmetrical shocks. However, whilst the variances of shocks to nominal exchange rates, relative inflation rates and international competitiveness have declined under the EMS, the variance of shocks

Table 9.17.

Standard deviations of symmetrical and asymmetrical shocks to current account indices (quarterly data).
Sample periods: 71Q3 to 78Q4 and 81Q3 to 88Q4

	Germany	France	Italy	Netherlands	Belgium	Denmark	Ireland
Germany		8,2**	14,1**	6,4**	5,0**	5,1**	n.a.
		9,1**	9,5**	5,2**	6,2**	5,8**	n.a.
France	18,2		9,2**	6,4**	7,6**	7,5**	n.a.
	26,7		15,6**	8,2**	6,8**	6,6**	n.a.
Italy	35,4	28,3		9,2**	12,0**	11,1**	n.a.
	35,1	39,5		12,8**	9,9**	10,7**	n.a.
Netherlands	18,0	15,3	28,8		4,1**	3,1**	n.a.
	17,5	16,5	33,4		2,2*	2,9**	n.a.
Belgium	14,4	13,3	29,8	6,7		2,7**	n.a.
	20,7	18,4	32,7	7,4		2,3**	n.a.
Denmark	15,8	14,4	31,0	6,4	5,1		n.a.
	18,6	16,4	30,9	4,6	6,5		n.a.
Ireland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

The lower (upper) numbers are standard deviations of sums (differences) of the level indices of the variables for the two countries in the rows and columns. Results are reported for both the pre-EMS (above the diagonal) and EMS (below the diagonal) period. Italic numbers indicate predominantly asymmetrical shocks and asterisks characterize the significance of the heteroscedasticity test at 5%(*) or 1%(**) levels.

to external balances has increased. Since current external balances form an important indicator of the compatibility of macroeconomic performances with greater exchange-rate stability, this current account externality of the EMS is a serious obstacle to further monetary integration. Furthermore, it suggests that relative inflation rates and competitiveness have not moved sufficiently in the right direction to avoid current account imbalances, and supplementary asymmetrical fiscal or supply side politics may be needed to achieve the necessary reversal of current external balance developments before moving to economic and monetary union.

Secondly, whilst during the EMS period relative inflation rates are clearly dominated by symmetrical shocks, real wages exhibit a relatively large proportion of asymmetrical shocks. This suggests that substantial differences in the degree of wage moderation in response to deflation have remained during the EMS period. In addition, relative unemployment shocks, which prior to the EMS were predominantly symmetrical, are found to be primarily asymmetrical during the EMS period. This result, however, does not apply to relative unemployment shocks between the former snake participants Germany, The Netherlands, Belgium and Denmark, which after 1982 experienced predominantly symmetrical unemployment shocks and relatively moderate and quite symmetrical price and wage inflations. When judged on the basis of these relative labour market developments a monetary union between the former snake participants is therefore likely to be achievable at the cost of smaller labour market distortions. Furthermore, it has been shown that asymmetrical fiscal policies significantly contributed to asymmetrical real wage behaviour between the three major ERM participants (France and Italy on the one side and Germany on the other). More symmetrical real wage behaviour between these countries is therefore likely to require further harmonization and coordination of fiscal policies.

Thirdly, the predominantly symmetrical behaviour of inflation rates is found to coincide with predominantly symmetrical domestic demand and supply shocks. The decline in the variability of asymmetrical demand and supply shocks during the EMS period is thereby consistent with the general decline of output growth rates and the increased synchronization of business cycles across most industrialized countries. It is important to note that the only asymmetrical behaviour of domestic demand shocks is found for Germany and may

largely be attributed to the strong performance of the German economy. In addition, this asymmetry in domestic product demand is not inconsistent with the asymmetry in external demand for German products, which largely explains the massive current account surplus of Germany. To eliminate such asymmetries before moving to economic and monetary union, ERM countries may have to pursue asymmetric domestic policies which improve their price and cost competitiveness.

Finally, relative money supply shocks are found to be predominantly asymmetrical, and money demand shocks also exhibit a relatively large proportion of asymmetry. It is important to note that these asymmetrical shocks would be eliminated under a monetary union with perfect capital mobility and currency substitution. The existence of asymmetrical monetary shocks may therefore provide a rationale for further monetary integration since they prevent an efficient international coordination of monetary policies. On the other hand, asymmetrical monetary shocks may simply be a reflection of asymmetries in the conduct of monetary policies within the EMS, which are studied in Weber (1990b). Note, however, that such 'asymmetries' in 'shocks' and 'policies' cannot really be separated, either analytically or empirically, without an elaborate theoretical model, which, unfortunately, is often impossible to test econometrically.

With respect to future research it should be noted that in view of the above limitations the present study may only be viewed as a first attempt to 'make the data talk' on the relevance of 'asymmetrical shocks' within the EMS. These 'asymmetries in shocks' to major macroeconomic variables are thereby based on admittedly crude approximations of the 'shocks', which are nevertheless defendable given the fact that less erratic time series (low variance) are more easily predicted (low error or 'shock' variance), regardless of the prediction methods employed. However, the use of conditional rather than unconditional variances, for example by estimating Arima time series models or structural regression models for each of the relevant national variables and their 'symmetrical' (sums) and 'asymmetrical' (differences) components, may be viewed as a next step. This would also allow to separate identification of transitory and permanent shocks, whereas this study focuses primarily on the latter by taking the appropriate differences (first or fourth differences in the case of seasonality) of the levels of the original series.

Appendix

Data descriptions

Monthly data

Exchange rates	*IMF — International financial statistics*, l. rf.
Foreign exchange reserves	*IMF — International financial statistics*, l. 1 d.d.
Consumer price indices	*IMF — International financial statistics*, l. 64; exceptions: for Ireland and Spain data on wholesale price indices from *IMF — International financial statistics*, l. 63, were used.

Monthly and quarterly data

Interest rates:

Call money rates	*IMF — International financial statistics*, l. 60 b; exceptions: for Ireland and Greece data from *OECD — Main economic indicators* were used.
Three-month rates	*OECD — Main economic indicators*; exception: for Italy a six-month rate was used.
Three-month Euromarket rates	*IMF — International financial statistics*, l. 60 ea.
Government bond rates	*IMF — International financial statistics*, l. 61.

Monetary aggregates:

Base money	*IMF — International financial statistics*, l. 14.
Narrow money (M1)	*OECD — Main economic indicators*, index (1985 = 100) of seasonally adjusted money.
Quasi-money (M2, M3)	*OECD — Main economic indicators*, index (1985 = 100) of seasonally adjusted quasi-money.

Quarterly data

Wages	*OECD — Main economic indicators*, index (1985 = 100) of hourly rates in industry or manufacturing.
Industrial production	*OECD — Main economic indicators*, index (1985 = 100) of seasonally adjusted total industrial production; exception: for Denmark an index of industrial animal products was used.
Retail sales	*OECD — Main economic indicators*, value index (1985 = 100) of seasonally adjusted total retail sales.
Unemployment rates	*OECD — Main economic indicators*, seasonally adjusted standardized unemployment rate.
Government expenditure	*IMF — International financial statistics*, l. 82; exception: for France data from *OECD — Main economic indicators* on seasonally adjusted real (1980 = 100) government expenditure were used.
Current account balance	*OECD — Main economic indicators*, billions of national currency units. To facilitate a comparison this series was transformed into an index series (71Q2 = 100).

References

Artis, J. M. (1987), 'The European monetary system. An evaluation', *Journal of policy modelling*, 9, pp. 175-98.

Artis, M. and Taylor, M. P. (1988), 'Exchange rates, interest rates, capital controls and the European Monetary System: assessing the track record', in: Giavazzi, F., Miccossi, S. and Miller, M., eds, *The European Monetary System*. Cambridge University Press.

Baxter, M. and Stockman, A. (1989), 'Business cycles and the exchange rate regime: some international evidence', *Journal of monetary economics*, 23, pp. 377-400.

Claassen, E.-M. (1988), 'IMS, EMS, and the (N-1) problem', in: Gebauer, W., ed., *Geld und Währung*, Working Paper No 9, University of Frankfurt.

Cohen, D. and Wyplosz, C. (1989), 'The European monetary union: an agnostic evaluation', CEPR Discussion Paper No 306, April 1989.

Collins, S. M. (1987), 'Inflation and the EMS' (Mimeo), Paper presented at the Conference on the EMS, Perugia, October 1987.

De Grauwe, P. (1988), 'Is the European Monetary System a DM-zone?' CEPS Working Document No 39.

Dornbusch, R. (1989), 'Credibility, debt and unemployment: Ireland's failed stabilization', *Economic policy* (April 1989), pp. 173-209.

Fischer, S. (1988), 'Monetary policy and performance in the US, Japan and Europe, 1973-86', *Finanzmarkt und Portfolio Management*, 2, pp. 8-25.

Fratianni, M. and von Hagen, J. (1989a), 'Asymmetries and realignments in the EMS', Indiana University Discussion Paper 429.

Fratianni, M. and von Hagen, J. (1989b), 'German dominance in the EMS: evidence from interest rates', Indiana University Discussion Paper 430.

Fratianni, M. and von Hagen, J. (1989c), 'The European Monetary System: 10 years after', Bradley Policy Research Center, Carnegie-Rochester Public Policy Conference (April 1989).

Giavazzi, F. (1988), 'Incentives to fix the exchange rate', *European economic review*, 32, pp. 382-87.

Giavazzi, F. (1989), 'The exchange rate question in Europe' (Mimeo).

Giavazzi, F. and Giovannini, A. (1987), 'The EMS and the dollar', *Economic policy* (October 1987), pp. 456-85.

Giavazzi, F. and Giovannini, A. (1988), 'Can the European Monetary System be copied outside Europe? Lessons from 10 years of monetary policy coordination in Europe', National Bureau of Economic Research, NBER Working Paper No 2786.

Giavazzi, F. and Pagano, M. (1985), 'Capital controls and the European Monetary System (Occasional Paper), in: *Capital control and foreign exchange legislation*. Euromobiliare, Milan.

Giavazzi, F. and Pagano, M. (1988), 'The advantage of tying one's hand, EMS discipline and central bank credibility', *European economic review*, 32, pp. 1055-82.

Giovannini, A. (1988), 'How do fixed exchange rate regimes work: the evidence from the gold standard', Bretton Woods and the EMS, National Bureau of Economic Research, NBER Working Paper No 2766.

Goldfeld, S. M. and Quandt, R. E. (1965), 'Some tests for homoscedasticity', *Journal of the American Statistical Association*, 60, pp. 539-47.

Gros, D. and Thygesen, N. (1988), 'The EMS: achievements, current issues and directions for the future' (Mimeo), Centre for European Policy Studies.

Lucas, R. E. (1976), 'Econometric policy evaluation: a critique', in: Brunner, K. and Meltzer, A. H., eds, *The Phillips curve and labor markets*, Carnegie-Rochester conference series on public policy, 1, pp. 19-46.

Rogoff, K. (1985), 'Can exchange rate predictability be achieved without monetary convergence: evidence from the EMS', *European economic review*, 28, pp. 93-115.

Ungerer, H., Evens, O. and Nyberg, P. (1983), 'The European Monetary System: the experience, 1979-82', IMF Occasional Paper No 10.

Ungerer, H., Evans, O., Mayer, T. and Young, P. (1986), 'The European Monetary System: recent developments', IMF Occasional Paper No 18.

Van Ypersele, J. (1984), *The European Monetary System: origins, operation and outlook*, The *European Perspectives* series. Commission of the European Communities, Brussels.

Weber, A. A. (1988), 'The credibility of monetary policies, policymakers' reputation and the EMS hypothesis: empirical evidence from 13 countries', Centre of Economic Research Discussion Paper 8803, Tilburg University, The Netherlands.

Weber, A. A. (1990a), 'Credibility, reputation and the conduct of economic policies within the European Monetary System', *Volkswirtschaftliche Diskussionsbeiträge* No 11-90, University of Siegen, Germany.

Weber, A. A. (1990b), 'Symmetries in the conduct of monetary policies in the European Monetary System: some empirical evidence' (Mimeo).

Wyplosz, C. (1987), 'Capital flow liberalization and the EMS: a French perspective', *European Economy*, 36.

Wyplosz, C. (1988), 'Monetary policy in France: Monetarism or Darwinism', *Finanzmarkt und Portfolio Management*, 2, pp. 56-67.

Wyplosz, C. (1989a), 'Asymmetry in the EMS: international or systemic?', *European economic review*, 33, pp. 310-26.

Wyplosz, C. (1989b), 'EMS puzzles' (Mimeo), December 1989.

10. Alternative exchange rate regimes: the role of the exchange rate and the implications for wage-price adjustment

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1. Introduction

European monetary union (EMU) has many advantages. Full monetary integration will undoubtedly reduce transactions costs in Europe. It may also provide a basis for enduring price stability. And, while the elimination of nominal exchange rate uncertainty does not in itself remove all real exchange rate uncertainty, there is ample evidence that more freely floating nominal exchange rates may be associated both with substantial medium-term misalignment and with speculative bubbles which can persist long enough to do serious damage to the real economy. To this extent, EMU might also underwrite the success of the 1992 programme for integration of product and labour markets in the Community.

If these benefits of EMU came free, we would all be quick to seize the opportunity. But we must also recognize some potential disadvantages. A common monetary policy implies the loss of national sovereignty over monetary policy. This is not a cost for existing ERM members who, in agreeing to dismantle controls on capital movements, have effectively committed themselves to this course in any case.

Other points to be addressed before clear acceptance of EMU include the danger that national fiscal policies create incentives for a collective European monetization. In my view much the most attractive way in which to dispose of this difficulty is to prevent those setting Europe's monetary policy from monetizing deficits, rather than to constrain the autonomy of national fiscal authorities. These and other difficulties are dealt with by other contributors to this report.

The task I set myself is very simple, and the question may be formulated as follows. Suppose the balance of all the other arguments led to a clear wish for EMU. Could the loss of exchange-rate adjustment as a macroeconomic option be sufficiently disadvantageous to cause us to reverse our overall judgement?

My answer proceeds in the following stages. First, we need a framework in which to think through these complex issues. I present a simple model of partially integrated economies;

it includes several Member States and the rest of the world. Importantly, it has a smart, forward-looking private sector that understands the consequences of the policy regime in which they live. The model can be used to contrast the ERM with EMU.

Next, I ask a very simple question. What is the long-term equilibrium in this model? Specifically, within EMU will market forces eventually get us back to equilibrium or must some other policy compensate for the loss of the exchange-rate instrument? If so, what can that policy be?

Then I examine dynamic adjustment ot the long-term equilibrium, contrasting EMU and the ERM. I characterize the speed of adjustment both of Europe as a whole and of individual Member States relative to the Community average. Within this framework, I can characterize both the extent to which the private sector 'compensates' for the loss of exchange rate adjustment, and the effects of other policies (such as fiscal policy) on dynamic behaviour.

The underlying dynamics can be derived in a world without shocks, and they are of great importance. But the extent to which shocks have an impact on the system is of equal significance. The next section contrasts ERM and EMU in the extent to which they allow shocks to have an impact on the system, and in the way that their impact is then digested as the system works its way back towards long-term equilibrium.

These results are all obtained within a coherent theoretical framework. It is possible to put empirical estimates on the critical parameters and hence calibrate the importance of different effects.

Other approaches may complement the approach I pursue here. It is possible both to examine reduced form relationships directly from the data and to simulate existing macroeconometric models linking national economies. But for the purpose at hand, there are profound advantages in a tractable theoretical model whose foundations are robust to the regime change being contemplated.

2. An outline of the model

Full details of the model and its solution are contained in the Appendix. The model has n countries within the Community and a sector representing the rest of the world (ROW). The latter is assumed to be in long-term equilibrium throughout. We are mainly interested in the European countries.

In each country there are overlapping wage contracts, as in Taylor (1979). Forward-looking wage-setters set wages to reflect prices over the contract life. Real wages also grow with underlying productivity. Over the business cycle, real wages vary procyclically in line with deviations of current output from potential output. Potential output grows steadily over time. Prices are a mark-up on unit labour costs (wages adjusted for trend productivity). Aggregate demand comprises the trade surplus and domestic absorption. The trade balance in each Member State depends on competitiveness, both relative to other Member States and relative to the ROW, and on outputs (relative to capacity) at home and abroad. Domestic absorption is driven by fiscal policy and real interest rates, and a wealth effect of the real balance type.

In each country, fiscal variables grow in line with trend output, and partially accommodate deviations of output from potential. The latter need not be conscious discretionary policy; it will arise in any case from the operation of the automatic stabilizer provided by the tax and transfer system.

The demand for money recognizes the possibility of currency substitution in Europe; we are talking about a comparison of the ERM and EMU after capital controls have been removed, not a historical account of the ERM in the presence of captial controls. In EMU there is a single money, and currency substitution is complete: the common European interest rate depends only on aggregate European variables: money, output, and prices.

I characterize the ERM as follows. Each country has a parameter Q describing the extent to which its exchange rate accommodates competitiveness changes. When $Q = 0$ we have zero accommodation, and complete nominal exchange-rate fixity. As Q increases towards unity, competitiveness is increasingly stabilized. If shocks to competitiveness came only from differential inflation, $Q = 1$ would correspond to a crawling peg enforcing purchasing power parity.

I also use Q to index the degree of currency substitution. When $Q = 1$, everyone knows that all shocks will be accommodated in the exchange rate. National money demands then depend only on variables of that country; money demands are competely segregated. As Q falls towards 0, interest rates in say Germany depend increasingly not only on German money supply, output and prices, but also on the same variables in other Member States. Note that endogenizing currency substitution in such a way is essential for any intelligent comparison of EMU with a gradually tightening EMS; otherwise, we have the unappealing situation where national money demands depend only on national variables,

no matter how tight the EMS, but suddenly we have a single money demand in the Community when EMU is adopted.

In EMU, the European system of central banks sets the joint money supply; its division between hypothetical national currencies is irrelevant since currency substitution is complete and they all have the same interest rate. In the ERM, I assume that the Bundesbank sets the German money supply and all other central banks set national money supplies to enforce the desired degree of accommodation Q in the presence of interest parity and complete capital mobility.

I assume that the monetary authority (the Bundesbank in the EMS or the European system of central banks under EMU) credibly pursues a tough monetary policy: it accommodates real shocks but not nominal shocks. Thus, under EMU the Community money supply increases with Community output, and accommodates any shocks to the Community demand for real money balances. Under the EMS two versions of Bundesbank policy may be contemplated. In the first, the German money supply responds only to German real output and German money demand shocks; in the second, knowing how other Member States will have to set their money supplies to achieve the exchange-rate objectives in the presence of interest parity, the Bundesbank chooses the German money stock in such a way that the Community money supply accommodates only Community real output and overall shocks to Community money demand.

For the Community as a whole, the exchange rate floats against the rest of the world. Given the Community monetary policy, under either EMU or the EMS, the Community's behaviour against the rest of the world then is analogous to the usual analysis of a small open economy in a Dornbusch-type model with overlapping wage contracts.

That completes the description of the model. I now turn to what we can learn from it.

3. Long-term equilibrium

In long-term equilibrium there is internal and external balance. Internal balance means each Member State's output equals underlying supply (growing steadily over time). External balance means the trade account is in balance (abstracting from external debt, or assuming the real interest rate is negligible). Hence, domestic demand equals potential output in each country.

If all countries have the same underlying productivity growth rate, the real exchange rate must be constant. Since the

Community monetary policy does not accommodate European nominal variables, all European nominal variables are constant. If the rest of the world has permanent inflation, the Community's external exchange rate is changing at the same rate.

3.1. Long-term equilibrium in EMU

In EMU the internal nominal exchange rate is permanently fixed. If internal competitiveness can be subject to a permanent shock for some reason, the real exchange rates of Member States must be able to offset this. Since this cannot be achieved by the nominal exchange rate, it must be achieved by relative prices in long-term equilibrium. Anything that makes Germany permanently more competitive than France must be offset by a permanent reduction in French prices relative to those in Germany.

Now consider internal balance. Nobody has any inflation and nominal interest rates are the same throughout the Community; real interest rates are the same throughout the Community. In each country domestic demand (absorption) must equal domestic potential output. Each country's fiscal policy grows with its potential output and responds to deviations of output from potential. Suppose that is all that fiscal policy does: there is no attempt at cross-country fiscal coordination. Let each country be subject to a permanent shock to domestic absorption. Since there is a wealth effect, with lower domestic prices boosting domestic demand, it is possible to choose the long-term equilibrium price level in each country to ensure that domestic demand equals potential output.

But now we have a contradiction. If prices (and hence wages too) are to perform the job of correcting for permanent disturbances to domestic demand for output, they cannot independently do the job of correcting for permanent shocks to competitiveness between Member States. Since it is only relative prices which can fulfil that latter role in a monetary union, some other policy is required to take care of domestic demand in long-term equilibrium, and that policy has to be fiscal policy. To sum up, permanent shocks to relative domestic demand will have to be offset by permanent changes in relative fiscal policies.

This could be achieved by explicit coordination of fiscal policies, but this is not necessary. It would suffice for each country to let fiscal policy accommodate its own permanent shock to domestic demand. However this cannot be achieved by some simple dependence of fiscal policy on domestic prices, for these must still perform the independent role of ensuring external balance.

3.2. Long-term equilibrium under the EMS

Suppose German monetary policy accommodates only real German growth and other countries set national money supplies to ensure that the nominal exchange rate against Community partners accommodates some fraction Q of competitiveness changes coming from relative price differences or real shocks. $Q = 0$ corresponds to the case of EMU discussed above.

Suppose $Q = 1$, a pure crawling peg and arguably not very different from the very early years of the EMS. It turns out that tough German policy is sufficient to tie down constant nominal values throughout the Community. Although other countries pursue PPP (purchasing power parity), the presence of the wealth effect in their domestic demand equations is sufficient to tie down their individual price levels. With $Q = 1$ the long-term exchange rate is realigned in the presence of any permanent real shocks to competitiveness, so there is now no need for fiscal policy independently to achieve that goal. Domestic prices can take care of permanent shocks to domestic demand. It appears that this exchange-rate regime makes no demands on fiscal policy in the long run.

But this argument needs closer investigation. With discrepancies in the permanent components of different countries' domestic demands (for which we get no adjustment from relative interest rates in the steady state: exchange rates are constant and interest parity equates interest rates), this means that the nominal exchange rate must offset not merely real competitiveness shocks but also any permanent change in relative prices which has been necessary to generate relative wealth effects to offset relative demand differences. Such exchange-rate policy is logically possible (a necessary condition for which is $Q = 1$) but surely improbable. It is much more plausible that national fiscal policies deal with permanent national idiosyncrasies in demand. Moreover the EMS of the late 1980s is one in which Q is substantially below unity. In short it restores the need for an eventual adjustment of fiscal policy to cope with relative demand shocks in the Community; the difference between a low Q and a zero Q is merely one of degree.

In this sense, with respect to the long-term equilibrium, it seems unlikely that there is any substantial disadvantage, from the fiscal viewpoint, in moving from the ERM to EMU. By the same token, since fiscal policy has a role to play in both, even in the long run, attempts to restrict national fiscal policies may be counterproductive. The objective of long-term price stability is much better served by preventing the Community's central monetary authority from monetizing any fiscal deficits.

Not all Community members are currently in the ERM. For Greece and Portugal, it remains an option to allow the exchange rate eventually to float to a level which will balance the external account. Hence, relative to their present position, EMU imposes a restriction on those countries' ability independently to choose their fiscal policy in the long run. But the above analysis makes clear that this restriction is effectively imposed at the date Member States join the ERM, and any additional restraint in moving from the ERM to EMU is negligible.

This discussion has assumed that the accommodation index Q is the same for nominal and real shocks. It would of course be possible to discriminate between the two. Then it would be possible to enjoy the benefits of nominal discipline without sacrificing the ability of the real exchange rate to cope with permanent real shocks. There are two reasons why this point should not be overstressed. First, as a matter of theory, the extent of currency substitution (and possibly the integration of real economies) will depend on the extent to which exchange rates are allowed to change for whatever reason. Moves towards greater integration are thus likely to place political pressure on maintaining a low value of Q if the ERM continues, whatever the source of the shock. Second, a cursory inspection of the historical operation reveals that nominal realignments in practice have been susbtantially driven by accumulated changes in relative prices. In contrast, they have not accommodated permanent real discrepancies in competitiveness; or, putting the point the other way round, substantial trade imbalances have been allowed to persist. Hence it remains my contention that, in thinking about whether the need to attain equilibrium in the long run places additional requirements on national fiscal policy, the answer is clear: a move from the ERM to EMU would have a negligible impact on the burden placed on national fiscal policies.

The situation may of course be very different with respect to dynamics, and it is to that subject I now turn.

4. Dynamics in the absence of shocks

It is convenient to discuss the dynamics in two stages. In this section I suppose that the European economies begin away from long-term equilibrium because of some past shocks, but that no new shocks occur. We can then study how quickly Europe gets back to long-term equilibrium under EMU or the ERM. In the next section I introduce shocks.

I will assume that the European economies have broadly the same structure though they may differ in scale from one another. It will then be true that the European economy can be factorized: the dynamics of its aggregate behaviour will depend only on aggregate European variables, and the dynamics of each country's deviation from the average will depend only on other such deviations. We can talk about the two issues separately. I begin by discussing EMU.

4.1. Underlying dynamics in EMU: the Community aggregate

There are many possible explanations of sluggish dynamics. For convenience the model I analyse uses overlapping two-period forward-looking wage contracts. This model is simple enough to solve and, because it incorporates forward-looking wage setting, it allows us to ask interesting questions about the private sector's response to alternative policy regimes.

With two-period contracts at each date the relevant initial conditions — the variables fresh decisions must treat as predetermined — are the set of wages being carried over from the previous period. For the Community aggregate, only the aggregate wage last period, matters for today. All the temporary equilibrium values of today's aggregate variables are simply related to yesterday's wages. And this first order dynamic system can be shown to have a unique convergent root ρ_1, such that when we measure aggregate prices P, output Y, or inflation π, in deviations from their long-term equilibrium values

$$P_t = \rho_1 P_{t-1} \qquad Y_t = \rho_1 Y_{t-1} \qquad \pi_t = \rho_1 \pi_{t-1}$$

so the size of the root ρ_1 (a positive fraction) tells us about the degree of sluggishness or persistence of the European economy as a whole. My analysis establishes the following propositions:

(1) But for the interaction with the rest of the world, ρ_1 might be very close to unity, the case of pure hysteresis and no convergence towards long-term equilibrium. The floating exchange rate with the rest of the world reduces ρ_1 and speeds up adjustment of the aggregate economy. Intuitively, a country inheriting nominal wages which are too high not merely faces a domestic recession but also external uncompetitiveness. Real exchange-rate overshooting places extra pressure on wage-setters and speeds up the wage adjustment to the steady-state level. I conclude that attempts to understand EMU dynamics without considering Europe's external linkages may be seriously misleading. Even when these are introduced, there remains substantial sluggishness in the aggregate European economy.

(2) The degree of sluggishness becomes larger the more active the cyclical stabilization policy which the fiscal authorities pursue. Forward-looking wage-setters are less frightened of future unemployment the more they anticipate the government will bail them out. Well-meaning fiscal stabilization is actually counterproductive. Hence, if there were no future shocks, it would be doubly undesirable to have high marginal tax rates or other cyclical response: it would slow down dynamic adjustment, and it would probably have adverse supply side effects: which here I have taken as exogenous). Of course, with shocks, more active stabilization may damp the impact effect of shocks. There will then be a trade-off between damping the impact effect and making the subsequent dynamics less attractive. That trade-off is the subject of the next section. And from the previous section, we already know that in EMU an eventual response to permanent competitiveness shocks is essential if long-term equilibrium is to be restored.

(3) In general, the speed of adjustment of the aggregate economy is larger,

(i) the greater the response of real wages to the state of the business cycle,

(ii) the larger the wealth effect,

(iii) the greater the effect of real interest rates on domestic demand,

(iv) the greater the extent of Europe's trade with the rest of the world.

In the context of 1992, it seems plausible that greater economic integration of product markets will reduce the scope for insider workers to appropriate rents from their firms who now face more competitive output markets. If so, then the implication of (i) is that 1992 will be a force for increasing the speed of response of the European macroeconomy under EMU.

4.2. Underlying dynamics in EMU: deviations from the Community average

Each country's deviation from the Community average depends only on other such deviation variables if countries are symmetric in structure. As in the aggregate system there is now another root, say γ_2, again a positive fraction, describing how quickly deviations from the Community average are eliminated. A low γ_2 implies fast convergence.

Because of the factorization into averages and differences, the convergence properties are independent of the aggregate monetary policy (or any other aggregate variables), though I continue to assume the aggregate monetary policy of ac-

commodating only real aggregate variables. My analysis of the convergence root γ_2 establishes for EMU that:

(1) for plausible parameter values, γ_2 may be well in excess of zero. Convergence (of both nominal and real variables) may not be rapid.

(2) As in the aggregate system, and for the same reason, greater fiscal stabilization over the business cycle makes the root larger and convergence more sluggish.

(3) Convergence is also more rapid:

(i) the more sensitive net exports to the level of competitiveness;

(ii) the less sensitive each Member State's net export to fluctuations in relative outputs of Member States;

(iii) the more sensitive real wages to the business cycle.

Of course these three propositions must be taken together, since greater integration will typically make trade balances between Member States more sensitive to both competitiveness and relative outputs and increase real wage sensitivity. So, the effects of greater integration of real economies on the speed of convergence in EMU is actually ambiguous.

4.3. Underlying dynamics in the ERM: deviations from the Community average

Instead of EMU we now have Germany setting monetary policy and other exchange rates being realigned with an accommodation parameter Q. My analysis establishes:

(1) If Q is permanently fixed, the speed of convergence is higher, the lower is Q, and as Q tends to zero the ERM converges on EMU. This conclusion depends, of course, on the parametrization of currency substitution in the model, which tends to infinity as the degree of exchange-rate accommodation in the EMS tends to zero. If, because of fears of subsequent policy reversal, even a rigid EMS does not lead to full currency substitution, the above conclusion will not hold exactly, though its qualitative spirit would survive.

(2) Qualitatively, the response of the speed of convergence to changes in other parameters is in the same direction as under EMU, but a given change in any other parameter has a smaller absolute effect on the convergent root, the larger is Q.

(3) It is also possible to analyse an evolving EMS in which $Q = aQ_{-1}$ for some positive fraction a. This system converges on EMU. The root γ_2 is changing over time. At each moment it depends on the evolution speed a and the inherited Q. The convergent speed is faster (i) the

smaller is a and the faster the evolution of the EMS, and (ii) the smaller Q has already become (the closer we already are to EMU). But the speed of convergence is highest of all under EMU itself.

This latter system embodies a gradualist approach, and could be thought of as a smooth version of the Delors plan to move in phases. However, it does not capture the spirit of the British proposal for tough independent monetary policies and gradual convergence on EMU.

Indeed, it is intrinsic to the notion of currency substitution that I have described above that convergence of monetary union can only be a product of gradual elimination of exchange-rate risk. A gradually tightening EMS could in principle converge on EMU in the limit. In contrast, having national monetary authorities pursuing independent, tough monetary rules necessarily throws the impact of shocks on to exchange rates, thereby preventing currencies becoming perfect substitutes for one another, even in the limit. In short, the UK proposals for currency competition are unlikely to have the effect of smooth convergence on EMU.

4.4. Underlying dynamics of the EMS: the aggregate system

This depends now on aggregate monetary policy which in turn depends on what the core country Germany does. Suppose, first, Germany predicts the monetary policy of the other countries and residually sets its own money supply so that the aggregate Community money supply grows in line with real variables, but does not accommodate nominal shocks.

Monetary policy is now the same as under EMU, and all the aggregate dynamics are the same. In short, in the absence of any future shocks, the only consequence of moving to EMU is to speed up the rate of convergence between Member States: the behaviour of the Community aggregate would be unaffected.

Before discussing an alternative assumption about the German monetary policy rule, I should draw out one implication of all the preceding analysis. For the aggregate variables, current values are equal to ρ_1 times the value last period. Deviations are equal to γ_2 times the deviation last period. Putting the two together, and substituting, we can represent each country's variables in the current period as being related to its own past variables. For example, with two ERM members, each country will satisfy.

$$z_t = (\rho_1 + \gamma_2)z_{t-1} + (\rho_1 - \gamma_2)z_{t-2}$$

where z denotes output, or prices, or inflation, or the trade balance. Indeed with n countries, there are n predetermined variables (wages in each country) and there will be one root ρ_1 for the aggregate system but 11 roots for the discrepancy system, and the substitution will yield an $AR(12)$ process in that country's variables alone.

Two points follow from this. First, with respect to empirical work endeavouring to discover the economic structure from vector autoregressions, such reduced forms (as always) are never capable of telling us anything until we impose additional assumptions to identify the structural variables. In the above example, Germany determines the collective monetary policy but there still exists a vector autoregression in purely French variables as one of the many ways of representing the determinants of French variables today.

The second point is made most easily using the above country example. Suppose the ERM comprises France and Germany, with Germany setting the money stock, and French money supply being adapted to enforce a constant degree of exchange rate accommodation Q in the presence of free capital movements and interest parity. Suppose that instead of ensuring that the aggregate money stock accommodates aggregate real output, Germany sets the German money stock to accommodate German real output. It is then possible to show that the dynamics converge on the dynamics achieved when Germany instead sets its objective as ensuring that the aggregate money stock reflects aggregate variables. This remarkable result means that, from the aggregate viewpoint, the Community may derive substantially the same benefit from an inward-looking Germany as from an explicitly aggregate monetary rule.

What this means is that, in the absence of future shocks, either kind of ERM has essentially the same aggregate behaviour as EMU, but the latter has faster convergence.

Let me repeat again that this comparison assumes free capital mobility. In short, the above discussion suggests that the 1992 programme, and specifically the decision to liberalize capital controls, is of much greater macroeconomic signficance than the issue of how rapidly we adopt full monetary union. Conversely, at this point in the argument, there is no strong macroeconomic case for not proceeding to EMU if it has other benefits.

This is not to say that there are no distributional issues involved in the move to EMU. A clear way to highlight this is to assume that each country cares about the misery index M which equals inflation π plus unemployment, which can be viewed as $-y$ where y is the deviation of output from

full capacity output. Suppose each country wants to minimize the undiscounted present value of M.

Factorizing the economy into the aggregate ($+$) system and the ($-$) system, simplifying the presentation by assuming two countries France and Germany, and letting the ($-$) system denote French variables minus their contemporaneous German counterparts, in France each variable z can be expressed as $(1/2) \, (\overset{+}{z} + \overset{-}{z})$ and each German variable as $(1/2) \, (\overset{+}{z} - \overset{-}{z})$. Since the root of the ($+$) system is the same in the EMS and EMU, the present value of that part is unaffected by the regime choice. Each $\overset{-}{z}$ is proportional to the predetermined relative wages $(\overset{-}{w})_{-1}$. Hence, expressing French misery as $(1/2) \, (\overset{+}{M} + \overset{-}{M})$ and German misery as $(1/2) \, (\overset{+}{M} - \overset{-}{M})$, we see that French and German misery today shares a common part $\overset{+}{M}$ and differs by another part $\overset{-}{M}$ of equal magnitude but opposite sign. In the ($-$) system, it is a zero sum game. The size of the convergent root for the ($-$) system, the only thing influenced by the regime choice, has the consequence of enlarging or shrinking the discrepancy when we take present values. Hence, the regime choice will affect the distribution of welfare between Member States.

It may be helpful to restate the theme of this section. A country is in a slump because its inherited nominal wages are too high. The more policy guarantees to stabilize real variables, the less current nominal wages need to adjust and the more the problem persists into the future. Thus, active fiscal stabilization is counterproductive. The exchange-rate policy is entirely about relativities: it affects the ($-$) system but not the ($+$) system. The more exchange-rate policy accommodates, the less pressure there is on relative nominal wages to adjust, and the more the discrepancy persists into the future.

5. Temporary shocks

In this section, I complicate the preceding discussion by making the framework explicitly stochastic. This section discusses temporary shocks which bombard the economy each period. I focus on temporary shocks which last only one period. The following section analyses shocks which are random walks: having occurred unexpectedly they then persist forever.

5.1. Dynamics of the aggregate system

The aggregate system may be subject to several kinds of shock: in the demand for output, in external trade, or in money demand. In principle these can be partially or fully accommodated by aggregate monetary and fiscal policy. My primary interest is in the implications of EMU for fiscal policy.

If stabilization policy is discretionary, there is a serious issue about whether government can diagnose the source of the shock quickly enough to respond during the current period. But in quantitative terms the most significant impact of fiscal policy may derive from the operation of automatic stabilizers which require no such diagnosis.

Even then, fiscal policy may be conceived in one of two ways. Most ambitiously, there might be a federal component as in the monetary union of the United States, where at given tax and social security rates, revenues flow from Massachussetts to Texas when the former has a boom and the latter a slump. At the other extreme, individual Member States may get no help from the rest of the Community; the issue is then the extent to which they can pursue self-help through domestic stabilization policy.

I focus on the latter, partly because there are no extant proposals for a more ambitious federal tax system, but more importantly because it is of interest to assess EMU against a 'worst case' scenario. One important difference between the two types of fiscal intervention is in the implied debt dynamics for national governments. This is undoubtedly a subject of major concern, not least because of its impact on the question of whether the monetary authorities will face any pressure to monetize, but it is a subject I cannot address. My formal analytical model is already considerably complicated, and debt dynamics would be the straw that broke its back. And I hope already to have demonstrated that there is a large pay-off to have an explicit model which can yield interesting predictions about the consequences of alternative exchange-rate regimes.

Consider any shock which feeds through into the product market. In my framework, wages and prices are set at the start of the period, before temporary shocks are known. The shock shows up in output, the trade balance, interest rate, and exchange rates, both within the Community and externally. With an automatic stabilizer component, fiscal policy is also affected.

Since wages are set in advance of the shock, current wages are unaffected by any temporary shock (except of course a shock to the wage setting equation itself). But current wages form the only relevant variable inherited by the system next period, and by then the temporary shock has disappeared. Hence, the future evolution of each economy is unaffected by the shock.

In such circumstances deliberate pursuit of fiscal stabilization is likely to be unattractive in either the EMS or EMU. The temporary gain is small, and there is a long-term cost: the greater the average stabilization response the slower the response of the aggregate economy, as given by the root ρ_1 of the $(+)$ system. This applies whether stabilization policy is explicit or merely a series of apparently discretionary actions for which the smart wage setters deduce the underlying rule on average.

I should qualify this in one regard. The dynamics of wage setting depend on expected variables, including expected values of fiscal variables. If the fiscal authorities could credibly distinguish their policy response to expected and unexpected output deviations from potential, they could dampen fluctuations without affecting dynamics by operating vigorously only in response to surprises. But this is surely not very plausible. And, as I have argued, other policy goals such as equity imply high marginal tax rates which operate whether or not the output deviation is anticipated.

5.2. Dynamics of the relative system

Now consider the $(-)$ system. We are of course particularly interested in exchange rates themselves. Suppose there is a temporary relative shock in the $(-)$ system. For reasons given above, it will not immediately affect wages or prices. But it will affect output and interest rates.

Within EMU the situation is very similar to that in the aggregate system. Since there is no effect on the wages carried over to next period, there is no enduring effect. In EMU there is no possibility of relative monetary policy, so the only conceivable response is a fiscal one. Even if discretionary fiscal policy is possible in time, the pay-off seems small in relation to the adverse effect on convergence dynamics from systematic pursuit of such a policy.

Within the EMS the issue is more subtle. Wages are set in advance of shocks and unaffected by them. Domestic prices are a mark-up on wages, but the presence of the rest of the world implies that external shocks affect the import price component of national price levels. But relative prices within the Community remain unaffected if countries are symmetric. Hence the EMS exchange-rate rules, as characterized by the accommodation parameter Q, leave internal exchange rates unaffected by contemporaneous shocks.

But other relative shocks, for example in aggregate demand, want to show up in interest rates. Hence in the EMS temporary shocks must be sterilized by offsets in national money supplies in countries outside Germany to leave interest differentials unaffected. Such monetary intervention is effective in the short run and has no effect on long-term dynamics. In fact temporary relative shocks to domestic demand are completely eliminated in this way and there is no need for an additional fiscal response. In this sense, the EMS will cope better than EMU with temporary relative shocks.

Finally there is the question of temporary shocks to competitiveness. Under EMU this will have a temporary effect, but no persisting effect, on output and the trade balance. Under the EMS essentially the same will happen. A more sophisticated model could allow for exchange-rate bands, and specify the accommodation parameter Q with respect to band realignments. This would have the attractive feature that it would then be possible for Member States to accommodate temporary shocks of any nature by allowing small movements of their exchange rate within the band, knowing that the shock would have disappeared by the following period.

6. Permanent shocks

When shocks are permanent, it seems obvious that it is more important for policy to offset them. But this conclusion may be too hasty.

6.1. The Community aggregate

Permanent shocks have persistent effects: since they are still around when wages are renegotiated they get into the entire dynamics of the system. A permanent shock thus has two effects. It quickly affects the inherited variables from which future variables are extrapolated along the convergent path. It also has a technical effect. Since the system's dynamics refer to variables in deviations from their steady-state level, by affecting the steady state a permanent shock can immediately affect the inherited values of variables measured in deviation form. Permanent shocks need to be taken seriously.

Two concepts need to be distinguished. The first is the expected values of variables. If the system is (log) linear, then shocks, whether temporary or permanent, have no effect on today's conditional expectation. The expected value of each and every surprise is necessarily zero.

However, policymakers may be interested in other concepts. Suppose for example they are interested in minimizing the expected present value of squared deviations of output from potential. This can be decomposed into two parts: the square of the expected path of such deviations, and the variance of the forecasting error. When shocks are permanent, the extent

of stabilization policy will affect the latter. Thus, for example, if aggregate output deviations y from potential obey

$$y = \rho y_{-1} + \varepsilon$$

where ρ is the stable root of the aggregate system and ε is an unforecastable shock which occurs each period and stays forever thereafter, it is simple to show that the expected present value of squared y is given by

$$\rho^2(y_{-1})^2/(1 - \varphi^2) + \sigma^2/(1 - \varphi\rho^2)(1 - \varphi)$$

where φ is the discount factor and σ^2 is the variance of ε. More active stabilization policy reduces the variance σ^2 of the forecasting error but increases the underlying root ρ. The latter has two effects: it increases the variance of the forecasting error and it also increases the first term, the present value of the square of expected output deviations.

Hence when the aggregate economy is close to long-term equilibrium, it will be attractive to pursue an active stabilization policy. This stops damaging shocks getting into the system; and slowing down the dynamics hardly matters when the system is close to long-term equilibrium. In contrast, when the system is already a long way away from equilibrium, it will be more important to speed up the dynamics by reducing the degree of stabilization policy, even though this means that future shocks will be allowed into the system more easily.

This trade-off reminds us that all simple rules, such as the pursuit of a given degree of stabilization policy, are time inconsistent. However, solving for the full dynamic programming solution is considerably more complicated. Moreover, in discussing a major regime change, policy is, to an important extent, interested in laying down the rules of the game for how such a system will operate; it may be able to precommit policymakers to an important extent.

Since the above analysis applies to the aggregate system, it applies equally in EMU or EMS after the abolition of capital controls. I now turn to the analysis of shocks in the relative system where the exchange-rate regime makes a difference.

6.2. Differences between Member States

A very similar analysis applies in the $(-)$ system. Consider first what would happen under EMU. Let us look at a permanent shock to competitiveness.

First, recall from the analysis of long-term equilibrium that relative fiscal policy will have to adjust if we are to get to the steady state at all. In this sense the issue is when to

respond to permanent shocks, not whether to respond to them.

Of course, my distinction between temporary and permanent shocks, although usefully stark, is also too simple. In real policymaking the dilemma is to know whether shocks now identified will persist, and if so for how long. The preceding analysis highlights the danger of overactivism. First, the shock may have gone before policymakers can do anything and well intentioned intervention may actually make things worse. Second, systematic intervention may attract a high cost in slowing down the underlying dynamics of the system. This suggests that, whatever the instrument of relative policy reponse, whether an exchange-rate realignment or a change in relative fiscal stance, policymakers will be inclined to delay until they have accumulated evidence that the shock is likely to persist.

Within EMU, the only instrument of relative policy is fiscal policy. Suppose fiscal policy has three components: trend growth with productivity, a stabilization component associated with deviations of output from potential, and an explicit component connected with permanent relative shocks to competitiveness. The competitiveness shock itself may have arisen either because of a relative supply shock to potential output or because of a change in consumer preferences. And the competitiveness shock is only of significance if it is within the Community; externally the Community floats against the rest of the world.

The first point to note is that the roots of the convergent path depend on stabilization policy with respect to deviations of output from potential, but not to movements of fiscal policy in line with potential. Hence if the competitiveness shock is really a permanent supply-side shock which affects different countries differently, it can be accommodated without affecting the speed of convergence of the system to its long-term equilibrium. A similar argument applies to such accommodation through realignments within the EMS. Hence in this instance there is a powerful case for a full policy response as soon as the shock can confidently be diagnosed as persistent.

The second point to note is that, as in the aggregate system, permanent shocks, by affecting the steady state, can cause immediate jumps in the predetermined variables when these are expressed in deviations from the new steady state. Thus, some shocks bring the steady state closer; others move it further away. Again these remarks apply both to the EMS and EMU.

The third point to note is that, in the absence of shocks, EMU has faster convergence dynamics than the EMS, for

given values of all other relevant parameters. If convergence itself is an objective, the policy design problem is where to enjoy the fruits of the gain. One possibility is to set all parameters as they would otherwise have been. But there are other options. For example, making fiscal policy more responsive to output, or to the trade balance, will slow down the dynamics of EMU relative to what they might have been, but may still leave underlying dynamics faster than in the EMS. In this way, relative to EMS, it may be possible in EMU to pursue a fiscal policy which neutralizes shocks effectively without sacrificing the speed of convergence of the relative system.

As in the aggregate system, the trade-offs faced will depend on the initial position. When Member States are far apart, policies designed to insulate the Community from further shocks to relativities will be less attractive because it is more important to have faster underlying convergence dynamics; conversely, when substantial convergence has already taken place, further neutralization of shocks to convergence can be pursued at much smaller cost.

This observation applies not only over time but at a point in time. Over time, we can say that if the Community has waited until substantial convergence has taken place before discussing EMU, it should not now be worried about the cost of systematically pursuing fiscal policy to dampen future relative shocks before they can do lasting damage. At a point in time, we can say that those members whose inherited macroeconomic performance is most different from the Community average are those for whom policies designed to insulate future relative shocks will be most damaging in terms of slowing down their underlying speed of convergence to the Community average.

7. Calibrating the model

In the Appendix, I derive explicit expressions for the roots of both the Community average system and of the deviations of a Member State from the average. In this section I attempt a first tentative calibration of the model.

Since I have argued that a move from the EMS to EMU will have neglible effect on the dynamics of the Community average, I restrict my attention to the deviation of a Member State from the Community average. Thus, I am interested in how (with unchanged fiscal policy) the change of exchange-rate regime will affect the tendency of Member States to converge with one another. It goes without saying that some heroic assumptions are necessary to produce even tentative estimates. Two are worth emphasizing. First, simple analytical results are possible only if we assume that all

Member States essentially have the same economic structure. Second, in estimating parameters during periods when fiscal policy rules may have been changing, empirical estimation is inevitably vulnerable to the Lucas critique. Even so, it is tempting to see what the numbers look like at first glance.

The key equation for the root γ_2 governing the deviations of Member States from the Community average is

$$0 = (1 - \rho_2)^2 - \omega(1 + \rho_2)(b_1 + c_1)(1 - \rho_2)(1 - Q)/(1 + a_1 + g_1)$$

where ω is the effect of output (relative to potential) on real wages, a_1 the effect of domestic output (relative to the Community average) on the trade deficit, b_1 the effect of the real exchange rate against the ecu on the trade surplus, g_1 the response of fiscal policy to the business cycle and c_1 the effect of real interest rates on aggregate demand.

Since the dynamics apply to a system already differenced to be covariance stationary, I estimate equations in first difference form to knock out variables such as potential output which may be expected to follow a random walk with constant drift. Estimation is on annual date from 1957 to 1969. Since we are interested in deviations from the Community average, and have had to assume all countries symmetric, estimation is performed only on German data (any other would do). The Community average is constructed as a weighted average using ecu weights, thereby allowing us to make use directly of data on the German mark/ecu exchange rate. The superscript (ˆ) denotes German variables relative to this Community average. The following are the key regressions (t-statistics in parentheses):

$$\Delta (4w - p_{+1} - 2p - p_{-1}) = -0,008 + 2,3 \, \Delta(y + y_{-1})$$
$$(5.48)$$

$$\Delta \hat{y} = -0,002 + 0,36 \, \Delta(s - \hat{p}) - 0,16 \, \Delta(s - \hat{p})_{-1}$$
$$(0.80) \quad (1.17) \quad (2.38)$$
$$- 0,59 \, \Delta(\hat{r} - \hat{p}_{+1} + \hat{p})$$

where s denotes the nominal exchange rate of the German mark against the ecu. Taking these estimates at face value this implies

$$\omega = 2,3$$

$$b_1/(1 + a_1 + g_1) = 0,2$$

$$c_1/(1 + a_1 + g_1) = 0,59$$

These may now be used in the above formula. During the early years of the EMS, the degree of inflation accommodation in the exchange rate was high (e.g. $Q = 0,9$). These estimates suggest that γ_2 would then also be of the order of

0,9, with only 10 % of deviation from the Community average being eliminated each year. Characterizing the later period of the EMS with a much lower accommodation coefficient (e.g. $Q = 0,4$) would imply a root γ_2 also not very different from 0,4, with 60 % of discrepancies from the Community average being reduced each year. Setting Q at the EMU value of zero actually yields a negative root γ_2, implying damped cyclical overshooting of the Community average.

Clearly, such results should be treated with considerable scepticism for several reasons. In addition to the tentativeness of the econometric estimates (not least because a tractable analytical model requires simpler dynamics than the data really want), there is also the fact that the solution to the non-linear equation for γ is sensitive to small changes in estimated values of the key parameters.

Even so, one point is nicely illustrated in these computations. The speed of convergence of Member States is not an exogenous constant made in heaven; it is highly sensitive to the exchange-rate regime in force. The practical significance of this is that whereas it may be tempting for politicians to say 'wait until a reasonable degree of convergence has been achieved before changing the regime', changing the regime may be the most practical way to bring about convergence in a reasonable time.

8. Conclusions

I have presented a systematic framework in which to address a series of related questions about the design of the Community's macroeconomic policies for the 1990s and beyond. I developed this framework to address some particular questions: (i) will there be a large macroeconomic cost in giving up the option of exchange-rate adjustment?, (ii) what degree of fiscal activism will be required to compensate?, and (iii) how much will market forces, specifically the impact on wage setting, act as a substitute adjustment mechanism?

Within this framework, I have been able to contrast the consequences of an immediate move to monetary union with the alternative of persisting with a fairly tight EMS in which capital controls have now been, or will soon be, abolished.

I have drawn several conclusions. First, the move from the EMS of the early 1980s — with substantial exchange-rate accommodation and ubiquitous capital controls, to that of the early 1990s with much reduced exchange-rate accommodation and no capital controls — may have involved significantly greater changes in the options for macroeconomic policy than the further steps towards EMU; however these

are finally undertaken. For ERM members, monetary autonomy has already been surrendered. Nor in general will exchange-rate policy alone be capable of getting Member States to the steady state: already there is a requirement for eventual fiscal adjustment. Qualitatively, that eventually required under EMU will scarcely be any greater.

Second, I have been able to contrast the underlying dynamics of the two regimes. Other things equal, EMU will display faster convergence of Member States to one another because wage setters will be less shielded from the consequences of remaining divergent from one another. This enhanced convergence applies not merely to nominal variables but also to real variables; in the absence of future shocks, even the trade balances between Member States will converge more quickly under EMU than under the EMS. Credible macroeconomic policy is having its effect on private sector behaviour.

Viewing the EMS as a zone dominated by the Bundesbank, it makes little difference to dynamics whether the Bundesbank targets the German money supply purely on German real variables or sets German monetary policy, after predicting the monetary policy of other Member States, to ensure that the Community aggregate money stock accommodates Community real variables.

Since this monetary policy matches what I assume would be the rule of a European system of central banks, and since, if countries are symmetric, the behaviour of the aggregate system is independent of the relative system, the dynamics of all aggregate variables will be the same under the EMS and EMU. This dichotomy between aggregate and relative is only exact if countries are exactly symmetric in structure, but an approximation theorem holds: if countries are almost symmetric the preceding results will constitute a very good approximation.

When shocks are very temporary, there is little gain from explicit attempts to offset these shocks, since they do not affect wages which form the key to the transmission of dynamics into the future. The one shock to which this argument does not apply is a shock to wages themselves. Then there may be more important grounds for intervention before too much of the shock is allowed to spill over into the future. Active fiscal stabilization is likely to be counterproductive when shocks are temporary: the gain from reducing the impact of shocks is likely to be poor exchange for more sluggish underlying dynamics.

At the other extreme, permanent shocks can have serious and persistent effects. Under EMU any permanent relative shock will require a response in relative fiscal policies sooner

or later. More generally, policymakers will face a trade-off between damping the impact of permanent shocks and the consequence that the anticipation of such policies has in slowing down the underlying dynamics. In general, active neutralization of shocks is most attractive when the system, whether in aggregate or relative form, is close to its long-term equilibrium position, and least attractive when it is far from its steady-state position. Such considerations can inform the design of policy for the Community as a whole, and the incentives for particular countries with differing initial positions.

The analysis suggests that for ERM members, the further move towards monetary union should not impose major macroeconomic costs, and may even have benefits. This conclusion presupposes an intelligent and appropriate use of fiscal policy. In EMU, fiscal policy is the only powerful instrument for making relative adjustments in domestic demand, even if relative goods prices eventually take care of competitiveness.

In the absence of any federal fiscal system, which would achieve many of the requisite characteristics at given tax rates, it is important to allow national fiscal authorities freedom to look after their own economies. My analysis does not directly address debt dynamics, of a government or of a country, and is not therefore suitable for a formal discussion of the credibility of monetary policy and its relation to fiscal policy. However, given the significance I have attached to fiscal policy under EMU, I cannot close without reiterating that my own view is that it is vastly preferable to break the link between irresponsible fiscal policy and monetization at the monetary end of the chain, not by putting national fiscal policies in unnecessary, and potentially dangerous, strait-jackets.

Appendix

EMU versus the EMS: a formal model of dynamic adjustment

The model has $N+1$ countries. N countries are members of the EMS which floats against the rest of the world (ROW), variables of the latter being denoted with an asterisk.

Initially the model is deterministic though shocks are introduced later in the analysis. To address these issues we need a forward-looking model of wage-price setting. It is convenient to adopt the overlapping contract model of Taylor (1979).

Wage and price setting

Nominal wages are set for two periods at a time; half the firms renegotiate each period. Each country produces non-traded goods, whose prices are p_{nt} and traded goods whose prices are p_t. The law of one price holds for traded goods. This does not of course mean that PPP holds, for that requires equality of unit labour costs when measured in a common currency. If d_n is the share of non-traded goods in output, the GDP deflator p is given by

$$p = d_n p_{nt} + (1-d_n)p_t \tag{1}$$

where $(1-d_n)$ indexes the degree of openness.

Wage setting today depends on the GDP deflator over the two-period contract, on underlying trend productivity, and on the tightness of the labour market when wages are set.

Let y_s denote full capacity output, which grows at rate n.

$$y_s = y_{s,-1} + n \tag{2}$$

and if the labour force is constant, y_s also measures trend productivity. If y is actual output then $(y-y_s)$ measures the tightness of the labour market. Hence in each country

$$2w = (p + p_{+1}) + (y_s + y_s + n) + \omega(y-y_s) \tag{3}$$

where ω denotes the responsiveness of current wage setting to the current tightness of the labour market. The large empirical literature on wage-price setting emphasizes that pricing mark-ups are not sensitive to the tightness of the labour market. Thus

$$2p = w + w_{-1} - (y_s + y_s) \tag{4}$$

where p denotes the average output price arising from the traded goods sector selling at a price p_t and the non-traded sector selling at a price p_{nt}. Disembodied productivity growth is enjoyed even by workers in the second year of their labour contract.

Competitiveness depends on relative unit wage costs. In each country unit labour costs are given by the right-hand side of Equation (4), so competitiveness depends on relative price p expressed in a common currency.

Product markets

Let $\tilde{z}$ denote the contemporaneous Community average $(1/N)(z_1 + z_2 + .. + z_N)$ for any variable z. In the short run,

output is demand determined and given by

$$y = (a_0 + a_1((\bar{y} - \bar{y}_s) - (y - y_s)) + a_2((y^* - y^*_s) - (\bar{y} - \bar{y}_s)) + b_1(\bar{p} - p + s) + b_2(p^* + e - \bar{p})) + (c_0 + g - c_1(r - p_{+1} + p)) \tag{5}$$

where the first two lines denote the trade balance and the last denotes domestic absorption; a_0 and c_0 are permanent shocks to competitiveness and domestic demand; g denotes fiscal policy; r the nominal interest rate; e denotes the logarithm of the ecu per unit of the ROW currency; and s the logarithm of the domestic currency of each Member States per unit of the ecu.

I assume fiscal policy takes the form

$$g = y_s - g_1(y - y_s) \tag{6}$$

Thus, fiscal variables grow with trend output, and partially offset the business cycle.

Finally, there is monetary policy. With a single money, interest rates are of course the same within EMU countries in Equation (5) and there is complete currency substitution; at the other extreme, with freely floating exchange rates, economies may be completely isolated, with money demand in each depending only on domestic variables. In characterizing the EMS, I assume that Germany chooses its money supply and that EMS members as a whole choose the extent of exchange-rate accommodation by other Member States. Specifically, I assume that the ecu exchange rate of the Ith Member State (e.g. France) obeys

$$s_i = Q_i(p_i - \bar{p}) \tag{7}$$

where Q_i is a positive fraction. The case where $Q = 0$ corresponds to full monetary union and $Q = 1$ corresponds to complete real exchange-rate stabilization. This has the attractive feature that EMU can be depicted as a special case of the EMS. For simplicity, I assume that each of the $(N-1)$ EMS members (except Germany) has the same Q.

This parametrization suggests a natural analogue in modelling currency substitution. Define the closed economy inverse money demands D by

$$r = \eta(y + p - m) = \eta D \tag{8}$$

I now assume national money demands satisfy

$$r = \eta(D + (Q - 1)(D - \bar{D})) \tag{9}$$

When $Q = 1$, exchange rates accommodate all competitiveness shocks, different currencies are poor substitutes, and national interest rates depend only on the national variables

in the closed economy money demand equation. As Q falls, national currencies become increasingly good substitutes, and one country's interest rates depend increasingly on variables in other Member States. In the limit, $Q = 0$ implies complete currency substitution: Equation (9) says that all Member States then face the same interest rate which depends only on Community-wide variables.

Let $\hat{z}$ denote $z - \tilde{z}$. In the EMS interest parity holds. For a static EMS with constant Q,

$$\hat{r} = s_{+1} - s = Q(\hat{p}_{+1} - \hat{p}) \tag{10}$$

and from (9)

$$\tilde{r} = \eta\tilde{D} \qquad \hat{r} = \eta Q\hat{D} \tag{11}$$

Equations (10) and (11) tell us, for given German monetary policy in the EMS, how other Member States must set their money supplies to achieve the appropriate interest rates to enforce the desired exchange-rate rules in the presence of perfect capital mobility. Notice that $\hat{D}$, the deviation of one Member State's $(y - p - m)$ from the Community average, is undefined when $Q = O$ (full union and common interest rates), as is entirely appropriate when the two currencies have become perfect substitutes.

I assume that German money supply m^G follows one of two processes

$$m^G = y_s^G \tag{12a}$$

$$m^G = y_s^G - (\hat{y}_s^G - \hat{m}_s^G) \qquad \tilde{m} = \tilde{y}_s \tag{12b}$$

The former says that the Bundesbank accommodates only underlying real German output growth, characterizing the EMS as being linked to an inward-looking German monetary policy. The latter says that the Bundesbank predicts other Member States' money supplies and sets German monetary policy to ensure that the Community average money stock $\tilde{m}$ accommodates only underlying average Community output $\tilde{y}_s$. In EMU an explicitly aggregate policy is set to ensure Equation (12b).

In what follows I shall assume that the rest of the world is in long-term equilibrium such that $(y^* - y^*_s) = r^* = p^* = 0$.

A. Monetary union

I begin by analysing the consequences of an immediate jump to full monetary union. I assume that within the union internal exchange rates s are fixed at $s = 0$ for all time. The European system of central banks has taken over the money

supply and pursues the money supply rule — Equation (12b). The demand for this single currency is given by aggregate variables, and there is a common interest rate r.

The steady state in the monetary union

For internal balance in each Member State $y = y_s$ and each country's output is at full capacity which is growing steadily over time.

For external balance, in each Member State

$$0 = a_0 - b_1 \hat{p} + b_2 (e - \tilde{p}) \tag{13}$$

Aggregating across Member States

$$0 = \tilde{a}_0 + b_2 (e - \tilde{p}) \tag{14}$$

which shows how the Community's external exchange rate e offsets the deviation of Community prices $\tilde{p}$ from world levels and any Community-wide shock to competitiveness. Together with Equation (13) this implies

$$0 = \hat{a}_0 - b_1 \hat{p} \tag{15}$$

which shows how relative prices within the Community offset relative shocks to competitiveness inside the Community.

The Community monetary policy implies

$$\tilde{m} = \tilde{y}_s = \tilde{p} + y - \eta^{-1} \tilde{r}$$

and interest parity with the rest of the world implies that $r = r^* = 0$ in this long-term equilibrium without any inflation. Hence $\tilde{p} = 0$. Together with Equation (15) this determines the price level in each Member State, and Equation (14) determines the external exchange rate of the Community.

In each country, domestic absorption must also equal full employment output. Given the fiscal rules (6) this implies

$$y_s = c_0 + y_s$$

which in general does not hold. In short, the fiscal rules (6) will not suffice. Given monetary policy, the Community's aggregate price level deflates the nominal money stock to achieve the appropriate interest rates for external Community equilibrium. Relative prices within the Community take care of relative competitiveness within the Community. Thus, the price mechanism is completely preoccupied with attaining external balance and has no independent freedom

to assist in attaining internal balance. Since real wages respond to deviations from full capacity, they cannot help either at full capacity itself. Hence fiscal policy must assume the residual role of offsetting any (permanent) shocks to domestic absorption. Having made this point, I therefore amend the fiscal rules to

$$g = y_s - g_1 (y - y_s) - c_0 \tag{6'}$$

which supposes that each fiscal authority neutralizes permanent shocks c_0 to domestic absorption in its own country. The monetary union now has a well-defined long-term equilibrium with internal and external balance.

Would this need for relative fiscal policies to take care of permanent relative absorption shocks be unnecessary if we augmented the IS curve by a wealth effect? In a fully specified model with microfoundations for intertemporal private sector behaviour it is possible that the answer is yes: long-term budget balance for the private sector essentially constrains their demands in line with productive potential. But a simple wealth effect of the real balance variety will not suffice to dispel the need for relative fiscal policy to cope with relative demand shocks which persist. The reason is straightforward. Since relative prices have to deal with competitiveness, they cannot independently deal with persisting relative demand disturbances. That is the major lesson of the steady-state analysis.

Dynamics in a monetary union

Given the monetary policy, the union has a steady state in which prices are constant and all real variables are growing at rate n, the underlying rate of productivity growth. To study the dynamics, it is convenient to work in deviations. In this section I measure, p, p^*, and r in deviations from their steady-state values; I measure y and y^* as the deviations from the contemporaneous levels of y_s and y^*_s, and in the deviation notation w now denotes what was formerly $(w - y_s - n/2)$. Hence with variables redefined in this way, the relevant equations become

$$2w = p + p_{+1} + \omega y \tag{16}$$

$$2p = w + w_{-1} \tag{17}$$

$$g = -g_1 y \tag{18}$$

$$r = \eta (\tilde{p} + \tilde{y}) \tag{19}$$

$$\begin{aligned} y(1 + g_1 + a_1) &= (a_1 - a_2)\tilde{y} + b_1(\tilde{p} - p) + b_2(e - \tilde{p}) \\ &\quad - c_1(r - p_{+1} + p) \end{aligned} \tag{20}$$

Dynamics of the (+) system

The (+) system describes the whole union. Its equations are simple

$$\tilde{y}(1+g_1+a_2) = b_2(e-\tilde{p}) -c_1(r-\tilde{p}_{+1}+\tilde{p})$$

$$2\tilde{\omega}=\tilde{p}+\tilde{p}_{+1}+\omega\tilde{y} \tag{21}$$

$$2\tilde{p}=\tilde{w}+\tilde{w}_{-1}$$

$$r=e_{+1}-e$$

$$r=\eta(\tilde{p}+\tilde{y})$$

Since the only predetermined variable in the current period is the inherited wage $\tilde{w}_{-1}$, this system will have roots of the form $\tilde{z}=\rho_1\tilde{z}_{-1}$ for all relevant variables z. Equating coefficients on $\tilde{w}_{-1}$, Equations (21) together imply

$$0 = (1-\rho)^2(\ (1-\rho)(1+g_1+a_2) + (b_2+c_1(1-\rho))\eta) \\ - \omega(1+\rho)\ (1+\eta-\rho)(b_2+c_1(1-\rho)) \tag{22}$$

This is a cubic in ρ with a negative coefficient on ρ^3. Call this cubic $G(\rho)$. Clearly $G(-1)$ is positive, and $G(1)$ is negative. Moreover, the slope $G'(\rho)$ is positive at $\rho = -1$. Hence there exists a unique root ρ in the range between -1 and $+1$. The unique stable root is positive if $G(0)$ is positive, which requires

$$1+g_1+a_2+b_2(1-\omega(1+\eta))+c_1(\eta(1-\omega)-\omega) > 0$$

for which a small ω (sluggish real wage response over the business cycle) is sufficient. The stable root ρ_1 may be well in excess of zero, implying substantial aggregate sluggishness for the Community average. Thus, we should not expect rapid adjustment of output, inflation or the external trade balance.

One final remark is of relevance. An increase in g_1, the extent to which fiscal authorities stabilize output over the cycle, must increase $G(\rho)$ in Equation (22) at each value of ρ. Consequently, the function (locally downward sloping) now intersects the horizontal axis at a larger value of ρ. Hence, the consequence of a greater fiscal stabilization (whether discretionary or through automatic stabilizers such as the tax and transfer system) is to raise $G(\rho)$ and hence to raise the root ρ at which $G(0)$ is zero.

Fiscal stabilization is thus perverse in the sense that it makes the dynamic response of the aggregate union more sluggish because of its induced effect on forward-looking wage setting. If Europe is in a slump, this tends to bid down real wages; for sticky prices the lower nominal wage boosts output both through the wealth effect and because monetary policy is non-accommodating, so interest rates also fall.

Stabilization policy reduces the need for wage cuts and dampens this process. This is a striking example of the Lucas critique in action.

This should certainly sound a note of caution for those who automatically assume that monetary union will require everywhere a more active fiscal policy to compensate. However the issue is more subtle for two reasons. First, the major role of fiscal policy may lie in the (−) system where the loss of exchange-rate realignment has a direct impact. Exchange rates, relating to differences between countries, never feature in the (+) system if the two countries are symmetric. Second, I have so far excluded shocks. I take up that question now.

Temporary shocks

I assume that wages and prices are set before the shock is known, so the shock affects output and interest rates. Hence, there is no effect on the wages carried over to next period, and no persistence. The gains to offsetting shocks are small.

If, say, the degree in fiscal stabilization g_1 is increased in an effort to provide greater damping of temporary shocks, this will permanently affect the dynamics since a larger g_1 increases the root of both the (+) and (−) systems. Well-meaning stabilization policy is almost certainly counter-productive when shocks are temporary.

Permanent shocks

Now suppose the union is subject to shocks which follow a random walk. This allows us to formulate the trade-offs for stabilization policy.

From the preceding analysis, it is evident that a permanent shock a_0 to competitiveness will be immediately offset by the nominal exchange rate e, leaving all other variables following the same path as before. The fiscal rules (6') already suppose that trend fiscal policy offsets permanent shocks to domestic absorption. The simplest way to introduce the policy dilemma within the framework I have adopted is to assume a permanent shock to Community money demand. Call this shock α.

Thus the money market equilibrium condition becomes

$$0 = r = \eta(\tilde{p} + \tilde{y}) + \alpha$$

The consequence of this amendment is that the steady-state price level for the Community now satisfies $\eta\tilde{p}= -\alpha$. Given the strict monetary rule, a permanently higher level of money demand can be satisfied only by a permanently lower price level which augments the real money stock.

Hence, when a permanent shock first occurs, it has the consequence of immediately changing w and p since the variables are measured in deviations from the steady state and the latter has changed. These changes in turn show up in unexpected changes in output and interest rates. Suppose the monetary shock follows a random walk: $\alpha = \alpha_{-1} + u$.

Suppose policymakers care about the present value of expected squared deviations of variables from their steady-state levels. For each variable such as y the mean squared error can be decomposed into two parts: the square of the expected level of y and the variance of the forecasting error for y.

For a given policy the conditional expectation y^e obeys $y^e = \rho_1 y^e_{-1}$ so if φ is the discount rate the present value of such deviations is given by $y^2_{-1}/(1 - \varphi\rho^2_1)$. Thus, a more active stabilization policy (higher g_1) increases ρ_1 and increases the welfare loss from this first component of the welfare cost. But more active stabilization damps the output consequences of the permanent shocks as they have an immediate impact on the system and hence reduces the variance of the forecasting error which makes up the second part of the welfare cost.

Thus there is a trade-off. More active stabilization helps the variance of the forecasting error but worsens the present value of the squared expected values of y. From this we can deduce that more active stabilization will be more attractive when the Community is already close to the steady state. Then the first term in the welfare cost function is negligible. Slowing down the dynamics is unimportant when we are close to the steady state; rather it is important to prevent new shocks getting into the system. In contrast, when the economy is a long way from the steady state, the trade-off may go the other way. The welfare cost is reduced by speeding up the underlying dynamics (less stabilization) which has a large effect on the expected deviation from the steady state.

This important point reminds us that simple rules of the type investigated here are time-inconsistent. However, solving the dynamic programming problem to obtain the time-consistent solution formidably complicates the analysis. In any case, we are, to an important extent, interested in investigating the rules of the game for a new exchange-rate regime. To some extent these may be able to precommit the nature of the policy response.

Dynamics of the (−) system

The basic equations are

$$(1 + g_1 + a_1)\hat{y} = -b_1\hat{p} - c_1(\hat{p} - \hat{p}_{+1})$$
$$2\hat{w} = \hat{p} + \hat{p}_{+1} + \omega\hat{y} \tag{23}$$
$$2\hat{p} = \hat{w} + \hat{w}_{-1}$$

whence letting γ be the roots of this equation and proceeding as in the previous analysis of the (+) system

$$0 = (1 - \gamma)^2 - \omega(1 + \gamma)(b_1 + c_1(1 - \gamma))/(1 + g_1 + a_1) \tag{24}$$

Calling this quadratic $H(\gamma)$, $H(-1)$ is positive and $H(1)$ negative, so again there is a unique root between -1 and $+1$ and it is positive if $H(0)$ is positive

$$H(0) = 1 - \omega(b_1 + c_1)/(1 + g_1 + a_1) \tag{25}$$

which again for plausible parameter values is almost certainly positive.

The convergent root will be larger and convergence more sluggish (i) the larger the fiscal stabilization parameter g_1; (ii) the greater the sensitivity a_1 of one Member State's trade balance to output deviations relative to other Member States; (iii) the greater the sensitivity b_1 of each Member State's trade balance to competitiveness against other Member States; and (iv) the greater the effect c_1 of real interest rates on aggregate demand. The interpretation is very similar to that described above for the Community aggregate and essentially reflects the induced incentives for wage bargainers to adjust wages towards steady-state levels.

Shocks in the (−) system

Replacing $\hat{y}$ and ρ_1 by $\hat{y}$ and γ, the previous analysis for the (+) system essentially carries over. For permanent shocks, fiscal stabilization through g_1 will be less attractive the further the two economies are initially apart, because the promise of such behaviour is anticipated by forward-looking wage setters. At the opposite extreme, if the economies have already converged, fiscal action is attractive because it prevents important differences from subsequently emerging.

Summing up on monetary union

The basic system is linear. Relative fiscal policies must neutralize permanent shocks if the steady state is to be attainable. Assuming that monetary policy does not accommodate nominal shocks, the dynamics of the system can be characterized by two roots, one root ρ describing aggregate behaviour and the other root γ describing relative behaviour. Both roots are likely to be positive and may be close to unity. Dynamics are sluggish.

The essence of the union is most easily illustrated when there are only two countries, say France denoted without and Germany with an asterisk. For each variable z made suitably stationary by de-trending or measuring in deviations from its steady state level

$$(z + z^*) = \rho (z + z^*)_{-1}$$

$$(z - z^*) = \gamma (z - z^*)_{-1}$$

whence we can recover national variables z and z^*

$$z = (1/2) (\rho + \gamma)z_{-1} + (1/2) (\rho - \gamma)z^*_{-1}$$

$$z^* = (1/2) (\rho + \gamma)z^*_{-1} + (1/2) (\rho - \gamma)z_{-1} \tag{26}$$

Note that initial conditions in the other country will have little effect when $(\rho - \gamma)$ is close to zero. A country's future will depend primarily on its own past, whose effects are likely to persist for a long time.

One final remark is in order. Since Equation (26) implies that

$$z = (\rho + \gamma)z_{-1} - (\rho\gamma)z^*_{-2}$$

$$z^* = (\rho + \gamma)z^*_{-1} - (\rho\gamma)z^*_{-2}$$

each country's variables can be expressed as a univariate $AR(2)$ process. Hence, running simple vector autoregressions of the form

$$z = \Sigma a_i z_{-i} + \Sigma b_j z^*_{-j}$$

is not an interesting procedure for endeavouring to discover anything about interdependence. As in the original discussion of the rational expectations Phillips curve by Lucas and Sargent, one would need to search for changes in a structural equation or policy rule in one country which would then change the reduced form parameters a_i and b_j in a knowable way, to have a hope of identifying interdependence parameters from VARs of the above form.

B. A static EMS

In the monetary union, the joint money supply accommodates joint supply side growth, there is a single currency, a common interest rate and a fixed exchange rate. In contrast, I characterize the EMS as follows: Germany chooses the money supply and France and Germany together choose the degree of nominal exchange-rate accommodation. This parameter Q also indexes the degree of currency substitution.

This framework allows us to contemplate both the early EMS, in which Q was close to unity and nominal exchange-rate accommodation almost complete, and the recently more rigid EMS in which Q has fallen substantially. However, the analysis of this section assumes that Q is constant and expected to remain so, whatever particular value it takes on. This I term a 'static EMS'. We could also investigate an evolving EMS where Q follows a specified convergent process.

Suppose that German monetary policy accommodates only German real supply side growth and that the (crawling) realignment rule is

$$s = Q (p - \bar{p}) \tag{27}$$

The steady state in the static EMS

In each country output equals underlying supply. External balance determines the required pattern of real exchange rates within the Community. In the steady state, German prices are constant because of the non-accommodating German money supply. Provided the EMS exerts some nominal discipline ($Q < 1$), the exchange-rate rules then determine all other Member States' price levels to ensure the appropriate real exchange rates for external balance. Thus, the steady state has no inflation in any country. Nominal exchange rates are constant and the nominal interest differential is zero.

In each country, domestic demand equals potential output, since interest parity implies interest rates are equated in the steady state. Hence, if different countries experience persisting different demand shocks (for example from external debt or assets), relative prices still cannot simultaneously achieve both external balance and internal balance independently, and we cannot get any help from interest rate differentials which are necessarily zero. Hence the ability to realign in the EMS allows us to dispense with the requirement for relative fiscal discrepancies to deal with persisting relative demand differences only if the realignment rule not only completely neutralizes long-term competitiveness shocks but also independently neutralizes long-term shocks to relative domestic absorption across Member States. It seems altogether more plausible that relative fiscal policies perform this role.

Hence in the long run there is no substantive difference between EMU and EMS. In what follows it is convenient to assume that each country's fiscal policy offsets its own permanent demand shocks. Hence for each Member State

$p=0$ in long-term equilibrium. Equilibrium in the money markets then implies

$$r=0 \qquad\qquad m=y_s$$

so in long-term equilibrium (for a given fixed Q) EMS has the same monetary policy as EMU, even though the money supply of Member States other than Germany is determined by interest parity and the degree of exchange-rate accommodation Q.

If, alternatively, Germany explicitly chooses its money supply to ensure that the aggregate money supply accommodates aggregate supply side growth, then of course the above is true even in the short run.

Hence, we have the complete specification of the steady state in the static EMS. I now proceed to dynamic analysis using the same deviation variables as in the analysis of monetary union. The convenient Aoki factorization into independent $(+)$ and $(-)$ systems works only when the two countries are symmetric in structure. Unlike the EMU case, now German and French monetary policies differ. Even so, the Aoki procedure is still useful.

Dynamics of the $(-)$ system

By analogy with the EMU case, measuring s in deviations from its steady-state level, and noting that then $s=Q\hat{p}$ we now have

$$\hat{y}(1+g_1+a_1)=b_1(Q-1)\hat{p}-c_1(\hat{r}-\hat{p}_{+1}+\hat{p})$$

Interest parity implies $\hat{r}=s_{+1}-s=Q(\hat{p}_{+1}-\hat{p})$ whence

$$\hat{y}(1+g_1+a_1)=-\hat{p}b_1(1-Q)+c_1(1-Q)(\hat{p}_{+1}-\hat{p}) \qquad (28)$$

which differs from the corresponding equation for monetary union only in that b_1 and c_1 are now multiplied by $(1-Q)$. Hence, we can immediately observe (i) that even under the asymmetric EMS regime, the $(-)$ system depends only on $(-)$ variables, and (ii) as Q tends to zero the root of this system tends to the root of the EMU system. Proceeding exactly as in the EMU analysis, the roots γ in Equation (28) satisfy

$$0=(1-\gamma)^2-\omega(1+\gamma)(b_1(1-Q)+c_1(1-Q)(1-\gamma))/(1+g_1+a_1) \qquad (29)$$

Calling the right-hand side $H(\gamma)$ we see that at each γ a larger Q raises $H(\gamma)$. Hence, the stable root is monotonically increasing in Q.

As Q tends to unity (a pure crawling peg enforcing PPP) the convergent root tends to unity, and convergence hardly takes place at all. Whatever the value Q in a static EMS, an immediate move to monetary union ($Q=0$) must increase the rate of subsequent convergence by reducing the stable root γ.

Remaining dynamics

We have been fortunate that the $(-)$ system was so simple to analyse.

The $(+)$ system depends on both $(+)$ and $(-)$ variables because of the asymmetry of monetary policy. As under EMU the IS curve is

$$\tilde{y}(1+g_1+a_2)=b_2(e-\tilde{p})-c_1(\tilde{r}-\tilde{p}_{+1}-\tilde{p}) \qquad (30)$$

The LM curve for the Community is the same as under EMU if the Bundesbank acts as a Stackelberg leader, first predicting the money supplies of other Member States in enforcing their target exchange-rate rules and then setting German money residually to achieve an aggregate money supply for the Community which reflects only aggregate variables for the Community; in that case, the root ρ of the aggregate $(+)$ system is identical to that under EMU.

Of greater interest is the case where the Bundesbank is inward looking, setting German money to reflect only German variables. Specifically, I assume German money grows in line with German full employment output. Letting r denote the German interest rate, we first make use of the decomposition $r=\hat{r}+\tilde{r}$ and then note that from Equation (8) German interest rates will then follow

$$r=\eta(D+(Q-1)\hat{D})=\eta(\tilde{y}+\hat{y}+\tilde{p}+\hat{p}(Q-1)\hat{D})$$
$$=\eta(\tilde{y}+\tilde{p})+\eta(\hat{y}+\hat{p}+(Q-1)\hat{D})$$

whence

$$\tilde{r}=\eta(\tilde{y}+\tilde{p})+\eta(\hat{y}+\hat{p}+(Q-1)\hat{D})-\hat{r} \qquad (31)$$

which compares with $\tilde{r}=\eta(\tilde{y}+\tilde{p})$ under monetary union.

From our analysis of the $(-)$ system above, we know the $(\hat{\ })$ variables are $AR(1)$ with a unique stable root γ. We can now use this.

Using the wage-price equations for the $(+)$ system, and equating coefficients on the predetermined variables in the usual way, we obtain

$$G(\rho)\tilde{w}_{-1}=A\hat{w}_{-1} \qquad (32)$$

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whereas in analysing EMU we simply obtained $G(\rho)\tilde{w}_{-1} = 0$. There are two crucial points to observe. First, the function $G(\rho)$ is the same as for the EMU case: this is because the IS Equation (31) is the same under EMU and EMS and because the relation between $\tilde{r}$ and $\tilde{y}$ in Equation (32) is the same as under EMU except for the additional term in ($\hat{\ }$) variables. Second, it is precisely the presence of this extra term which gives rise to the non-zero right-hand side of Equation (32) in comparison with the zero value under EMU.

For all the $(+)$ variables (prices, output, etc.) which we can denote $\tilde{z}$, the solution to Equation (32) is

$$\tilde{z} - \gamma\tilde{z}_{-1} = \rho(\tilde{z}_{-1} - \gamma\tilde{z}_{-2}) \tag{33}$$

where ρ is the same value as under EMU and γ is the value of the root for the $(-)$ system.

Note that this implies that the aggregate dynamics obey

$$\tilde{z} = (\rho + \gamma)\tilde{z}_{-1} - \rho\gamma\tilde{z}_{-2} \tag{34}$$

exactly as under EMU. In fact if the initial conditions are appropriate, the two regimes will be the same at Community level. To see this, rewrite Equation (34) as

$$\tilde{z} = \rho\tilde{z}_{-1} + \gamma(\tilde{z}_{-1} - \rho\tilde{z}_{-2})$$

so if $\tilde{z}_{-1}$ happens to equal $\rho\tilde{z}_{-2}$, EMS will look exactly like EMU at Community level; otherwise, the EMS follows an error correction mechanism towards the EMU path.

References

Alogoskoufis, G. S. (1990), 'Exchange rate regimes and the persistence of inflation', CEPR Discussion Paper 390.

Begg, D. K. H. (1982), 'Rational expectations, wage rigidity and involuntary unemployment', Oxford Economic Papers.

Bryant, R. C. *et al.* (1989), *Macroeconomic policies in an interdependent world,* International Monetary Fund.

Casella, A. (1990), 'Participation in a currency union', CEPR Discussion Paper 395.

Cohen, D. and Wyplosz, C. (1989), 'The European Monetary Union: an agnostic evaluation', in: Bryant, R. C. *et al., Macroeconomic policies in an interdependent world,* International Monetary Fund.

Dornbusch, R. (1982), 'PPP exchange rate rules and macro-economic stability', *Journal of political economy,* 90, pp. 158-162.

Eichengreen, B. (1990), 'One money for Europe', *Economic policy,* No 10, April, pp. 117-187.

Giavazzi, F. and Giovannini, A. (1989), *Limiting exchange rate flexibility; the European Monetary System.* MIT Press.

Giavazzi, F. and Pagano, M. (1988), 'The advantage of tying one's hands: EMS discipline and central bank credibility', *European economic review,* 32, pp. 1055-1082.

Taylor, J. B. (1979), 'Staggered wage setting in a macro-model', *American economic review,* Papers and Proceedings of the Annual Meeting of the American Economic Association.

Taylor, J. B. (1980), 'Aggregate dynamics and staggered contracts', *Journal of political economy,* 88, pp. 1-23.

Part V

The international dimension

11. International costs and benefits from EMU

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1. Introduction

The costs and benefits to the Community as a whole from the process of European economic and monetary union (EMU) will inevitably be affected by developments in the rest of the world. These are largely external to the process itself. In addition, costs and benefits will also depend on the reactions of non-Europeans and international institutions to the international consequences of EMU. Thus, to assess such costs and benefits requires taking a view on the current and prospective state of the international monetary system and the process of policy coordination among the industrial economies.

The factors that must be considered are both institutional and analytical. To evaluate the former, one must look at the nature of international institutions and their prospective changes. The analytical issues can be put conveniently into three categories. The first has to do with international money, in its unit of account, means of payment and store of value functions. The second has to do with the nature of the exchange-rate regime between the European currency unit (ecu)[2] and the other major currencies. The third has to do with the coordination of monetary and fiscal policies world wide and the international adjustment process. This categorization corresponds closely to the three main aspects of any international monetary system, namely the reserve regime, the exchange-rate regime and the adjustment obligations.

This study is therefore structured as follows: In Section 2 we examine alternative scenarios for the shape of international monetary institutions following the establishment of EMU. We suggest that the major impact will be on the G-7 meetings of finance ministers and central bank governors and the annual G-7 summits. The prospective changes may strengthen the bargaining power of the Europeans in monetary negotiations and are likely to have a small positive impact on other economic negotiations. The impact of EMU on the functioning of other institutions is likely to be minimal, with the exception of the International Monetary Fund (IMF) and the Bank for International Settlements (BIS).

In Section 3 we concentrate on the reserve regime and vehicle currency issues, looking at the potential international role of the ecu and the associated costs and benefits for Europe. We cannot see any significant costs, but we suggest that the potential benefits are also unlikely to be very high in the short run. The establishment of major international reserve and vehicle currencies is a very slow process, unless there are large shocks that cause significant disruption in the world monetary and trading system. History and hysteresis dominate. Although the ecu will be a much stronger contender for eventually usurping the US dollar's role in the international monetary system than even the Deutschmark of a unified Germany, it is unlikely that the change in its status and role with EMU will prove to be the palace *coup* that overturns the US dollar as the main international reserve and vehicle currency. The main potential benefit from European monetary unification is therefore likely to come from the partial substitution of ecu for US dollar reserves in the portfolios of European central banks; the potential costs and benefits that might arise from the ecu taking a reserve role outside the Community are unlikely to be realized soon.

In Section 4, we look at international exchange-rate regimes and the monetary and fiscal coordination process. EMU will reduce some of the uncertainties that impede policy coordination, clearly a benefit. By creating more symmetry in the global process of policy coordination among industrial countries, it will increase the need for (benefits from) explicit coordination. But it is likely to make international coordination of fiscal policy even more difficult and thereby to increase the burden on monetary policy coordination. Finally, EMU will have a wide range of effects on the politics of economic policy coordination. There are likely to be clear benefits to the Community from its greater 'weight' as a single economic player and its enhanced ability to trade off macroeconomic policy commitments against policies on issues such as trade, agriculture, and the environment.

2. European monetary union and international institutions

The main institutions related to the process of macroeconomic policy coordination and surveillance are the IMF, the OECD, the BIS, the annual G-7 political summits, and

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[2] Throughout this paper we use 'ecu' to denote whatever will be the common currency used in the final stage of EMU, though it may well not be constructed or defined like the current ecu, and may indeed take a different name.

the G-7 meetings of finance ministers and central bank governors. How might these institutions adapt to EMU, and what are the likely costs and benefits for Europe? International institutions have a variety of functions. These include the gathering and exchange of information, the setting of standards and guidelines, the creation, policing and enforcement of binding rules, and the redistribution of resources.

Since at least 1985, the key institution in the process of monetary and fiscal policy coordination is the G-7 group of finance ministers and central bank governors. Also important are its various *ad hoc* sub-committees, e.g. G-3 agreements between the USA, Japan and West Germany. The G-7 economic summits, instituted in 1975, are also of paramount importance, as they must endorse some of the important agreements of finance ministers and central bankers. The OECD serves mainly as a vehicle for consultation and the setting of standards and guidelines. It is thus confined mainly to two of the potential functions of international institutions referred to above. On the other hand, the IMF has activities that cover all functions. It is charged with the task of coordinating the financing and adjustment of external imbalances and dealing with international debt (together with the World Bank), and is the main international organization involved in international monetary issues. The BIS mainly serves as a forum for central bank governors in the G-10 countries plus Switzerland to meet independently of finance ministers, partly to coordinate monetary policies, partly to deal with regulatory issues.

Stage I of the EMU process will not create any new European institutions, as it consists of the participation of all European Community (EC) countries in the exchange-rate mechanism (ERM) of the EMS and the liberalization of capital markets. It is thus unlikely that it will generate any pressure for the adaptation of international institutions. It may, however, increase the role of the BIS, as it is likely that the liberalization of capital markets will make speculative attacks on European currencies more likely, and central bank consultations in these episodes will not be limited to intra-EC discussions.

Stage II envisages the creation of the European system of central banks (ESCB), and a commitment to fixed exchange rates. As is recognized by many, Stage II is likely to be a short step to full monetary union. In any case, Stage II will require a common European response to international macroeconomic developments. This need will of course be even more urgent with full EMU. With its associated reduction of monetary sovereignty for individual economies, EMU will in all probability put significant pressure on the current G-7 process. The pressure is likely to come from

non-participants in this process who, having relinquished their monetary sovereignty, may want a bigger say on the international monetary relations of the Community. Such pressure, and the expected refusal of the current summit attendees to expand membership, may be a source of friction in the normal operation of the Community and other institutions.

2.1. The G-7 summits

Such frictions have often arisen in connection with the G-7 summits. As Putman and Bayne (1987) suggest, 'The summits were always bound to arouse anxiety and suspicion among those who were left out. These feelings were keenest among those just outside the circle, whose right to participate, on grounds of economic weight or international influence, seemed only slightly less than those inside' (pp. 148-9). One of the major causes of frictions concerned the role of the European Community. Although the four largest Member States participate in the G-7 summits, smaller countries often take exception to that. As Putman and Bayne (1987) report, there was concern that 'The Community is ... put on one side and the Four will act more and more like a directorate' (p. 151). Although there was an initial attempt to prevent the repetition of the Rambouillet summit on these grounds, the position that was finally adopted was to insist that the President of the European Commission must always be present at the summit, as well as the leader of the country holding the presidency of the Council of Ministers at the time of the summit. This principle was conceded in part for the first London summit of May 1977. Since then, 'Commission participation in the summit and its preparations was extended to cover all the economic items, not just those within Community competence' (*ibid.* p. 151). In fact, from 1977 to 1981 a meeting of the European Council was always held shortly before the economic summit. 'Although no formal mandate was given to those Community members attending the summit, common positions agreed at the European Council — on North-South matters in 1977, on economic policy in 1978, on energy in 1979 — were carried forward to the summit and exercised a considerable influence on the outcome' (*ibid.* p. 152). Since 1981, however, there has been no formal linking of the European Council with the G-7 summits. This may have reflected the change of direction of the summits (less oriented towards specific results), and the lack of European initiatives in the first half of the 1980s.

EMU is unlikely to affect the G-7 summits of Heads of States, but it will certainly have implications for the G-7 finance ministers and central bank governors' meetings. Since 1985, these have taken over many of the functions of the Heads of States' summits on economic policy matters.

There are at least two ways in which the G-7 finance ministers' summit may change in Stage II and beyond. It may simply be reduced to a G-3 summit. Although one may assume that the President of the ESCB would act as the European central bank governor in such a G-3 meeting, it is unclear who would be the finance minister representing the Community. Without other major changes in political institutions, the relevant EC commissioner would not carry as much political clout as the US and Japanese finance ministers. On the other hand, to opt for the finance minister of the country chairing the European Council would create high turnover, which is bound to affect adversely the influence of Europeans on proceedings and decisions. Such an option may therefore be harmful to Europe. The second alternative is for the current G-7 meeting to carry on as now, but with three central bank governors instead of seven. This latter alternative seems more likely, although there will still be more need for the four European finance ministers to coordinate their positions and clear important decisions with the rest of the EC finance ministers. This alternative is likely to be a continuous source of dissatisfaction in the rest of Europe at being excluded from the international coordination process and to result in increased demands for wider participation. Such feelings were certainly there when the G-7 summits were initiated and are likely to strengthen with the process of European economic unification. One solution to this problem could be for the finance minister of the country that presides in the European Council also to take part in the G-7 meetings of finance ministers. The same could apply for the summit meetings.[3]

2.2. The IMF

In regard to the IMF, the two main issues are Article IV consultations and quota obligations with their associated voting rights. It is not clear at this stage how these two issues would be resolved. The alternative solutions to the problem of Article IV consultations are not likely to result in any significant costs or benefits for the Community. If EMU results in the establishment of Community 'Article IV'-type consultations between the European central bank and the finance ministries of the Community members, then IMF consultations may become redundant. A single Community consultation could replace the 12 existing ones. More formal consultations between national governments and the European central bank may become necessary in any case, especially if EMU involves fiscal targets for the member countries. The cost of replacing IMF consultations by Community consultations is unlikely to be high.

The IMF quotas and consequent voting rights of the EC countries might well be unaffected by EMU, since the general principle hitherto has been that separate quotas are associated with politically independent nations. That status might be considered unaltered by EMU alone. We should, however, consider the possible consequences of intra-EC institutional changes that might go so far as to raise this issue.

Table 11.1.

IMF quotas

		(% of total)
USA		19,14
UK		6,63
FR of Germany		5,79
France		4,81
Japan		4,53
	Total EC	28,22

Source: IMF 1989 Annual Report.

If the EC quota were to be calculated by simply aggregating the current quotas of the Community countries, this would make the Community the largest shareholder of the Fund (see Table 11.1), even ignoring any eventual consequences of German unification. Currently, the combined votes of the EC countries exceed those of the United States of America and Japan together. The sum of the quotas of the EC countries already give the Community a veto for many important decisions that require an 85% majority, if these votes are cast jointly. The USA also possesses such a veto.[4]

In the case of a recalculation, it is unlikely that the EC quota would be the sum of the current ones, as intra-Community trade would in all probability be excluded. Such an exclusion would give the Community a much lower quota, and associated voting rights, than a simple addition. It is estimated that intra-Community trade accounts for a little less than 50% of the external trade of Community countries. Even if the quotas of the EC countries were adjusted to exclude such trade fully, the total quota of the EEC would still exceed 15%, giving it a blocking veto for the decisions that require an 85% majority.[5]

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[3] He may of course already be there. In the past three years, the choice of June (1988) and July (1989, 1990) for the summit has ensured that the country presiding in the EC at the time has been a member of the G-7.

[4] Note, however, that the 'constituency system' for the Executive Board suggests that normally the EC votes could not be cast jointly, as some of the EC members belong to constituencies with non-EC countries.

[5] Quotas are in principle calculated according to formulae in which several variables enter: GDP, reserves, average current payments and receipts, and the variability of current receipts. As is clear from the extended negotiations about quota reallocations still under way, there is substantial scope for 'paying due regard to all aspects and functions of quotas in the Fund' (*Source:* an IMF document).

In any case, the issue of IMF quotas is politically complex irrespective of EMU, as is illustrated by current discussions about the increase in the quota of Japan and the relative positions of the UK and France. EMU will add to the complications, as will the question of quotas for Eastern European countries. We cannot speculate on the outcome, and the consequences may depend less on numerical voting power than on the weight of the European Community as a unitary actor, as opposed to the current separate influence exerted by Germany, the UK, France, Italy and other members of the Twelve.

2.3. The BIS and the OECD

Institutions such as the BIS will also be affected by EMU, although it is again unclear in what direction, since we still have no precise specification of ESCB or the eventual European central bank. Currently the BIS is acting as host to the embryonic ESCB; eventually its role will diminish as the European central bank becomes fully autonomous. In any case, BIS changes are unlikely to have an important bearing on the international coordination process. Changes in the role of the OECD, and that of the EC countries in it, are not predictable either. However, they are unlikely to involve significant costs or benefits.

To conclude, the main question mark over the functioning of the current international economic institutions concerns the current G-7 finance ministers and central bank governors meetings, the G-7 political summits and the IMF. The technical issue of substituting the chairman of the ESCB or eventually the governor of the European Central Bank for the current four European central bank governors in G-7 meetings appears straightforward. This may alleviate the coordination problems occasionally besetting EC countries in this forum, and may result in a more effective pursuit of Community goals. What is likely to be less straightforward is the reaction of the increasingly aware smaller European countries to summits that include only the four largest countries of Europe. This could possibly be resolved by an agreement of the G-7 to include the President of the European Council in the political summits (in addition to the President of the Commission) and his finance minister in the finance ministers' meetings.

We see it less likely that the G-7 process will be transformed into a G-3 process, although if it were, European bargaining power would increase. The costs from international institutional changes are, therefore, likely to be small and transitory. The benefits from the better coordination of European positions in these meetings may be greater than these costs, irrespective of whether we have G-7 or G-3 summits. We shall have more to say on these costs and benefits in the

section below on the international coordination of macroeconomic policies. Additional small net benefits for Europe could stem from the possible amalgamation of IMF quotas and voting rights of the Community countries, although it is still unclear what the outcome is likely to be.

3. The international role of the ecu

Whether the European currency (ecu) in Stage III is likely to become a major international currency will depend on several factors. The emergence of major international currencies is a process that is driven by fundamentals, such as the reduction in transaction costs and the economies of scale associated with monetary exchange. Such fundamentals depend on the importance of the issuing economy for international trade and investment, but history and hysteresis are very significant too.

For example, the pound sterling remained the major international currency long after London lost its position as the most important financial centre in the world. The US dollar did not fully emerge as the principal international currency until after World War II. In addition, it took the major shocks of world wars to weaken the hold of the pound sterling in the international economy and strengthen the role of the US dollar. It is also worth noting that the US dollar's importance in the world economy was hardly affected by the breakdown of the Bretton Woods system of fixed exchange rates and the demonetization of gold.

Is it likely that the ecu will emerge as a serious contender for the US dollar in its unit of account, means of payment and store of value roles in international trade and finance? In such a case, will the European Community benefit or lose from issuing a major international currency?

To answer the first question, one must look first at the fundamentals. What is it that makes some currencies assume a pivotal role in the international monetary system?

3.1. The means of payment function

Let us first start with the means of payment function of international money, as many seem to think that this function is instrumental in the emergence of international currencies. According to Cohen (1971), 'An international economy with only national moneys is like a barter economy. ... Transaction costs are high because of the practical problem of achieving the required double coincidence of wants in the foreign exchange market. However, as in a barter economy, transaction costs can be substantially diminished for an

individual if he adapts his own currency mix to that of other individuals, holding for specific use as international exchange intermediaries inventories of the most widely demanded foreign currencies. These are of course the currencies of the countries that are predominant in world trade—the countries that account for the largest proportion of international transactions' (pp. 25-26). To assess the potential role of the ECU we must look to demand for means of international payments by official bodies and by the private sector.

We begin with the demand by official bodies. As Krugman (1984) among others suggests, 'Probably the most important reason for holding reserves in dollars is that the dollar is an intervention currency' (p. 273). The reduced need for exchange market intervention in US dollars by EC central banks that will follow establishment of EMU will entail a decline in the importance of the US dollar as an international means of payment. However, this does not make the ECU a major reserve currency outside the European Community, unless foreign exchange intervention by non-EC countries is also in ecus.

Table 11.2 presents data on the composition of official international reserves.

The share of the US dollar in official reserves, although declining, is overwhelmingly higher than the share of any other single currency. In fact it is higher than the combined share of all other currencies taken together. The share of major European currencies shows a slow increase, especially since the depreciation of the US dollar in 1985 and 1986. It is important to note that these trends are not simply the outcome of revaluations following changes in exchange rates, but also the result of diversification away from the dollar (IMF Annual Report 1989, p. 53).

The data in Table 11.2 probably overstate the position of the US dollar, as (after 1978) they add to the SDR value of US dollar holdings the SDR value of ecus issued against US dollars. If these ecus are treated separately, the share of the US dollar for 1988 falls to 54,5% of the total, and the share of the major European currencies to 20,6%.

Table 11.3 contains a breakdown of the composition of foreign exchange reserves for industrial economies and LDCs. It suggests a much larger trend decline in the share of US dollars for the industrial economies than for LDCs. In addition, the LDCs seem to have diversified towards the Japanese yen rather than European currencies.

Table 11.2.

Percentage share of national currencies in foreign exchange reserves (all countries)

	1973	1976	1978	1980	1982	1984	1986	1988
US dollar	84,5	86,7	82,8	68,6	70,5	69,4	66,0	63,3
Pound sterling	5,9	2,1	1,6	2,9	2,4	3,0	2,8	3,1
Deutschmark	6,7	7,3	10,1	14,9	12,3	12,3	14,9	16,2
French franc	1,2	1,0	1,0	1,7	1,2	1,0	1,2	1,7
Swiss franc	1,4	1,6	2,1	3,2	2,8	2,1	1,9	1,5
Dutch guilder	0,4	0,5	0,5	1,3	1,1	0,8	1,1	1,1
Japanese yen	—	1,2	1,9	4,3	4,7	5,6	7,6	7,2
Major EC currencies	14,2	10,9	13,2	20,8	17,0	17,1	20,0	22,1

Source: IMF.

Table 11.3.

Percentage share of national currencies in foreign exchange reserves (developed countries and less-developed countries treated separately)

	Industrialized economies			LDCs		
	1980	1984	1988	1980	1984	1988
US dollar	77,6	73,6	67,4	59,8	64,9	53,9
Pound sterling	0,7	1,6	1,9	5,0	4,4	5,7
Deutschmark	14,3	14,8	18,3	15,5	9,7	11,9
French franc	0,5	0,4	1,6	2,9	1,7	1,9
Swiss franc	1,7	1,4	1,0	4,7	2,8	2,6
Dutch guilder	0,7	0,6	1,1	1,9	0,9	1,0
Japanese yen	3,3	6,3	6,4	5,3	5,0	9,0
Unspecified	1,2	1,2	2,3	4,9	10,6	14,1
Major EC currencies	16,2	17,4	22,9	25,3	16,7	20,5

Source: IMF.

The trend decline in the share of US dollar reserves in the portfolios of central banks of industrial economies is likely to be reinforced as a result of the process of EMU, since European central banks will stop intervening in US dollars to support their currencies. The ecu may also become a substitute for US dollars in the portfolios of non-EEC central banks that decide to peg their exchange rate to the ecu. For example, the EFTA countries appear to be pegging to the EMS already (see below), although officially they are either floating or pegging to a basket of currencies (Gylfason (1990) discusses the exchange-rate policies of the Nordic countries). In addition, liberalization in Eastern Europe may proceed to the point where these countries contemplate full convertibility. That would increase their demand for reserves in which the ecu is likely to occupy an important position.[6]

Thus, EMU is likely to result in substitution of ecus for US dollars. The extent of this potential substitution will be limited by hysteresis, but it could gather pace if the US dollar enters a prolonged period of weakness. One cannot rule out a prolonged weakness of the US dollar, especially if there is loss of confidence because of a failure to correct global current account imbalances and the growth of US debt. The position of the ecu may also be strengthened if there is an overall increase in the demand for reserves by central banks. Since 1985 official circles have been much more positive towards exchange-rate management, whether through *ad hoc* macroeconomic policy coordination, or

through some rule based system. One expects an increase in the demand for reserves when there is a commitment to defend the exchange rate (see Dooley *et al.* (1989); Black (1985), however, suggests that the evidence on that is mixed).

We next turn to the means of payment function of international money as it applies to the private sector. Note that whereas international transactions in goods markets are arranged between importers and exporters, eventual payment is intermediated through commercial banks. Thus, what one should look for are the 'thickness' externalities that cause dealers to prefer indirect exchanges through a vehicle currency to direct exchanges of one currency for another. These externalities have to do with the problem of double coincidence of wants that money is supposed to be solving. If there are many dealers prepared to exchange US dollars, then a dealer wishing to exchange pesetas for drachmas may find it less costly to go through two exchanges, one of pesetas for US dollars and one of US dollars for drachmas, than to try to find a dealer holding drachmas who wants to exchange them for pesetas. A vehicle currency may emerge in the interbank market even in the absence of direct use of the currency by importers and exporters.[7]

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[6] Poland introduced convertibility of the zloty in trade transactions on 1 January 1990, with an adjustable peg for the exchange rate, but it pegged against the US dollar.

[7] There is a theoretical literature investigating the emergence of media of exchange when there are are more than two traders. Excellent examples are the models of Jones (1976) and more recently Kiyotaki and Wright (1989). Typically such models have a multiplicity of equilibria. For example, in the Kiyotaki and Wright model there are equilibria with one money, but also equilibria with more than one. What this model would imply for the problem at hand is that the ecu may fail to dent the US dollar's position in interbank markets, although one cannot discount the possibility that its importance in trading in Europe and its periphery is such as to make it emerge as a significant regional (secondary) reserve currency.

In a recent article on turnover in the foreign exchange market, the Banca d'Italia *Economic bulletin* reported on a survey of 21 countries in April 1989. Europe accounted for 50% of the volume of transactions, of which half was in London. The US dollar still accounts for 45% of total turnover; the Deutschmark and yen together for slightly over 25%. In Italy (a useful 'representative' case), the US dollar and Deutschmark account for 39% and 32% of non-lira turnover, respectively, and for 54% and 24% of lira turnover. In the forward market the US dollar accounts for 40% of transactions against other foreign currencies and 97% of transactions against the lira.

The market for the ecu will be thicker than the market for any of the current EC currencies, making it more likely that the ecu will emerge as a medium of exchange in interbank markets. Thus, the fundamentals point towards a potentially large utilization of the ecu in interbank markets. If this process starts, it will be self-sustained, because of the externalities involved. However, it is also worth noting that despite the fundamentals, hysteresis plays a large role in the adoption of a currency as an international means of payment. To paraphrase Newlyn (1962), international money 'falls within that perplexing but fascinating group of phenomena ... affected by self-justifying beliefs. If the members of a community think that money will be generally acceptable, then it will be; otherwise not' (p. 2).

For both the interbank market and the non-bank private sector the ecu will not be adopted unless banking in it is as cheap as the alternatives. Whether this will be the case will depend on the success of financial deregulation in bringing down the cost of banking in the European Community.

3.2. The unit of account function

We can next turn to the unit of account role of international money. This is closely linked to the means of payments role for national economies, although less so in the international monetary system. The unit of account role for an international currency depends first on whether importers and exporters invoice in that particular currency. Black (1985) presents evidence that whereas European firms invoice a very large proportion of their exports in their own currency, the proportion of their imports that is invoiced in other currencies, and especially in US dollars, is quite significant. On the other hand, Japanese firms invoice mainly in US dollars, while more than 70% of LDC exports, 95% of OPEC exports and 85% of Latin American exports are invoiced in US dollars.

EMU will result in increased invoicing in ecus by EC firms. It is also quite possible that the economies of scale created by the substitution of a number of European currencies by a single one will induce firms from other areas that trade mainly with the European Community to start invoicing in ecus. This may include the EFTA countries, many Middle Eastern and Mediterranean economies, as well as the newly liberalizing economies of Eastern Europe. It may also include Japanese and US firms, as they may also be able to benefit from such economies of scale. To the extent that trade relations become concentrated in regional blocs (e.g. Europe-Africa, Japan-Asia, USA-Latin America), we might expect multiple vehicle cum unit-of-account currencies. But in so far as trade is uniformly distributed geographically and fully multilateral, there will still be powerful forces behind the use of a single dominant currency for these roles. In the latter case inertia will favour the US dollar. For example, it seems unlikely that the OPEC countries will switch from US dollar to ecu invoicing in the short to medium term.

The second aspect of the unit of account role of an international currency is related to whether there are countries that peg their own currency against it. Table 11.4 reports the number of countries that peg their exchange rate to the US dollar and other currencies. This is also a reflection of the importance of a currency as an international unit of account. Of the 55 countries that either peg their currency or maintain limited flexibility against a single other currency (all these are LDCs), 36 do so against the US dollar.

Table 11.4.

Exchange-rate arrangements, 31 March 1989: number of countries that peg against a single currency

Fixed peg	
US dollar	32
French franc	14
Other	5
Limited flexibility	
US dollar	4

Source: IMF (1989).

What is revealed in Table 11.4, and the data on invoicing of exports and imports, is that the ecu will have a long way to go before it becomes a major international unit of account. A number of factors will affect its prospects. One is the momentous changes in Eastern Europe. The Eastern European economies will necessarily have closer trade and financial links with Western Europe than with the United States

of America or Japan. This makes it far more likely that both their firms and their central banks will use the ecu as a unit of account.[8] The process will also depend on the stability of exchange rates between the US dollar, the yen and the ecu. If there is no prompt tackling of the global current account imbalances between Europe, Japan and the USA, it is quite possible that the US dollar will depreciate significantly against the yen and European currencies. Such US dollar weakness may improve the chances of the ecu (and the yen) to substitute for the US dollar as an international unit of account.

Table 11.5, which reports exchange rates against the Deutschmark for a number of currencies, shows a tendency

for the EFTA currencies to fluctuate less against the Deutschmark than against the US dollar. Compare for example their behaviour during the period of the US dollar's rise to that of the currencies of the Asian NICs. Whereas the currencies of the NICs rose together with the US dollar in the 1981-84 period (with the exception of the Hong Kong dollar which is more linked to sterling), the EFTA currencies were more linked to the Deutschmark. In addition, since 1987, when realignments in the EMS stopped, the EFTA currencies shadow the EMS quite closely (especially the Swiss franc and the Austrian schilling). Thus, exchange-rate developments in the 1980s suggest that the ecu may be an important unit of account for other economies with strong links with the European Community, such as the current EFTA currencies (see Gylfason (1990) for the Nordic countries).

Traditionally, the means of payment (international reserve) and unit of account (vehicle currency) functions of money go hand in hand. This was the case with the pound sterling

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[8] However, this tendency will not be unopposed, either at the micro- or at the international macro-level. A symbolic example is the reported resistance from the United States of America to the use of the ecu as the unit of account for fixing the quotas of the new European Bank for Reconstruction and Development.

Table 11.5.

Exchange rates against the Deutschmark

Country	Currency	1978	1982	1984	1986	1987	1988	1989
EEC								
France	Franc	2,25	2,70	3,07	3,20	3,34	3,39	3,39
Italy	Lira	423	557	617	687	722	741	729
UK	Pound sterling	0,26	0,24	0,26	0,32	0,34	0,32	0,35
Belgium	Franc	15,7	18,8	20,3	20,6	20,8	20,9	21,0
Denmark	Krone	2,75	3,43	3,64	3,73	3,81	3,83	3,89
Greece	Drachma	18,3	27,4	39,5	64,4	75,2	80,6	86,2
Ireland	Irish pound	0,26	0,29	0,32	0,34	0,37	0,37	0,37
Netherlands	Guilder	1,08	1,10	1,13	1,13	1,13	1,13	1,13
Portugal	Escudo	21,9	32,3	51,3	68,4	78,3	81,9	83,5
Spain	Peseta	38,2	45,3	56,6	64,6	68,7	66,3	62,9
EFTA								
Austria	Schilling	7,24	7,03	7,03	7,03	7,03	7,03	7,04
Finland	Markka	2,05	1,98	2,11	2,34	2,45	2,38	2,28
Norway	Krone	2,61	2,65	2,87	3,41	3,75	3,71	3,66
Sweden	Krona	2,25	2,58	2,91	3,29	3,53	3,49	3,42
Switzerland	Franc	0,89	0,84	0,83	0,83	0,83	0,83	0,87
USA	Dollar	0,50	0,41	0,35	0,46	0,56	0,57	0,53
Japan	Yen	104	103	84	78	80	73	73
NICs								
Singapore	Dollar	1,13	0,88	0,75	1,01	1,17	1,15	1,03
Taiwan	Dollar	18,5	16,1	13,9	17,5	17,7	16,2	13,9
South Korea	Won	241	301	284	407	459	416	354
Hong Kong	Dollar	2,33	2,50	2,75	3,60	4,34	4,45	4,25

The exchange rates are annual averages. *Source*: OECD *Economic outlook* (December 1989).

during the gold standard, and with the US dollar during the Bretton Woods system and beyond. It is very likely that the ecu will eventually become a far more important unit of account and means of payment than any of the current European currencies. But this process will be slow. Although the fundamentals look right, hysteresis is very important in such processes. Much will depend on whether the US dollar displays weakness because of the persistence of global imbalances, as well as on the attitudes of traders in the interbank, the Japanese and the LDC markets. In any case, the ecu is very likely to displace the US dollar in Europe and its immediate periphery, and thus to become an extremely important regional means of payment and unit of account.

3.3. The store of value function

The final issue related to the fundamentals of whether the ecu will become an important international currency has to do with the willingness of private investors to hold ecu assets. Some of the factors that affect the international investor also affect central banks, although central banks have an additional transactions motive as they have to intervene in support of their currencies.

As in the case of central bank reserves, US dollar bonds make up a significant proportion of the international bond market. Table 11.6 contains some selected data.

The data suggest a small decline of the role of the US dollar since the early 1980s, and a slight increase in the share of EC currencies, from 15,1% in 1982 to 17,5% in 1989. However, it is worth noting that the slight US dollar retreat has

been accompanied by a sharp rise in the share of Japanese yen-denominated bonds.

Clearly the fundamentals are related to risk and return. A number of developments may work in the ecu's favour in the medium term. First we may witness a diminution of the so-called 'safe haven' motive for US dollar holdings. If *détente* between East and West and the liberalization of the Eastern European economies prove durable, Europe may eventually seem a much safer 'haven' than previously. This, together with the liberalization of financial markets in the European Community, could increase the attractiveness of ecu-denominated assets. The second factor at work may be the anti-inflationary reputation of the Bundesbank, if it can credibly be transferred to the ESCB, and eventually the European central bank. It goes without saying that there is a downside. If liberalization in Eastern Europe and *détente* were to stall or be reversed, it will be that much more difficult for ecu assets to displace US dollar assets in international portfolios.

At this stage, the uncertainties involved are reflected clearly by the December 1989 OECD *Economic outlook:* 'Over a longer period, portfolio diversification considerations point to some factors that could continue to favour the US dollar, but others that are unfavourable. On balance, the unfavourable factors could be the stronger' (p. 44). Among such factors the OECD suggests that 'the growing importance of the ecu in financial transactions — notably bond issuance — combined with the creation of the EC single market and progress toward some form of monetary union in Europe, could over the longer term result in a significant erosion of the status of the dollar as "the" international currency'

Table 11.6.

Currency structure of the international bond market (total stocks, end of year)

	1982		1988		1989	
	billion US dollars	%	billion US dollars	%	billion US dollars	%
Total	259,1		1 085,4		1 175,7	
US dollar		56,1		43,3		45,8
Swiss franc		16,4		12,8		11,2
Japanese yen		6,4		12,2		10,4
Deutschmark		12,1		9,6		7,5
Pound sterling		1,8		6,7		6,1
Ecu		1,2		4,3		3,9

Source: BIS (1990).

(pp. 44-45). On the other hand, the 'thickness externalities' discussed above in respect of trade are not absent from financial transactions. Here, however, worldwide financial integration and globalization seem inexorable, in contrast to the possibility of regional trading blocks. Thus, financial globalization may favour the continued dominance of the US dollar.

3.4. Transitional issues

It is worth considering in somewhat more detail the process by which the ecu could become a major international currency. For this to happen there must be a demand for ecus from the rest of the world, but there must also be a matching supply. Given that one expects a fall in demand for US dollar reserves in the European Community, ecus will only be accumulated in the rest of world if there is a series of balance of payments deficits in the European Community, financed by either ecu-denominated bonds or currency. Whether the deficits are due to the current or capital account matters only in so far as current account deficits are usually seen as a sign of weakness, and may undermine the credibility of the European central bank. If past trends and current fiscal policies are maintained, however, only a sharp fall in private savings (a possible consequence of financial deregulation) could lead to the European Community running significant current account deficits. Table 11.7 reports current accounts as a percentage of GNP/GDP for the European Community, Japan and the USA.

Table 11.7.

Current balances of the EEC, Japan and the USA (% of GNP/GDP)

	1971	1976	1981	1986	1987	1988	1989	1990	1991
EEC	0,8	− 0,6	− 0,7	1,4	0,9	0,3	0,1	0,2	0,2
Japan	2,5	0,7	0,4	4,4	3,6	2,8	2,2	2,1	2,2
USA	− 0,1	0,2	0,3	− 3,1	− 3,2	− 2,6	− 2,3	− 2,1	− 2,1

Source: OECD *Economic outlook* (December 1989).

The data and the estimates and projections of the OECD for 1989-91 suggest that the European Community will continue with small current account surpluses. Thus, assuming there is a demand for the ecu outside the European Community, a build-up of ecu balances would require significant private and official capital outflows. If the European Community becomes an important capital exporter to the rest of the world, then the ecu may eventually become a widely held international currency. It was exactly this process that led to the establishment of the international role of sterling in the nineteenth century and the role of the US dollar after World War I. The US current account deficits of the 1960s undermined the US dollar's role, and the same is true for the current account deficits of the 1980s. However, because of the substantial hysteresis involved in the process, the US dollar still retains the prime position in the international monetary system.

What also has to be considered in assessing the prospects of the ecu as an international currency is the willingness of the Europeans to allow it to become one. There may be resistance on the part of the European central bank to the wide-spread international use of the ecu because of a perceived burden of acting as an international lender of last resort. Note that the post-war prohibition on the part of the UK of the use of sterling balances for third country credits may have been a stimulus to the growth of the Euromarkets, and that the Bundesbank was reluctant to have the Deutschmark used as an intervention currency in the EMS because this would have led to increased external influences on domestic monetary policy.

If the European central bank pursues the opposite route of actively promoting the international use of the ecu, one cannot discount the possibility of a tug of war between the ecu, the incumbent (the US dollar) and the major other contender (the yen) for international monetary supremacy. This could be a dangerous development. One might draw this lesson from the inter-war experience of the rivalry between pound sterling and the US dollar, with the French franc in the sidelines (Eichengreen, 1987). Even without such a potential rivalry, if EMU results in large-scale substitution of ecu for US dollar balances, the tendency for ecu appreciation *vis-à-vis* the US dollar may be a cause for concern.

There may well be an increased need for better monetary policy coordination at the international level to cope with such an eventuality. This danger, and the growing dissatisfaction with the current international monetary system, raise the possibility that in the medium term we shall see a strengthening of the SDR as both an international unit of account and an international reserve asset. Such a development was likely even before EMU was on the cards. EMU may increase its likelihood.

3.5. Costs and benefits

In the light of the above, the major short-term international benefits for Europe from the creation of EMU are likely to come from the substitution of ecu for US dollar assets in European portfolios. This will be because the need for intervention (traditionally conducted in US dollars) by European central banks will be eliminated. Therefore, the required US dollar reserves of the European central bank, or even the ESCB in the second stage of the Delors plan, will be far smaller than the current European US dollar reserves. The reduction of demand for US dollars is likely to be significant within Europe in general, as the proportion of intra-European trade is very high, and likely to grow even more with the 1992 programme.

Whether the European money (ecu) in Stage III is likely to become a major international reserve or vehicle currency will depend on several factors which were analysed in some detail. These include the possibility that the Eastern European economies and the EFTA countries will use the ecu as a unit of account and a medium of exchange, the likelihood that the ecu will be used increasingly in the interbank market, and the likely reduction of European risks following disarmament and the developments in Eastern Europe.

Although the fundamentals point towards a possibly significant role for the ecu in the international monetary system, it is nevertheless worth noting that the emergence of major international vehicle and reserve currencies is a very slow process. It is driven by fundamentals, but history and hysteresis are very important. We find it unlikely that the ecu will be a serious contender for the position of the US dollar in goods and asset trade that does not involve Europe and its immediate periphery. This opinion is based on our assessment of the fundamentals and on hysteresis. On the other hand, the ecu will substitute for the US dollar in intra-European trade and investment.

In the light of the above, what are the likely costs and benefits for Europe? The costs lie partly in the lender of last resort function of the central bank issuing a leading world currency. Such costs are currently shared between the IMF, the Federal Reserve Board, the Bank of Japan and the Bundesbank. We do not envisage that EMU will upset the current sharing of responsibilities, apart from substituting the ESCB for the Bundesbank in this role. Thus, it is unlikely that there will be additional costs on that score for the European Community as a whole.

The ecu foreign exchange market will be thicker than the markets of individual EC currencies. Thick markets are inherently less volatile than thin markets, but they are also harder to control by official intervention. Even if volatility were to increase, however, the costs may be very small. For example, Baxter and Stockman (1989) failed to find any real effects from the higher volatility of real exchange rates under flexible exchange-rate regimes, although Kenen and Rodrik (1986), and Perée and Steinherr (1989) have done so.

We finally come to the question of international seigniorage. If the ecu were to become a major international currency, there would be possibilities of raising seigniorage from the rest of the world. What would be the quantitative significance of such seigniorage? A comparison with other international currencies may be instructive. Cohen (1971) estimated that the seigniorage extracted from the fact that pound sterling was still a major regional currency in the 1950s and 1960s was almost zero. On the other hand, recent estimates by the Federal Reserve Board put the stock of US dollar notes and coins held outside the United States at about USD 130 billion. With treasury bill rates of the order of 8% per annum, this amounts to around USD 10 billion per annum, which is equal to about 0,2% of the 1988 US GNP. Corresponding numbers for the European Community would be substantially lower. If they were to rise to one-fifth of the US dollar seigniorage (say USD 2 billion), then international seigniorage would amount to about 0,05% of EC GNP. Even that figure may be optimistic in the short to medium term.

4. EMU, international exchange rate regimes and the coordination of macroeconomic policies

A number of issues arise in this connection. These include both technical and more fundamental questions relating to macroeconomic policy coordination and the stability of the international monetary system.

4.1. Exchange market intervention

The most prominent of the technical questions relate to the nature of exchange market intervention in Stages II and III.

Who will intervene to influence the external value of the ecu *vis-à-vis* the US dollar and the yen in Stage II? In what currency will this intervention take place? How is the ESCB going to coordinate intervention? In whose debt will open market operations be conducted? Some of these questions also arise for Stage III of full monetary union, although it is then clear that intervention will be decided by the European central bank.

The problem of coordinating exchange market intervention in Stage II of the Delors plan is unlikely to create any major additional costs for Europe. This problem has been successfully tackled at the intra-EC level in the current EMS, where there have been substantial periods without realignments of central parities. Detailed technical consultations will be necessary to formulate operating rules, and some internal (distributional) conflicts may arise, but these can be resolved. The more difficult problem may be to agree, both internally and with the USA and Japan, on the desired range for the value of the ecu and the macroeconomic policy mix needed to sustain it.

This brings us directly to international macroeconomic policy coordination. There are several types of uncertainty that constitute obstacles to successful coordination (see Frankel, 1988). The players may have incomplete or inaccurate knowledge of the initial position—the state of their own economies and those of other players. We may expect EMU and the associated development of intra-EC surveillance to improve this knowledge. Similarly, it should improve our understanding of the behaviour of the aggregate EC economy, thus reducing uncertainty about the effects of policies (model uncertainty). On the other hand, it may be more difficult for the Community as a whole to agree on the weights to assign to target variables than for the individual major EC economies that now participate in G-7 coordination. Without formal modelling, however, it is hard to say *a priori* whether coordination is easier with seven players having relatively well-defined objectives than with four, of whom one then speaks with somewhat less clarity. At this stage of our knowledge it is unlikely that we could obtain analytical results for such a problem. Nor is it clear whether the need for (benefit from) coordination is greater or smaller: there is no such need with only one agent, nor with an infinite number of atomistic agents. However, we know very little about how the costs of coordination failures vary between these two extremes.

4.2. Monetary policy coordination and the international monetary system

An important set of issues relates to analytical aspects of the international coordination of monetary policies. Is the

reduction in the number of major players in the international monetary arena likely to make coordination of monetary policies easier? Will EMU promote greater exchange-rate instability world wide, i.e. between a European currency and the US dollar and the yen? Some of the relevant factors can be examined with the help of three-country models. A major prior question is whether the USA currently acts as a Stackelberg leader *vis-à-vis* the G-7. If so, the emergence of another major player (in fact two — the European Community and Japan) will transform the nature of the game.

For example, Giavazzi and Giovannini (1989) suggest that more symmetry may generate instability in the international monetary system. If one economy is much larger and more closed than the others, it may be quite happy to act as a Stackelberg leader, using the money supply as its monetary policy instrument, without regard for its nominal exchange rate. One may then have an equilibrium in which the large economy sets its money supply, while the small economies intervene to affect their nominal exchange rates. However, if another major player were to emerge, in the absence of full cooperation, the greater symmetry may lead to instability. Both economies will have an incentive to try to use exchange-rate policy, as their bilateral exchange rate *vis-à-vis* the other large country matters more, and in such a case instability will arise. Thus, in the presence of large shocks we may see both economies trying to manipulate their exchange rates, i.e. use beggar-thy-neighbour monetary policies, in which case there is a reversion to flexible exchange rates. As the above authors put it, 'when the size of the Nth country is much larger than that of the other country (or countries), so that bilateral exchange-rate fluctuations do not significantly affect the Nth country's output and real income, a regime of managed rates does not display the instability that characterizes the symmetric case' (p. 208). These results suggest that the greater symmetry that EMU will imply for the international monetary system may result in a reversion to flexible exchange rates internationally.

Our view is that such a conclusion is unwarranted in the circumstances. The international monetary system today is not as asymmetric as (say) the classical gold standard or Bretton Woods. The leadership of the USA has been significantly eroded, and Japan and Germany have emerged as major players (see Group of Thirty, 1988).[9] Thus, EMU will not result in a qualitative switch from an asymmetric to a symmetric system, as the current system is already symmetric in many ways. In fact, the current arrangements, especially

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[9] In any case, there is a great deal of conclusion about the definition of leadership in a repeated game. Stackelberg leadership is not an appropriate concept, and even the less precise notion of asymmetry may no longer be appropriate.

after the meetings at the Plaza in September 1985, can be interpreted as cooperative management of exchange rates and world monetary policy by the G-7. For example, Funabashi (1988) in his wide-ranging assessment of the process from the Plaza to the Louvre suggests that 'One of the achievements of the Plaza strategy was to force consensus despite the existence of ideological obstacles' (p. 229). To the extent that the current international monetary system is already symmetric and cooperative in the setting of monetary policies, there is little scope for EMU to destabilize it. In fact, Germany and France in the Plaza to the Louvre process clearly had the concerns of the EMS in mind. According to Funabashi 'as the EMS factor was vital to the West German Plaza strategy, so it was to that of the French. The Germans sought to avoid a painful schism within the EMS that a free fall of the dollar might cause, while the French wanted to keep the West Germans from taking over the EMS' (p. 125).

Thus, the shift to a more symmetric system as a result of EMU will not be substantial. The current system already seems to be characterized by some cooperative determination of monetary policies with exchange-rate targets, although it may be second-best in that there is little use of fiscal policies for stabilization purposes (Alogoskoufis, 1989). In fact, in many ways the system resembles the blueprint of Williamson and Miller (1987), although there is the important difference that the central parities that constitute the targets of the monetary authorities of the G-7 are not publicly announced (see Miller et al., 1989, for theoretical and empirical investigations of alternative blueprints).

In conclusion, EMU is unlikely to undermine the evolution of the international monetary system towards greater nominal exchange-rate stability between the US dollar, the yen and European currencies. Monetary policies are already being determined in a coordinated manner, and this looks likely to continue in so far as there is no clear hegemony in the system. If anything, more symmetry among the players is likely to increase the need for (benefits from) coordination. An EC currency can unilaterally peg to the Deutschmark (accepting EMS discipline), but the ecu cannot unilaterally peg to the US dollar or the yen — close and reciprocal monetary policy coordination will be required to maintain exchange-rate stability (see Portes, 1989).

There must be clear responsibilities for ecu exchange-rate policy. There are two aspects, namely the choice of international monetary regime and the implementation of the exchange-rate policy. Given the policy regime, the implementation of exchange-rate policy will naturally be in the domain of the European central bank. However, finance ministers, both in the European Council and the G-7, will ultimately decide the Community's views on the choice of regime and will also be involved in issues such as (for example) the determination of target zones.

4.3. Coordination of fiscal policies

Issues relating to the international coordination of fiscal policies and the adjustment of external imbalances should also be considered. Recent discussions of blueprints for international monetary reform and their associated assignment rules provide an appropriate context.

Nation States will remain sovereign even under EMU. Under the most probable institutional scenarios examined in Section 1, and unless the provisions envisaged in the Delors Report are adopted in their most extreme form, it is unlikely that the nature of the fiscal coordination game will change significantly. But fiscal outcomes will condition the Community-wide monetary policy. In addition, without independent national monetary policies, there will be more pressure in individual countries to use fiscal policy for domestic stabilization, as well as incentives to consider incomes policies. On the other hand, EC-level taxation and expenditure cannot be expected to grow markedly relative to national budgets, nor to become significantly more amenable to use as tools of discretionary stabilization policy.

On balance, therefore, EMU is likely to make international coordination of fiscal policies more difficult and increase the burden on monetary policy coordination. This could be counted as a significant cost if it were thought that fiscal policy coordination has played or could otherwise in future play an important positive role in maintaining global stability and growth. This does not seem to have been the case in recent years, and indeed fiscal policy is seen as the Achilles' heel of the current international monetary system. Both the IMF and the OECD highlight the medium-term dangers from the lack of coordination of fiscal policies world-wide. For example, the October 1989 IMF *World economic outlook* suggests that 'The prospect of sizeable and persistent current account imbalances among the three largest industrial economies continues to cloud the medium-term outlook' (p. 1). It then proceeds to discuss the reasons for these imbalances, giving emphasis on fiscal policies. On the other hand, the December 1989 OECD *Economic outlook* suggests that 'Full implementation of fiscal policy commitments and closer cooperation in dealing with systemic financial market issues would further domestic objectives, while at the same time it would reduce the burden on monetary policy in achieving exchange rate objectives' (p. XV).

There are a number of ways in which EMU may help this process. The first has to do with the rules envisaged in the

Delors Report for limits on national budget deficits. It now seems unlikely that such precise limits will be applied, but EMU may well result in more fiscal coordination within Europe. On the other hand, to the extent that European fiscal policies are coordinated, the EC may have more bargaining power in international institutions like the G-7, to avoid a repetition of the outcomes of the early 1980s, when disagreements among the Europeans weakened pressure on the US administration to consider the international repercussions of its macroeconomic policy mix. For example, Putnam and Bayne (1987) suggest that since 1981 'the non-American summit participants would be unanimous in complaining about US interest rates, the budget deficit and the strength of the dollar, at least until the dollar turned down in 1985. But there was less unanimity about causes and cures. The simplest remedy, which appealed to the French socialists, would be for the Americans to loosen their monetary policy. However, the other governments were committed to the path of monetary rectitude embarked upon after the second oil price shock, and they were uneasy about recommending the opposite course to the Americans. ... Thus, ... the Americans mostly temporized. "Wait a while", was their message in Ottawa; "Let's study it", the approach in Versailles; "Our boom will solve it", the line in Williamsburg; and "After our elections", the promise at London II. Serious action on the dollar and the budget deficit had to wait till 1985' (pp. 127-28).

The question of whether EMU would increase potential coordination gains for the rest of the world and therefore induce the USA to be more cooperative does not admit an easy answer. The available empirical evidence does not suggest that it would. For example, as Currie *et al.* (1989) report in their recent survey (p. 26), the US benefits from coordination in empirical studies appear to be half as large as the benefits for Europe, irrespective of whether one examines coordination between the USA and Germany or between the USA and the European Community.

Economic policy coordination is ultimately and essentially political. Distributional issues must be resolved by a political process, both among countries in the European Community and between the Community and its partners. Even if policy coordination is expected to bring gains, it will not be implemented unless there is some *ex ante* understanding about the distribution of such gains. The bargaining necessary to reach such an understanding will be easier for the Community as a unit *vis-à-vis* the USA and Japan than for the four major EC countries acting individually in the G-7. On the other hand, *ex post* verification of compliance with an agreement on policies and enforcement of sanctions for non-compliance may be harder for the USA and Japan *vis-à-vis* the European Community than in dealing with individual countries. And it will take some time for the European Community to establish the credibility in implementing policy commitments that some of its major member countries currently possess.

This political balance is therefore mixed. It swings significantly towards the benefits side, however, when we take into account the greater geopolitical 'weight' of the European Community as a single economic player and its enhanced ability to trade off macroeconomic policy changes against other policies in areas such as trade, agriculture, and the environment. This may well be a major consideration for EC leaders. The single European market programme, moves towards EMU, and the 1989 revolution in Eastern Europe have stimulated a reassessment of Europe's role. Many Europeans still perceive significant asymmetries in the operation of the international economic system and find any remaining US leadership unacceptable. They believe that EMU will bring about greater symmetry, and that belief may be partly self-fulfilling, whatever the costs and benefits.

References

Alogoskoufis, G. S. (1989), 'Stabilization policy, fixed exchange rates and target zones', in: Miller, M., Eichengreen, B. and Portes, R. (eds.), *Blueprints for exchange rate management,* London, Academic Press (for CEPR).

Baxter, M. and Stockman, A. C. (1989), 'Business cycles and the exchange rate regime: some international evidence', *Journal of monetary economics,* 23, pp. 377-400.

Black, S. (1985), 'International money and international monetary arrangements', in: Kenen, P. B., and Jones, R. W. (eds.), *Handbook of international economics,* Volume 2, Amsterdam, North-Holland.

Cohen, B. J. (1971), *The future of sterling as an international currency.* London, Macmillan.

Currie, D. A., Holtham, G. and Hughes Hallet, A. (1989), 'The theory and practice of international policy coordination: does coordination pay?', in: Bryant, R. C., Currie, D. A., Frenkel, J. A., Masson, P. R., and Portes, R. (eds.), *Macroeconomic policies in an interdependent world,* The Brookings Institution, Centre for Economic Policy Research and International Monetary Fund.

Dooley, M. P., Lizondo, J. S. and Mathieson, D. J. (1989), 'The currency composition of foreign exchange reserves', *IMF staff papers,* 36, pp. 385-434.

Eichengreen, B. (1987), 'Conducting the international orchestra: Bank of England leadership under the classical gold standard', *Journal of international money and finance,* 6, pp. 5-29.

Frankel, J. (1988), *Obstacles to international macroeconomic policy coordination,* Studies in international finance, No 64, Princeton University.

Funabashi, Y. (1988), *Managing the dollar: from the Plaza to the Louvre,* Washington DC, Institute for International Economics.

Giavazzi, F. and Giovannini, A. (1989), 'Monetary policy interactions under managed exchange rates, *Economica,* 56, pp. 199-213.

Group of Thirty (1988), *International macroeconomic policy coordination,* New York and London, Group of Thirty.

Gylfason, T. (1990) 'Exchange rate policy, inflation and unemployment: the experience of the Nordic countries', *CEPR discussion paper,* No 377, London.

Jones, R. A. (1976), 'The origin and development of media of exchange', *Journal of political economy,* 84, pp. 757-75.

Kenen, P. B. and Rodrik, D. (1986), 'Measuring and analysing the effects of short-run volatility in real exchange rates', *Review of economics and statistics,* 68, pp. 311-15.

Kiyotaki, N. and Wright, R. (1989), 'On money as a medium of exchange', *Journal of political economy,* 97, pp. 927-54.

Krugman, P. (1984), 'The international role of the dollar: theory and prospect', in: Bilson, J. F. O. and Marston, R. C. (eds.), *Exchange rate theory and practice,* Chicago, University of Chicago Press (for NBER).

Miller, M., Eichengreen, B. and Portes, R. (1989), *Blueprints for exchange rate management,* London, Academic Press (for CEPR).

Newlyn, W. T. (1962), *Theory of money,* Oxford, Oxford University Press.

Perée, E. and Steinherr, A. (1989), 'Exchange rate uncertainty and foreign trade', *European economic review,* 33, pp. 1241-64.

Portes, R. (1989), 'Macroeconomic policy coordination and the European Monetary System, *CEPR discussion paper,* No 342, London (Forthcoming in Ferri, P. (ed.), *Ten years of the EMS,* London, Macmillan).

Putnam, R. D. and Bayne, N. (1987), *Hanging together: cooperation and conflict in the seven power summits* (revised edition), Cambridge Mass., Harvard University Press.

Williamson, J. and Miller, M. (1987), *Targets and indicators: a blueprint for the international coordination of economic policy,* Washington DC, Institute for International Economics.

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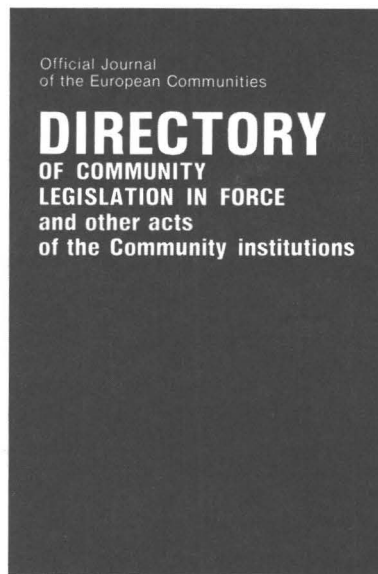
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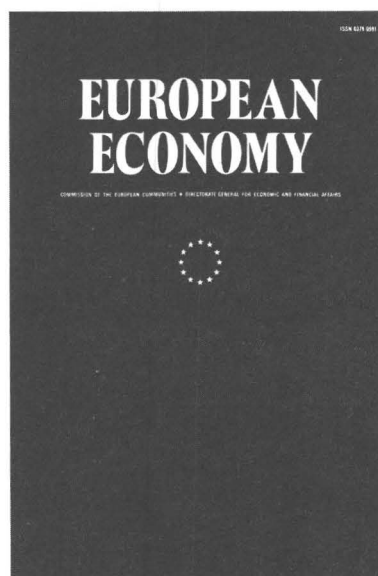
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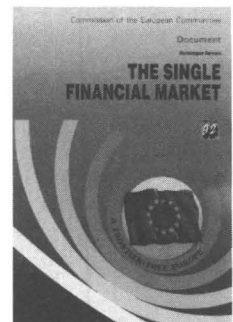
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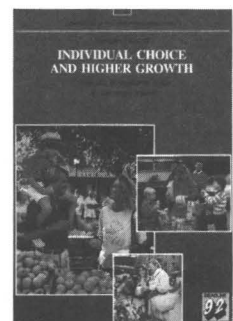
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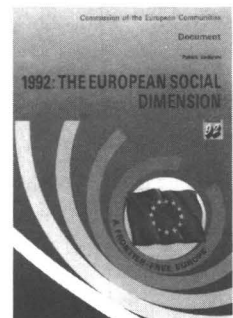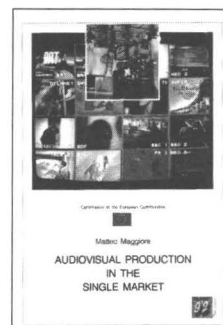
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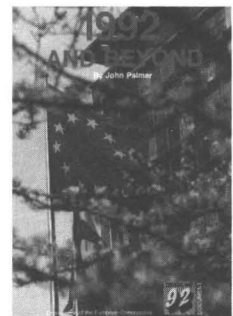
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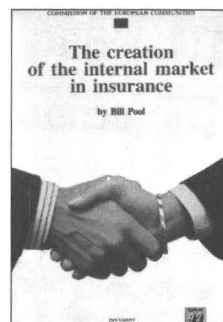
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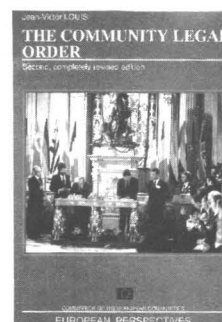
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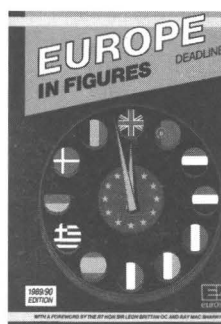
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