FISCAL AND MONETARY POLICY FOR A LOW-SPEED EUROPE

4TH ANNUAL REPORT OF THE CEPS MACROECONOMIC POLICY GROUP

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PREFACE

It is a particular pleasure to present this fourth report issued by the CEPS Macroeconomic Policy Group. As has been our practice for several years now, we have brought together a distinguished group of economists to produce a thorough analysis of the key challenges facing economic policy-makers in the EU.

Last year's report drew attention to the disappointing growth prospects for Europe. It is no source of satisfaction that this point of view was so strongly validated during 2001, when the euro area had a truly dismal productivity record. In this year's report we analyse some competing explanations for the productivity slowdown in Europe. We must admit, however, that we have not found a single satisfactory explanation for this development. Whatever its causes, slower productivity means fewer resources available for redistribution, which in turn has implications for monetary and fiscal policy. For example, the surprising persistence of inflation early in 2002 should be seen as one of the consequences, implying that it has become harder for monetary policy to maintain price stability. But this year's report also makes other important contributions and presents some surprising new findings on the effectiveness, or rather ineffectiveness of fiscal policy.

The main reason why it is a particular pleasure to announce this report is that in 2002 the MPG will produce a second, special report dealing with the issues raised by the enlargement of the eurozone. This special report will come out in the autumn and will discuss how the entry of the UK might affect the nature of the eurozone economy and how one can maintain the efficiency of the decision-making organ of the ECB after the next wave of enlargement, which will bring the number of potential euro area members to 25. The Governing Council might then end up having more than 30 members – not exactly the ideal size to manage monetary policy in the context of fast-moving financial markets. Be on the look out later this year for our recommendations on this point!

The Group is grateful for the comments from participants attending an off-the-record seminar organised by Deutsche Bank in Frankfurt, in particular Dr. Martin Hüfner, Prof. Dr. Otmar Issing and Prof. Dr. Axel Weber. The Group also thanks Prof. Dr. Ansgar Belke for the econometrics in section 3 of Chapter 2. Peer Ritter provided excellent research assistance. All remaining errors are ours.

The work of the CEPS Macroeconomic Policy Group would not have been possible without the support of two sponsors, Deutsche Bank and UBS. I wish to thank them for their material and financial contributions, which enable us to prepare two high-quality reports this year.

Daniel Gros
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POLICY CONCLUSIONS AND EXECUTIVE SUMMARY

Policy Conclusions

The eurozone is currently experiencing conditions close to stagflation: growth is below potential and inflation remains stubbornly above the European Central Bank's target of 2%. Fiscal deficits are also increasing again as consolidation fatigue sets in. One of the key underlying causes of this unhappy combination is the collapse of productivity growth in 2001.

To cope with this difficult situation, tough issues will have to be tackled in a number of policy areas. We specifically recommend the following:

The current **monetary policy** stance is broadly appropriate even if inflation has long been above the 2% limit set by the ECB. Shocks and the disappointing slowdown in productivity account for that. But the strategy is misguided because the 2% threshold is too low. Instead the goal of the ECB should become:

- To keep year-on-year core inflation at 1.5% with a tolerance band of ±1%.

This would still make the ECB more ambitious than most other central banks with an explicit inflation target.

Fiscal policy has also come to the forefront of policy discussions in Europe. Our research indicates that the effectiveness of fiscal policy as a tool of demand management has fallen over the last decades. Increases in government spending are now unlikely to have any positive impact on overall demand, while they almost certainly have a negative impact on private demand. Whether or not fiscal policy has any impact on inflation is difficult to say. Given this uncertainty we conclude that:

- the elaborate procedures currently in place to discuss fiscal policy at the European level are, at best, of little use, and
- calls for even-tighter fiscal policy coordination in the euro area should be resisted.

Some large Euroland countries seem on the point of ignoring the Stability Pact and their own commitments to approximate balance over the cycle. There is no justification for this behaviour at this point since the recovery has already started. The announced deviations from the Stability Pact programmes are minor (less than one half of 1% of GDP). Nevertheless,

they could still have a substantial negative effect on interest rates if financial markets perceive that they signal a change in the trend towards fiscal consolidation. Structural budget deficits must be brought into balance. Tax cuts must be accompanied by spending cuts.

Restoring productivity growth in Euroland can only be achieved through a removal of supply-side distortions, particularly through progress in labour market reforms. The complicated EU-wide processes that are supposed to foster this progress through peer pressure and learning from best practice are at best useless and may even make matters worse as they foster policies that put more bureaucrats to work than the unemployed.

Executive Summary

1. Stagnation of the European economy

The 'new economy' seems alive and well in the US. Output per man-hour continued to rise throughout the recession, and the rebound of early 2002 sent productivity growth to a record pace (+8% in Q1). By contrast in Europe, productivity growth has fallen close to zero.

Is this striking divergence just a reflection of the business cycle? Evidence points to the contrary. In the US the long upswing raised the question of whether the bulk of the observed increase in productivity was simply a cyclical phenomenon. The fact that productivity growth held up during the sharp slowdown of 2001 answers that question: the acceleration of productivity growth was not simply a cyclical phenomenon.

How about Europe? In Europe there was no acceleration of productivity to explain and the deceleration of demand in Europe was far less marked than in the US. But productivity is far more cyclical in Europe. When this is taken into account, the Euroland productivity figures for 2001 look bad. Indeed so bad that they convey a strong message: there can be no doubt about a strong decline of trend productivity in Euroland.

There has been some complacency in Europe about 'employment content' of growth. Is this really a good thing, particularly when it is recalled that it is merely the counterpart of the lower productivity growth described above? A higher employment content of growth is a good sign only in so far as it reflects a structural change in labour markets (getting lower-productivity workers back to work). Unfortunately, we do not find evidence that this has happened. So why has productivity growth slowed in Europe while it has increased in the US?

It is not for a lack of enthusiasm for the 'new economy' in Europe. Indeed, investment in information technology has considerably increased. Rather, a productivity paradox seems to be emerging. (Most of) Europe has caught up with the US in terms of IT spending, but the productivity gap is actually widening. The persistence of rigidities in labour and goods markets in Europe stands as the prime suspect for this paradox.

2. The dilemma for monetary policy: Stagnation plus inflation?

Growth has fallen during 2001 and is likely to stay below even the meagre potential of Euroland during 2002. But core inflation has remained so far stubbornly above the 2% ECB threshold, defying the expectations of a quick fall in early 2002. This has not happened so far (but should happen later in the year), possibly because of a succession of one-off shocks – including last but not least, the euro 'rounding' effect in the services sector, where prices are now rising above 3%. The current policy stance is appropriate if inflation does indeed decline significantly. If this does not happen and core inflation fails to decline, action would definitely be called for.

This is the conclusion emerging from the analysis of several indicators, from the short-term real interest rate to the monetary conditions index (MCI), which takes into account the impact of developments in the euro. Currently, monetary conditions are rather lax as the still-high inflation has lead to a fall in real (ex-post) interest rates. If inflation falls, as foreseen, and the euro continues in its rising trend, monetary conditions will 'automatically' become tighter, even without an increase in policy rates on the part of the ECB.

Turning to money growth, which attracts so much attention because of its prominent role in the communications emanating from the ECB, the acceleration of M3 during 2001 seems to have been related to an increase in liquidity preference, spurred by enhanced uncertainty, rather than signalling inflation risks. In the event it was very sensible to de facto ignore money growth that was twice as fast as the ECB's own reference value and to cut interest rates. Yet it would have been much better to acknowledge it openly (as repeatedly advocated by us, among many others), rather than insisting on discussing technical points of monetary analysis in press communiqués.

Policy decisions have recently been better explained, especially since the November 2001 decision by the governing Council, but the steps in improving clarity in communications have been much more timid than they could and should have been.

One tenet of the ECB's monetary policy strategy is that inflation should be in the 0-2% range. But does an upper limit of 2% make sense? With productivity growth nearly disappearing, it is becoming increasingly difficult to achieve, as increases in nominal wages now must lead immediately to price increases.

Moreover, the systematic difference between inflation in the services and goods sectors (on average 2% per annum in most of Euroland over the last 20 years) poses yet another problem to the 2% limit for total, headline inflation. Many sectors in the economy may have to be in (or very close to) deflation in order to meet the target for the total.

3. Fiscal policy: Is it a useful policy tool?

The 2001 slowdown was short and shallow. But, despite that, it triggered very strong calls to use fiscal policy to manage short-term demand. A necessary (and we would argue not sufficient) condition for these calls to be justified is confidence that fiscal policy is actually effective. Our analysis shows that this confidence has flimsy empirical support, if any.

Our results indicate that the multipliers do not deserve to be called multipliers, because it appears that an increase of government expenditure (purchases of goods and services) equivalent to 1% of GDP will lead, at most, to an increase in demand of a little more than 1%. As government purchases are themselves part of GDP, a 'multiplier' of one indicates that higher public expenditure have a zero impact on private demand. Moreover, the effectiveness is declining over time and, over the last 20 years, it is actually difficult to find any significant positive impact of fiscal policy on output at all, suggesting in many cases a more-than-100% crowding out. We also find that it is impossible to say whether or not fiscal policy has any impact on inflation.

Fiscal policy should not be used as a tool for active demand management. The exact sign and size of our estimates can of course be disputed, but in our opinion, it is more difficult to dismiss the qualitative result that, contrary to the conventional wisdom embodied in large-scale macroeconomic models, one knows very little about the actual effects of fiscal policy on aggregate demand and prices. Given this ignorance, the call for tighter co-ordination of national fiscal policies are at best misguided. The elaborate procedures to discuss, at the European level, fiscal policy may be well meaning in their objective but they look cumbersome and pedantic as they presuppose a detailed knowledge of the national and international effects of fiscal policies that is just not there.

CHAPTER 1
THE BIG PRODUCTIVITY SLOWDOWN IN EUROPE

1. Introduction

It is well known that productivity trends on the two shores of the Atlantic have diverged in recent years. Productivity growth has accelerated in the US and slowed down in Europe. What is less widely appreciated is that this divergence has now reached dramatic proportions. The latest US data indicate that productivity per man-hour in the United States has gone up by a spectacular 8.6% in the first quarter of 2002, improving upon the already high 5.2% in the last quarter of 2001.

The data for the first quarter of 2002 are likely to have been exceptional, aided by the sharp rebound. But the recent US data remain impressive even on an annual basis. The current slowdown during 2001 brought about an overall decline of 1.4 percentage points in the US growth rate of labour productivity (from 3.3% in 2000 to 1.9% in 2001). Yet 1.9% is still only half a percentage point smaller than the 1995-2000 average, the brightest period for the US economy in the last 40 years.

In contrast, in the EU in 2001, real GDP per employed person has increased by a mere 0.4%. The current slowdown in economic activity has halved GDP growth (from 3.4% in 2000 to 1.7% in 2001), while employment growth declined by a smaller amount (from 2% in 2000 to 1.3% in 2001). Productivity growth in 2001 was about one percentage point lower than in the year 2000 (which, in turn, is very similar to its 1995-2000 average). The 0.4% labour productivity recorded in 2001 is the lowest productivity growth rate in the EU since 1975, when EU economies were wallowing in the aftermath of the first oil shock.

The 2001 slowdown brought productivity growth down to zero or even negative figures in the large euro area countries, including Germany, France, Italy and Spain, with the result that the euro area performed even worse than the average EU-15. The EU-15 productivity growth remains positive for 2001 mainly because productivity growth in the UK, Ireland and Greece held up much better than in other member states.

Are the divergent productivity numbers, and in particular the dismal number for Europe for 2001, just a reflection of the business cycle? There is a stark contrast between the US and Europe. The long upswing in the US raised the question of what part of the observed increase in

productivity was simply a cyclical phenomenon. The fact that productivity growth held up during the sharp slowdown of 2001 indicates that it was not a cyclical phenomenon.

How about Europe? In Europe there was no acceleration of productivity to explain. Moreover, the slowdown in demand was less pronounced in Europe than in the US. In the US, growth fell by 3 percentage points, in Europe by only about half as much (1.7). From this point of view, one would have expected productivity to hold up better on this side of the Atlantic. But this might be offset by the fact that productivity growth is more cyclical in Europe. Hence the 2001 data for Euroland should be corrected for the cycle.

Since labour markets are more rigid in Europe than in the United States, one would expect productivity, as measured by output per employee, to respond sharply to a slowdown: if it is not possible to fire people but demand does not increase, output per employee should just be flat. Could this explain the bad 2001 figures for Europe, and in particular for Euroland? The short answer is no. The productivity figures for 2001 are so bad that they contain a strong message: there can be no doubt about a longer-run decline of productivity in Euroland. Box 1.1 reports the results of a very simple statistical exercise, namely a simple regression of the rate of growth of GDP per employee on a constant and GDP growth using the over 40 observations between 1960 and 2001. The difference between the value one would predict for 2001 on the basis of this relationship and the actual value for that same year gives an indication of the 'excess slowdown', or the acceleration of the decline in productivity growth. This difference was equal to -1.1%, implying that output per employee during 2001 was more than one full percentage point lower than one would have expected given the 'normal' relationship between the business cycle and productivity in the countries that form Euroland. For the US, by contrast, actual productivity was 0.55% higher during 2001 than one would have expected given the normal relationship.

This simple, perhaps simplistic, statistical exercise shows that the dismal 2001 numbers for productivity in Europe are not just a fluke, or a consequence of a bad business cycle.

Box 1.1 Regression analysis of the rate of growth of GDP/employee and GDP growth

A simple regression of the rate of growth of GDP per employee on a constant and GDP growth gives a coefficient for the latter variable of 0.83 in the eurozone and 0.38 in the US (with extremely high t-statistics of 10.3 and 4.8, respectively: period 1960-2001).

The results for the US were as follows:

Dependent variable: Output per employee	*Coefficients*	*Standard error*	*t Stat*	*P-value*
Intercept	0.30	0.32	0.95	0.35
GDP growth	0.38	0.08	4.84	0.00

Regression statistics			
Adjusted R square:	0.36	Standard error:	1.07
Observations:	41		

For the eurozone it turned out that one needs to include the first lag of the dependent variable. This is not surprising given the time it takes to fire people in most of Europe. When the lag of the dependent variable is also included as a regressor, the impact coefficient becomes 0.62. For the US the inclusion of a lag does not appear to be justified as it is not significant.

The results for the EU in detail were as follows:

Dependent variable: Output per employee	*Coefficients*	*Standard error*	*t Stat*	*P-value*
Intercept	-0.12	0.28	-0.41	0.68
Lagged dependent	0.33	0.10	3.47	0.00
GDP growth	0.62	0.09	6.63	0.00

Regression statistics			
Adjusted R square:	0.76	Standard error:	0.77
Observations:	39		

Productivity performance and the business cycle : different surprises.

	US		Eurozone	
	Predicted	Forecast error	Predicted	Forecast error
1999	1.85	0.35	1.93	-0.93
2000	1.88	0.22	2.41	-1.01
2001	0.75	0.55	1.39	-1.19

Columns 2 and 4 show the productivity growth predicted in the period from 1999 to 2001. The forecast errors are presented in colums 3 and 5.

2. Competing explanations for the slowdown in productivity

The disappointing recent numbers on productivity in Europe coincide with another remarkable trend. Even during the long recovery of the 1995-2001 period, employment growth was substantially higher relative to GDP growth than was the case in earlier decades.[1] For some observers this is a blessing. In fact, many policy reports have called for a more employment-intensive growth to solve the European unemployment problem. It is argued that some euro area countries are now solving the unemployment problem of the 1980s by incorporating workers back into employment. The higher the employment intensity of growth, the lower productivity growth is in the short run. And, while a fall in productivity growth in the short run may be an indication of improvements in the labour market, if the fall is sustained over the medium run then it will eventually imply a drop in GDP per capita growth.

Thus, whether the productivity deceleration observed in the euro area countries over the 1990s is a transitory phenomenon needed to restore high employment rates or, on the contrary, is a permanent phenomenon attributable to the inability of the euro area member countries to adopt new technologies and reduce the technological deficit vis-à-vis the US, has very important implications. Among these, there are two implications that impinge directly upon monetary policy. First, while both an increase of the employment rate towards its sustainable long-run level and an acceleration of productivity yield a rise in potential output growth, the effect on prices is different, since only productivity growth can moderate unit labour costs, if labour costs were increasing. Secondly, the productivity growth differential between the US and the euro area is often cited as the main reason for the appreciation of the dollar/euro exchange rate.[2] Thus, monetary policy needs to be aware of the sources of potential output growth.

[1] In the eurozone as a whole, employment growth relative to GDP growth was 7.4%, 11.5%, and 32% during the 1960-73, 1974-89, and 1990-99 periods, respectively.

[2] In a recent paper, Alquist and Chinn (2002) estimate that each percentage point in the US-euro area productivity differential results in a five percentage point real appreciation of the dollar. This is consistent with a model in which productivity growth brings expectations of higher future incomes and higher future profits, so that consumption and investment demand increase. If this wealth effect is sufficiently strong, then the demand for domestic goods overwhelms the downward pressure that higher productivity exerts upon the terms of trade and the real exchange rate appreciates.

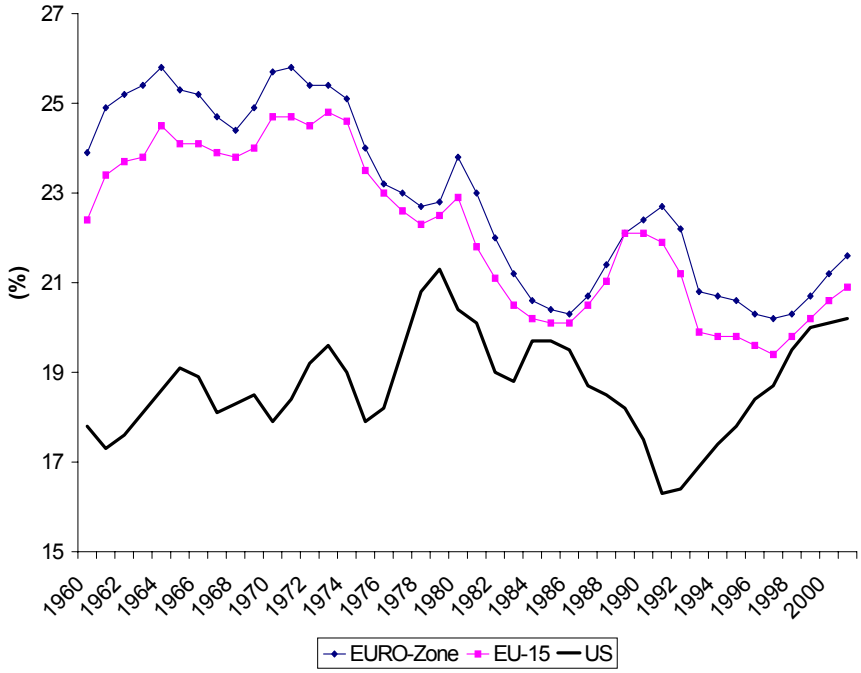
There are at least three interpretations of the evolution of employment and productivity growth in the eurozone countries over the last four decades:

i) The eurozone has experienced a fall both in the rate of technological progress and in capital deepening. In fact, investment rates in the eurozone have been declining in recent decades (see Figure 1.1), so that gross fixed capital formation as a percentage of GDP was 25.1%, 22.3% and 21.1% in the eurozone and 18.3%, 19.2% and 17.7% in the US, during the periods 1960-73, 1974-89 and 1990-99, respectively. And, as discussed in last year's MPG report, until very recently there still seemed to be a gap with the respect to the US in the rate of adoption of the new ICT and in the rate of technological innovation. (The following section will show that the gap seems to be closing.)

ii) The fall in the rate of growth of productivity recently observed in the eurozone is what is needed in the transition from a high equilibrium unemployment rate to a steady state with lower equilibrium unemployment. Thus, if structural unemployment were receding, employment growth would accelerate while productivity growth would decrease in the transition path towards the new balanced growth path. Moreover, many EU countries need not only to reduce unemployment but also to increase participation rates and to reduce the size of the informal sector in order to achieve the employment rate targets imposed by the so-called 'Lisbon process'. The entry into employment of long-term unemployed and groups with marginal labour market attachments may imply the creation of low-productivity jobs, which further decrease productivity growth.

iii) The diffusion of a general-purpose technology has generated a negative trade-off between employment growth and productivity growth. Beaudry and Collard (2002) show in a standard neo-classical growth model with exogenous technological progress that the endogenous adoption of a new technology produces an AK accumulation phase in which demographic factors are relevant for productivity growth, so that countries with low (high) population growth, and, hence, low (high) employment would tend to have low (high) productivity growth.

Figure 1.1 Gross fixed capital formation as proportion of GDP



Section 3 of this chapter will analyse hypothesis (i), looking at the intensity of adoption of IT and summarising the recent evidence on labour and total factor productivity growth. Section 4 will document the changing relationship between population growth, employment growth and productivity growth over the last three decades (1960-1999). Section 5 attempts to discriminate between hypotheses (ii) and (iii), reviewing the predictions of standard neo-classical growth models (with exogenous and endogenous technological progress) about the joint dynamics of population, employment and productivity growth. From this, we draw some conclusions about the likely evolution of productivity differentials between the US and the euro area in the medium run.

3. Is there a relation between IT and productivity in Europe?

Many commentators and observers reckon the extraordinary performance of the US economy is a result of the superior US position in the production and adoption of information technologies (IT). About two-thirds of the US growth resurgence of the second part of the 1990s has been attributed to the enhanced capital accumulation and the acceleration

in the pace of technical change enabled by the production and diffusion of information technologies. A survey conducted by the US Department of Commerce in October 2001 provides further evidence of how widespread IT is in the American economy. Two Americans out of three now use a computer at home, school or work, and the 80% of those who use a computer are also connected to the Internet. These figures have quickly grown by several percentage points in the last few years. No wonder that information technology is regarded as doing magic to productivity growth.

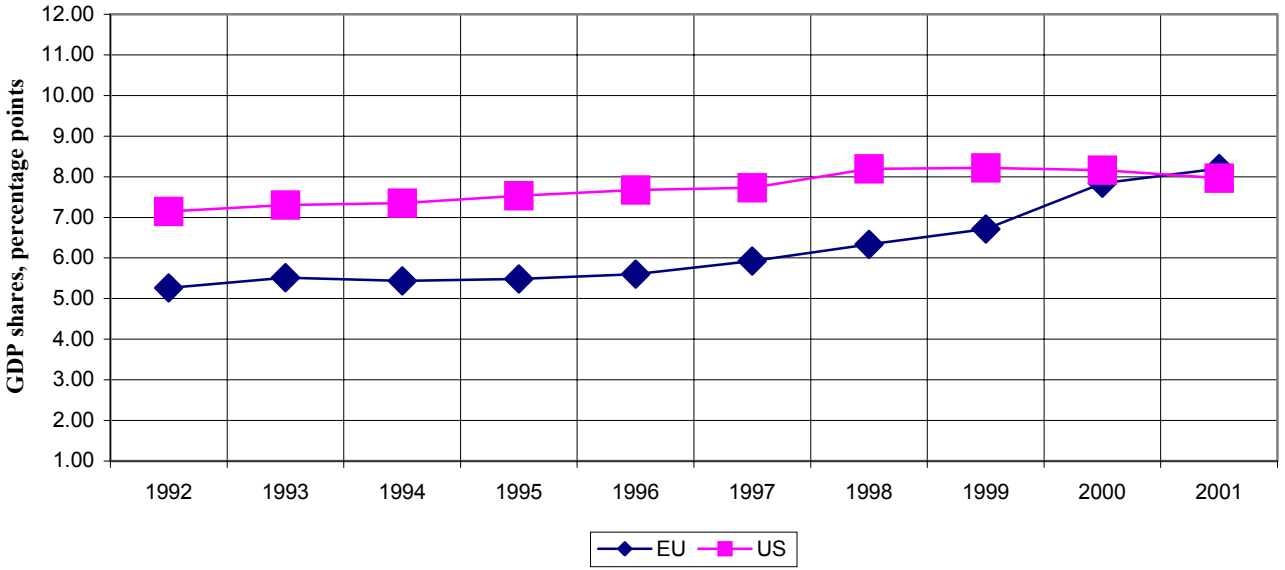
These comments so far have pertained to the United States. A first-hand presumption, though, is that as long as IT is the new engine of growth, the disappointing growth performance of European economies may find its roots in the delayed diffusion of IT.

Is Europe really lagging behind in terms of IT adoption? Available data on IT spending and investment – the most readily available measures of IT adoption from WITSA (2002) – unambiguously show that, as of 2001, this is no longer the case, at least for Europe as a whole.

As shown in Figure 1.2 IT spending in the EU was two percentage points smaller in the EU than in the US at the start of the Internet decade. This gap stayed roughly unchanged until 1998. By 2001, however, the spending gap was effectively reduced to zero: the EU catching-up in IT spending started in 1999 and was completed in 2001, when the GDP shares of IT spending was close to 8% of the respective GDP in both areas.

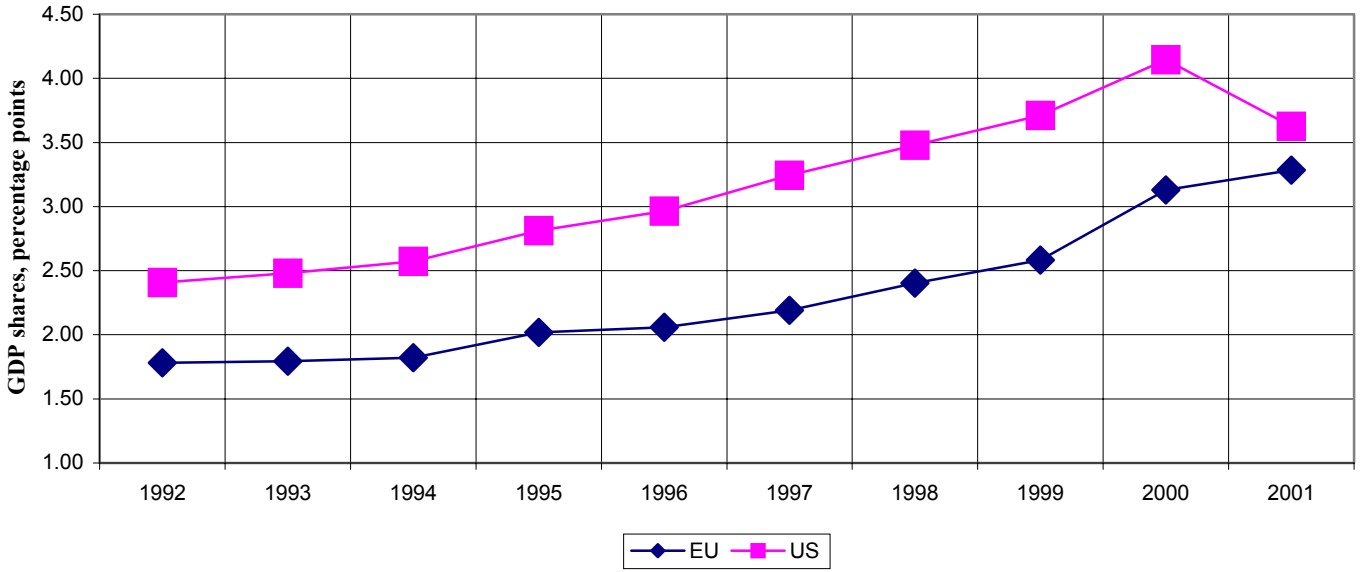
The closing of the IT investment gap with the US, depicted in Figure 1.3, is by contrast a more recent phenomenon, coincident with the sudden 2001 slowdown of IT investment in the US after the 2000 IT capital overhang. In 1992, IT investment was 1.8% of the EU GDP and 2.4% of the US GDP. This gap gradually went up to one percentage point in the first part of the 1990s, and stayed there in 1997-2000, but then declined to less than half a percentage point in 2001.

Figure 1.2 IT spending/GDP: EU vs. US



Source: Daveri (2002).

Figure 1.3 IT investment/GDP in the EU vs. the US



Source: Daveri (2002).

Altogether, these figures imply that Europe's catching-up in IT diffusion is much faster than most observers would have anticipated. The persisting growth gap suffered by the EU as a whole with respect to the US is thus *prima facie* not associated with the delayed adoption of information technologies.

Further details on the relation between IT and growth can also be gauged from the evidence on the heterogeneous diffusion of information technologies across the EU countries and how this relates to cross-country differences in growth rates.

Table 1.1 also shows that, in 1992-2001, IT diffusion was sharply diversified within Europe. In 1992, Sweden, Denmark, the Netherlands and the UK had a GDP share of IT spending comparable to the US. Over time, other countries, including Finland, France and Germany, but also Greece and Portugal, significantly accelerated their spending rates in information technologies. At the end of 2001, combining initial and subsequently accumulated differences, the EU is clearly polarised in two groups of countries, the 'fast' and the 'slow IT adopters'. The typical 'fast IT adopter' (i.e. Sweden, Denmark, the UK, the Netherlands, Finland, France, Germany, Belgium and Austria) spends and invests 9% and 3.7% respectively, of its GDP on IT goods, roughly 50% more than the typical 'slow adopter'. The group of the slow adopters includes Italy, Spain, Greece, Portugal and Ireland, accounting for about one-third of the EU's population.

Did fast and slow adopters, as defined above, enjoy systematically different growth rates of labour productivity? Table 1.2 reports the period changes in the growth rates of labour productivity before and after some time threshold. Looking at changes in growth rates is necessary to net out country-specific components from productivity growth. The evidence shows no appreciable difference in the growth performances of the two groups of countries.

Table 1.1 IT spending as a share of GDP

	GDP shares, % points				Changes in GDP shares, % points			
	1992	**1998**	**2001**	**1992-2001**	**1992-2001**	**1992-98**	**1998-2001**	**2000-01**
EU	5.26	5.93	8.20	6.23	+ 2.94	+ 1.07	+ 1.87	+ 0.36
SWE	7.34	9.09	11.55	8.63	+ 4.21	+ 1.75	+ 2.46	+ 1.16
UK	7.07	7.87	9.79	7.97	+ 2.72	+ 0.80	+ 1.92	+ 0.65
NET	6.39	7.76	9.55	7.39	+ 3.16	+ 1.38	+ 1.78	+ 0.15
DEN	6.13	7.38	9.52	7.19	+ 3.39	+ 1.26	+ 2.13	+ 0.38
FRA	5.71	6.86	9.18	6.75	+ 3.47	+ 1.15	+ 2.32	+ 0.52
BEL	5.37	6.60	8.26	6.36	+ 2.89	+ 1.23	+ 1.66	+ 0.29
GER	5.26	6.15	8.23	6.07	+ 2.97	+ 0.90	+ 2.07	+ 0.37
AUT	4.87	5.66	7.46	5.52	+ 2.59	+ 0.79	+ 1.80	+ 0.24
FIN	4.63	6.42	8.01	6.16	+ 3.38	+ 1.79	+ 1.59	+ 0.25
IRE	5.38	5.88	6.21	5.80	+ 0.83	+ 0.51	+ 0.32	- 0.45
SPA	3.70	4.11	5.23	4.21	+ 1.54	+ 0.42	+ 1.12	+ 0.09
ITA	3.65	4.50	5.86	4.49	+ 2.21	+ 0.85	+ 1.36	+ 0.14
POR	2.79	5.00	6.74	4.91	+ 3.96	+ 2.21	+ 1.74	- 0.31
GRE	2.46	5.05	6.30	4.34	+ 3.84	+ 2.59	+ 1.25	+ 0.10
US	7.14	7.73	7.96	7.73	+ 0.82	+ 1.05	- 0.23	- 0.20

Source: Daveri (2002).

Table 1.2 Change in growth rates of labour productivity (% points)

	[1]	[2]
	Δ growth rate of GDP per employed person	
	1996-2001 vs. 1990-95	1999-2000 vs. 1992-98
US	**+1.1**	**+0.8**
EU-15	**-0.8**	**-0.7**
Fast IT adopters	**- 0.29 (st.dev.=0.32)**	**- 0.27 (st.dev.=0.65)**
SWE	-1.1	-0.8
UK	-0.7	-0.4
NET	+0.0	-0.1
DEN	-0.3	-0.5
FRA	+0.4	-0.2
BEL	+0.4	-0.3
GER (*)	-0.4	-0.4
AUT	+0.4	+0.3
FIN	-1.3	+0.0
Slow IT adopters	**+ 0.04 (st.dev.=2.13)**	**+ 0.16 (st.dev.=3.03)**
IRE	+2.7	+1.1
SPA	-3.1	-2.5
ITA	-1.3	-1.4
POR	-1.9	+0.7
GRE	+3.8	+2.9

* 1990-95 data for Germany in fact refer to 1992-95.

Note: The group averages for fast and slow IT adopters are arithmetic. The EU 15 average is weighted by each country's population in each year.

If, in line with the US convention, 1995 is picked as the time threshold between the early stages and a more mature phase of the Internet, the (arithmetic) average changes in labour productivity growth are in fact very close to zero for both groups. Within the slow-adopters group, Ireland and Greece saw their growth performances sensibly improve over time. Italy and Spain experienced the reverse. As a result, the group average change in productivity growth is moderately positive (+0.2%), but with a high within-group standard deviation (2.1%). The fast adopters experienced even a slightly negative change in productivity growth in 1996-2001 compared to 1990-95 (-0.3%), with little variability above and below that figure.

The same conclusions are also reached when 1998 is taken as a benchmark and the changes in productivity growth in 1999-2000 and 1992-98 are looked at. This means that even when the 2001 slowdown is left out, there is no evidence that productivity growth was accelerating in either group.

To recap, the aggregate catching-up in IT spending for the EU has had no counterpart in terms of productivity growth so far. Within Europe, IT efforts are outright unrelated to any parallel performance in terms of growth rates. Should one thus infer that there is no link between IT and productivity in the European Union?

This may be the case for possibly two complementary reasons. IT investment might be simply unproductive on impact and hence generate no additional output upfront, when the investment cost is sunk. This hypothesis has been studied extensively and contrasted with stock market data to provide a unified rationale of the 1970s productivity slowdown and the 1990s growth resurgence (see e.g. Greenwood and Jovanovic, 1999). Due to learning effects, the introduction of information technologies results in extremely high costs of adjustment, with an adverse effect on the stock market and productivity growth for some time until the new invention has been absorbed. This is a potentially useful hypothesis for Europe as well. It is unfortunately still hard to evaluate, for the upsurge in IT spending in the EU is too recent.

The second possibility is that IT investment and spending does produce positive growth effects, but other factors more than offset its beneficial effects.

This conjecture can be evaluated in Table 1.3, where the changes in the growth contributions from IT capital (per hour worked) and TFP growth between the first and the second half of the 1990s are reported. The methodology of construction of growth contributions and TFP growth follows standard growth accounting practices. Both methods and data description are described in detail in Daveri (2001). Looking at both the growth contributions from IT as well as TFP growth is worthwhile, for information technologies may positively affect the growth rate of labour productivity through both channels (capital deepening and TFP).

Table 1.3 Change in growth contributions and in TFP growth (% points)

	[1]	[2]
	Δ growth contribution of IT capital per man hour	Δ TFP growth
	1996-99 vs. 1991-95	1996-99 vs. 1991-95
Fast IT adopters	**+0.13 (st.dev.=0.27)**	**-0.17 (st.dev.=1.39)**
SWE	0.33	-0.8
UK	0.68	-0.4
NET	-0.08	-0.1
DEN	0.14	-0.5
FRA	-0.02	-0.2
BEL	-0.07	-0.3
GER (*)	-0.14	-0.4
AUT	0.04	+0.3
FIN	0.32	+0.0
Slow IT-adopters	**+0.09 (st.dev.=0.20)**	**+ 0.14 (st.dev.=1.55)**
IRE	0.35	+1.1
SPA	-0.18	-2.5
ITA	-0.01	-1.4
POR	0.07	+0.7
GRE	0.21	+2.9

* 1990-95 data for Germany in fact refer to 1992-95.

While the actual size of the growth effects of IT in Europe is still surrounded by large measurement error, the overall picture from the available aggregate data is not. It is as follows:

1) The marginal growth contribution of IT capital (the 'capital deepening' effect) to the acceleration of labour productivity growth is low on average (about a tenth of a percentage point). It is slightly higher for the fast adopters than for the slow adopters (0.13 p.p. against 0.09). In both cases, it is much smaller than in the US, where it was about 0.5 p.p. (see Table 2 in Oliner and Sichel, 2000).

2) There are exceptions, however. The most notable one is the UK, where the additional IT growth contribution amounts to about two-thirds of a percentage point. This has not materialised in higher labour productivity growth mainly for the parallel decline in TFP growth experienced in the United Kingdom between the first and the second halves of the 1990s.

3) Sweden and Finland also cashed a positive additional growth contribution of about 0.3 percentage points from IT capital. This was more than offset by the decline in TFP growth in Sweden and by the (not reported) decline in the contribution of non-IT capital in Finland.

4) In Ireland and, to a lesser extent, Greece, the positive contributions from IT capital have been supplemented by increases in TFP growth. In spite of their limited IT investment shares, both countries benefited from comparatively high rates of return on investment (about 4.5% in real terms in the second half of the 1990s). In Ireland, this was clearly related to the presence of IT multinational corporations.

5) The other large EU countries experienced, one way or another, negative additional growth contributions from capital deepening and TFP growth. This effect was moderate in Germany, France, Denmark, Belgium and Denmark. It was more dramatic in Italy and Spain, where IT capital deepening did not take off and average TFP growth actually slowed down considerably by 1.4% and 2.5%, respectively, in 1996-99.

To sum up, it is certainly not yet appropriate to think of the EU economies as *new economies*. In general, it is hard to escape the conclusion that, despite the catching-up in IT diffusion experienced by most EU countries in recent years, information technologies have so far delivered little aggregate productivity gains in Europe. This is the productivity paradox for Europe. For countries in northern Europe, IT spending and investment are not much different from that of the United States. But even if the investment flow has reached the US size, the stock of installed IT may still be too low to gain from the network economies. In order to gauge whether IT will lead Europe to a similar economic growth as happened in the US, we need to understand why productivity growth has lagged behind the US and which factors have hampered growth in these countries so far. And which are the factors that – in contrast to southern European states – eventually led to IT adoption? If, as we argued in last year's report, labour market reform has not really progressed across the board in Europe, why has IT adoption progressed so much at least in some European countries.

The European Commission (2002) in its report on European competitiveness cites studies attributing a large part of the US productivity gains to the service sector. One reason for the differences in IT investment flows across Europe may be the different composition of the services sectors across Europe (business and financial services in the north versus hotels and restaurants in the south?).

But a more important factor might derive from the fact that the internal market for services is not yet completed. This implies that there are still separated national markets, whose dynamic might evolve differently depending on national regulatory regimes. Nicoletti (2001) groups countries along how liberal an approach to industry regulation they pursue. To the 'very liberal' cluster belong the US and in Europe, Sweden and the UK; to the 'mostly liberal' cluster belong Germany, Netherlands, Finland and also Ireland; in the medium liberal cluster are Denmark and Belgium; and a restrictive industrial policy is pursued by the remaining countries, in particular Italy and Greece. The slow IT adopters are seldom found among the keener deregulators. Slow IT adoption might to some extend constitute a reflection of a particular country's general unwillingness to reform.

For a full picture it would be necessary to take a more microeconomic look at IT adoption across Europe. On the supply side, which are the labour market institutions in particular – given their variety across Europe – that pose an impediment to structural change? On the demand side, which is the competitive environment of industries that use IT intensively?

This is beyond the scope of this report. In the following sections, we will retain our macroeconomic focus and analyse a macro-development that may also explain differences in productivity – abstracting from the microeconomics of labour market reform and deregulation. Differences in employment growth may in itself be sufficient to cause differences in productivity.

4. Population, employment and productivity growth: The facts

We now turn to a discussion of the second hypothesis concerning the productivity slowdown in Europe, namely that it could represent a welcome development. The core of this hypothesis is that labour markets now work better in Europe, allowing workers with lower productivity to also find a job. While these workers are coming into the work force, they mathematically lower measured productivity growth. What is the factual basis for this argument?

Table 1.4 reports the average annual growth rates of total population, working-age population (population aged 15-64), total labour force, employment, GDP, labour productivity and technological progress (measured by the ratio of total factor productivity to the wage share) over the last four decades of the 20th century.[3] We distinguish four periods, the years up to the first oil crisis (1960-73), the years of recessions after the negative oil shocks of the 1970s and 1980s and the subsequent recovery (1974-89), the 1990s, the years in which the introduction of new information and communication technologies led some pundits to believe in the existence of a 'new economy', and the second half of the 1990s, the period during which the contrast between the productivity performance of the eurozone and of the US has been the most striking.

During the first period (1960-73), population growth was slightly higher than in 1974-99. Working-age population, labour force and employment grew at roughly the same rates, as participation and unemployment rates were more or less constant.[4] In European countries, the rates of growth of labour productivity and technological progress were roughly similar, which suggests that these countries were close to a steady-state growth path. By contrast, in the US, the rate of growth of technological progress, which was lower than in Europe, was higher than productivity growth.[5]

The second period (1974-89) is characterised by the employment crisis in Europe. Despite declining participation rates, employment grew much less than the labour force. In this regard the comparison with the US is remarkable: whereas the rates of growth of the labour force and of employment were around 2% per annum in the latter, the rate of growth of the labour force averaged 0.7% per annum in the current members of the eurozone while employment grew at the very low rate of 0.3% per annum. This happened with working-age population growth rates of 1.2% and 0.8% per annum, in the US and in the eurozone, respectively. The evolution of productivity is also dramatically different in the two zones.

[3] Data for population come from the World Bank's Global Development Network Growth Database (available at www.worldbank.org/research/growth/). Data on the wage share come from EUROSTAT's Statistical Appendix to the European Economy. The rest of the series are from OECD databases.

[4] There are however some exceptions. In southern Europe, participation rates fell, mostly because young cohorts started to delay entrance into the labour market, remaining for a longer period in education. By contrast, US participation rates increased, accounted for mostly by increasing female participation rates.

[5] This also happened in Canada, Portugal, Spain, Japan and Norway. The average rate of technological progress for the eurozone is a GDP-weighted average.

Table 1.4 Rates of growth of population, labour force, employment, GDP and productivity (average annual rates in percentage points)

	1960-73	1974-89	1990-99	1995-99		1960-73	1974-89	1990-99	1995-99
Eurozone average									
Population	0.6	0.5	0.5	0.2	GDP	5.5	2.6	2.5	2.4
Working-age population	0.6	0.8	0.5	0.2	Labour productivity	5.1	2.3	1.7	1.4
Labour force	0.4	0.7	0.8	0.7	Technological progress	5.5	2.2	1.5	1.3
Employment	0.4	0.3	0.8	1.0					
United Kingdom									
Population	0.5	0.1	0.3	0.2	GDP	3.3	1.9	2.1	2.8
Working-age population	0.2	0.4	0.3	0.5	Labour productivity	3.0	1.5	1.9	1.3
Labour force	0.4	0.7	0.1	0.6	Technological progress	3.2	1.6	2.1	1.6
Employment	0.3	0.4	0.2	1.4					
US									
Population	1.2	1.0	1.0	0.9	GDP	4.4	3.0	3.0	3.8
Working-age population	1.7	1.2	1.0	1.1	Labour productivity	2.5	1.0	1.8	2.2
Labour force	1.9	2.0	1.1	1.2	Technological progress	3.0	1.1	2.0	2.6
Employment	1.9	2.0	1.2	1.6					
Japan									
Population	1.1	0.8	0.3	0.3	GDP	9.4	3.9	1.7	1.3
Working-age population	1.6	0.9	0.1	-0.1	Labour productivity	8.1	3.2	1.2	1.2
Labour force	1.3	0.8	0.8	0.6	Technological progress	8.9	2.6	0.2	0.4
Employment	1.3	0.7	0.5	0.6					

These are the years of the so-called 'productivity slowdown' in the US, where labour productivity and technological progress grew at a meagre 1.1% per annum, while the current member countries of the eurozone were enjoying average growth rates above 2%.

We finally come to the third period (1990-99) in which, again, there is some contrast between continental Europe and the US. While in the US, employment and labour force continued growing at similar rates, keeping medium-run unemployment roughly constant, in the eurozone employment and labour force growth increased to surpass working-age population, so that participation rates increased while the average unemployment rate remained more or less constant.[6] Thus, the employment rate in these countries was more than double the employment growth observed during the previous period (0.8% versus 0.3%), in contrast with the US in which employment and labour force growth fell with respect to the 1974-89 period. In the eurozone, however, the acceleration of employment was accompanied by a deceleration of productivity, whereas the contrary happened in the US where productivity growth surged to double the average rates of the 1974-89 period.

Table 1.5 Employment, productivity and working-age population: Regression results

	Coefficient	**Standard error**
Dependent variable: Employment growth		
1960-73	0.73	0.08
1974-89	0.14	0.15
1990-99	1.25	0.30
Dependent variable: Labour productivity growth		
1960-73	-0.62	0.20
1974-89	-0.48	0.21
1990-99	0.00	0.27
Dependent variable: Rate of growth of technological progress		
1960-73	-0.57	0.25
1974-89	-0.67	0.29
1990-99	0.25	0.42

Note: The sample is composed of the 19 countries presented in Table A.1 in the Annex of this chapter. Independent variables are a constant and the rate of growth of working-age population, whose coefficient and its standard error is reported in the table.

[6] The average unemployment rate in the eurozone increased over the first half of the 1990s to decrease in the second half, as was shown in last year's report. The rise of participation was mostly noticeable for women.

Thus, over the periods considered above, there are significant changes in the joint evolution of demographic, labour market and productivity variables. A simple regression of the productivity variables (labour productivity and technological progress) on working-age population gives results reported in Table 1.5. While in the three decades up to the 1990s there was a negative correlation between labour productivity growth and working-age population growth, on the one hand, and between the rate of growth of technological progress and working-age population growth, on the other, during the last decade this correlation has vanished. The reason has to be found in the evolution of employment. During the 1960-73 period, working-age population and employment grew at the same rate so that, since employment and productivity are negatively correlated (as it should be along a downward sloping labour demand curve), the latter and working-age population growth were also negatively correlated. During the 1974-89 period, despite the fact that employment grew at a lower rate than working-age population in most countries, with very little correlation between both variables, it remained a negative correlation between productivity growth (both labour productivity growth and the rate of technological progress) and working-age population growth. It is worth noting that when employment and working-age population began to grow again at similar rates throughout the 1990s, as happened in the 1960-1973 period, the correlation between productivity growth and working-age population growth seems to be null. In other words, countries experiencing relatively high employment growth had relatively low productivity growth and also relatively low rates of growth of technological progress (see Figures. 1.4-1.7). This is what Beaudry and Collard (2002) call the 'strong employment-productivity trade-off'.

5. The sources of potential output growth

Under the standard neo-classical growth model with exogenous technological change, potential output growth is independent of the rate of growth of the working-age population, so that in the balanced growth path the employment rate is constant (employment grows at the same rate as working-age population) and labour productivity growth is determined only by the rate of technological progress. Hence, any correlation between employment growth and labour productivity growth only arises in the transitional dynamics towards the steady state. Within this framework, a rising (falling) employment rate would lead to acceleration (deceleration) of the labour input that would lower (increase) the capital-labour ratio in steady state. In the transition to the new steady state, labour-productivity growth falls (increases) below (above) the rate of technological progress to converge to the new balanced growth path with the same rate of labour productivity and GDP per capita as in the previous one. Thus, the strong employment productivity trade-off is a

transitory phenomenon that vanishes in the long term, namely, in the period of time that it takes to converge to a new balanced growth path.

A negative correlation between productivity growth and employment growth can also be rationalised by an endogenous growth model with constant returns to capital in which the rate of growth of output per worker is negatively correlated with employment growth across countries. This situation arises when the elasticity of production with respect to capital increases but firms can choose the mix of the two technologies, the old one with a low elasticity of production with respect to capital and the new one with the higher elasticity (see Beaudry and Collard, 2002). The adoption of the new technology takes place gradually when the initial capital intensity (capital-to-labour ratio in efficiency units) is above a certain threshold, but it is not high enough. During this gradual adoption phase, productivity growth will be lower in countries with higher employment growth. Once the adoption of the new technology is completed and the economy converges to a new balanced growth path, aggregate labour productivity will rise at the rate of technological progress, while employment growth will be determined by working-age population growth. In any event, within this framework the negative correlation between labour productivity growth and employment growth is, as in the standard neo-classical framework, a negative phenomenon that will end when the adoption of the new technology is completed.

Neither of the hypothesis (ii) and (iii), mentioned in the introduction to this chapter, explains, however, the overall evolution characterised by the evidence reported in Tables 1.4 and 1.5. The first interpretation of the deceleration of productivity in the eurozone in the 1990s seems however inconsistent with the evolution of GDP growth and investment and with the lack of fundamental reforms in the labour market. If these countries had embarked on a transition path towards a steady state with higher equilibrium employment, we would have observed a rise of GDP growth. As seen in Figure 1.8, however, while the rate of growth of investment remained more or less constant through the 1974-89 and 1990-99 periods, GDP growth decreased by 0.1 percentage points. This suggests that the fall in productivity growth is due to something other than the dynamics of a new balanced growth path with lower structural unemployment.

The lack of fundamental reforms was an issue that we discussed at some length in last year's MPG report. In our view, the recent experience of labour market reforms in EU countries shows that institutional changes are often marginal and, in too many occasions, contradictory. The attempts to coordinate a common approach aimed at improving the functioning of the labour market are not delivering so far. Employment policies came to the top of the EU political agenda after the Amsterdam Treaty, which launched a coordinated European Employment Strategy to fight unemployment. The

European Council agreed in the Luxembourg Jobs Summit in November 1997 that this strategy should be built on thematic priorities, grouped in four pillars and described in employment guidelines. The four pillars (improving employability, developing entrepreneurship, encouraging adaptability of business and their employees, and strengthening the policies for equal opportunities) are theoretically sound, but, in practice, they have not led to the needed fundamental changes in employment policies. If anything, they have been a good alibi for increasing active labour market policies whose effectiveness in reducing unemployment is open to question.

Moreover, both of the interpretations (ii) and (iii) of the deceleration in productivity sketched in the introduction to this chapter rely upon the existence of an exogenous process for labour efficiency, so that the rate of technological progress is independent of labour market and demographic variables and also of changes in parameters characterising technologies (such as the elasticity of production with respect to capital). But, as shown in Table 1.4, the rate of technological progress has fallen in the eurozone, while it has increased in the US in the 1990-99 period vis-à-vis the 1974-89 period. And, as shown in Table 1.5, not only did the correlation across countries between labour productivity and working-age population growth, which was negative during the 1960-89 period, prove to be statistically insignificant only during the last decade. Something similar also happened regarding the correlation between the rate of technological progress and working-age population.

Thus, a more worrisome interpretation is that what we are observing is not totally due to transitional dynamics of new balanced growth paths with similar rates of technological progress across countries, either with exogenous or endogenous technological change. It may also be that the rates of technological progress are diverging: increasing in the US while decreasing in the eurozone. In this case, output potential growth will decrease in the eurozone while the euro will tend to depreciate against the dollar if there is not a compensating (negative) inflation differential in the eurozone with respect to the US. Will the increasing adoption of IT technologies in Europe be able to reverse this depreciation? Given the uneven speed of adoption and our reflections on the premises on economic reform that is necessary to reap the full benefits of IT investment, we remain sceptical that we will witness such a reversal any time soon.

Figure 1.4 Labour productivity growth and employment growth by period

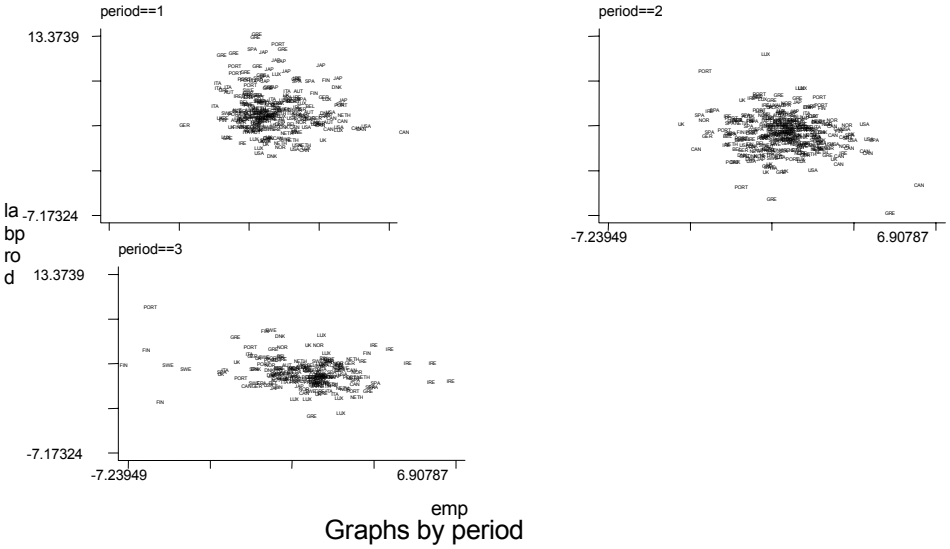


Figure 1.5 The rate of growth of technological progress and employment growth by period

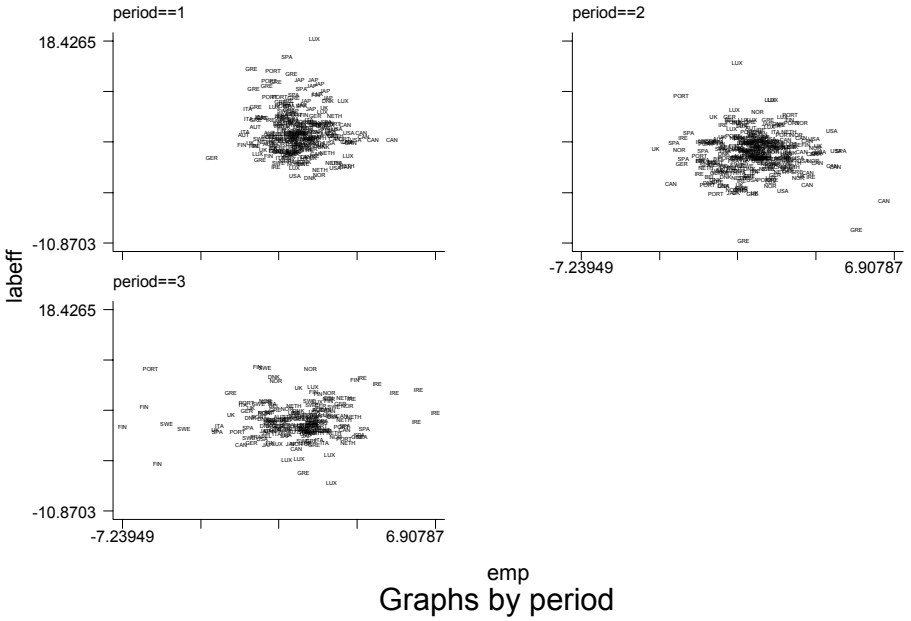


Figure 1.6 Labour productivity growth and employment growth by country

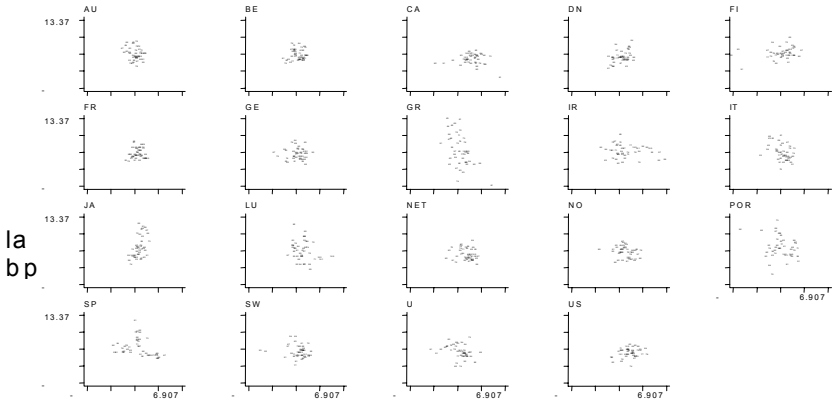


Figure 1.7 The rate of growth of technological progress and employment growth by country

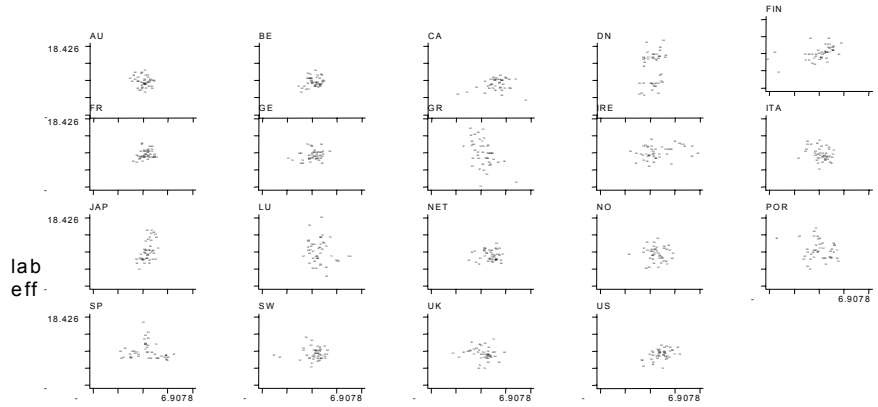
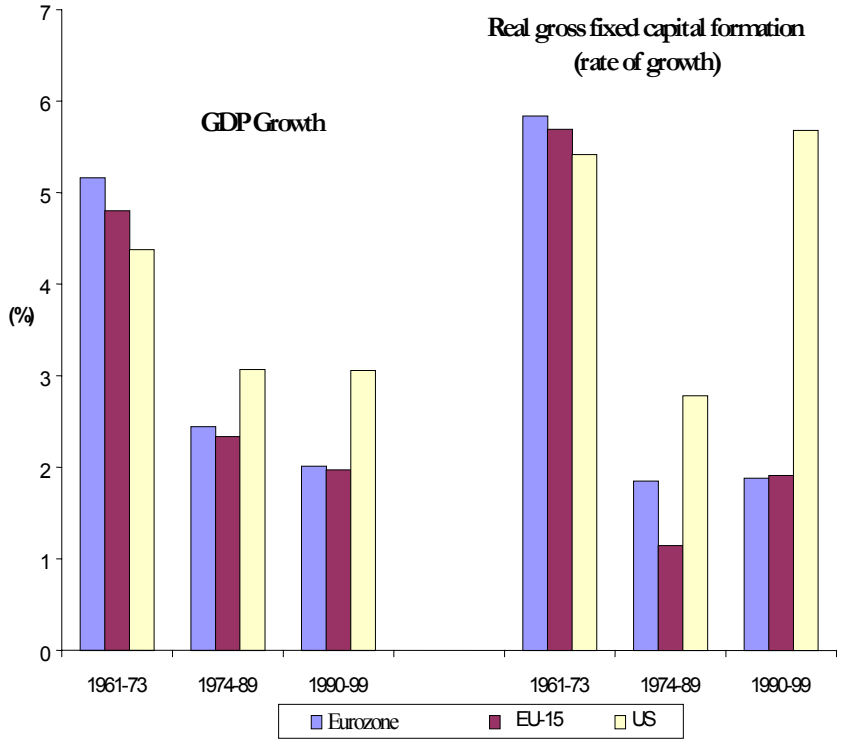


Figure 1.8 GDP growth and gross fixed capital formation



STATISTICAL ANNEX TO CHAPTER 1

Table A1.1 Rates of growth of population, labour force, employment, GDP and productivity in the euro area (average annual rates in percentage points), by country

	1960-73	1974-89	1990-99	1995-99		1960-73	1974-89	1990-99	1995-99
Austria									
Population	0.5	0.1	0.6	0.1	GDP	4.8	2.4	2.3	2.0
Working-age population	0.1	0.6	0.6	0.2	Labour productivity	4.9	2.3	1.9	1.6
Labour force	-0.1	0.3	0.5	0.4	Technological progress	5.0	2.1	1.7	º.4
Employment	0.0	0.2	0.5	0.4					
Belgium									
Population	0.5	0.1	0.3	0.2	GDP	4.9	2.1	2.2	2.3
Working-age population	0.3	0.5	0.1	0.0	Labour productivity	4.5	2.1	1.9	1.4
Labour force	0.5	0.4	0.6	0.6	Technological progress	4.9	1.9	1.8	1.4
Employment	0.5	0.0	0.4	0.9					
Finland									
Population	0.4	0.4	0.4	0.3	GDP	4.9	3.0	1.9	4.7
Working-age population	1.0	0.4	0.3	0.3	Labour productivity	4.4	2.6	2.9	2.4
Labour force	0.5	0.4	-0.3	0.6	Technological progress	4.4	2.6	3.9	6.0
Employment	0.5	0.4	-1.0	2.2					
France									
Population	1.0	0.5	0.5	0.4	GDP	5.4	2.5	1.8	2.3
Working-age population	1.1	0.9	0.4	0.4	Labour productivity	4.7	2.2	1.4	1.5
Labour force	0.8	0.8	0.6	0.6	Technological progress	5.1	2.1	1.3	1.8
Employment	0.7	0.3	0.4	0.9					

Germany									
Population	0.6	0.0	0.4	0.1	GDP	4.4	2.1	2.0	1.4
Working-age population	0.4	0.6	0.4	0.1	Labour productivity	4.1	1.9	1.7	1.1
Labour force	0.3	0.5	0.4	0.4	Technological progress	3.8	1.9	1.6	0.8
Employment	0.3	0.1	0.3	0.3					
Greece									
Population	0.5	0.8	0.4	0.2	GDP	8.6	1.6	1.9	2.8
Working-age population	0.3	1.0	0.6	0.2	Labour productivity	9.1	0.7	1.3	2.2
Labour force	-0.7	1.2	1.2	1.2	Technological progress	9.2	-0.3	1.0	2.3
Employment	-0.5	0.9	0.6	0.6					
Ireland									
Population	0.6	0.8	0.6	0.9	GDP	4.2	2.9	6.2	8.0
Working-age population	0.5	1.2	1.5	1.8	Labour productivity	4.1	2.7	2.6	2.4
Labour force	0.1	0.7	2.6	3.6	Technological progress	3.9	2.3	4.5	5.1
Employment	0.1	0.1	3.7	5.6					
Italy									
Population	0.7	0.2	0.2	0.2	GDP	5.3	2.8	1.5	2.1
Working-age population	0.4	0.6	0.1	-0.1	Labour productivity	5.5	2.0	1.4	1.5
Labour force	-0.2	1.0	0.3	0.6	Technological progress	5.6	1.9	1.2	1.7
Employment	-0.2	0.8	0.2	0.6					
The Netherlands									
Population	1.2	0.6	0.6	0.5	GDP	4.8	2.1	3.0	3.4
Working-age population	1.5	1.2	0.5	0.4	Labour productivity	3.3	1.3	1.0	0.8
Labour force	1.6	1.2	1.6	1.7	Technological progress	3.2	1.2	1.6	1.5

Employment	1.5	0.9	1.9	2.5					
Portugal									
Population	-0.3	0.9	0.1	0.2	GDP	7.0	3.0	2.7	3.2
Working-age population	-0.2	1.3	0.4	0.3	Labour productivity	6.7	3.1	2.8	3.3
Labour force	0.4	0.1	-0.1	-0.5	Technological progress	7.7	3.0	2.6	3.1
Employment	0.3	-0.1	-0.1	-0.1					
Spain									
Population	1.0	0.7	0.2	0.1	GDP	7.2	2.6	2.4	3.5
Working-age population	0.8	1.0	0.5	0.2	Labour productivity	6.5	2.8	1.2	0.8
Labour force	0.7	0.7	1.1	0.8	Technological progress	7.5	2.5	0.7	0.9
Employment	0.7	-0.3	1.3	2.6					

Table A1.2 Rates of growth of population, labour force, employment GDP and productivity, eurozone average and in other selected countries (average annual rates in percentage points)

	1960-73	1974-89	1990-99	1995-99		1960-73	1974-89	1990-99	1995-99
Eurozone average									
Population	0.6	0.5	0.5	0.2	GDP	5.5	2.6	2.5	2.4
Working-age population	0.6	0.8	0.5	0.2	Labour productivity	5.1	2.3	1.7	1.4
Labour force	0.4	0.7	0.8	0.7	Technological progress	5.5	2.2	1.5	1.3
Employment	0.4	0.3	0.8	1.0					
Sweden									
Population	0.6	0.3	0.4	0.2	GDP	4.1	1.8	1.7	3.3
Working-age population	0.5	0.2	0.4	0.3	Labour productivity	3.6	0.9	2.5	2.6
Labour force	0.6	0.8	-0.2	0.2	Technological progress	3.7	0.8	3.0	3.9
Employment	0.6	0.8	-0.8	0.7					
United Kingdom									
Population	0.5	0.1	0.3	0.2	GDP	3.3	1.9	2.1	2.8
Working-age population	0.2	0.4	0.3	0.5	Labour productivity	3.0	1.5	1.9	1.3
Labour force	0.4	0.7	0.1	0.6	Technological progress	3.2	1.6	2.1	1.6
Employment	0.3	0.4	0.2	1.4					
US									
Population	1.2	1.0	1.0	0.9	GDP	4.4	3.0	3.0	3.8
Working-age population	1.7	1.2	1.0	1.1	Labour productivity	2.5	1.0	1.8	2.2
Labour force	1.9	2.0	1.1	1.2	Technological progress	3.0	1.1	2.0	2.6
Employment	1.9	2.0	1.2	1.6					

Canada									
Population	1.7	1.3	1.1	1.0	GDP	5.3	3.2	2.3	3.4
Working-age population	2.5	1.6	1.1	1.1	Labour productivity	2.5	0.6	1.1	1.4
Labour force	2.7	2.7	1.2	1.4	Technological progress	3.5	0.4	1.1	1.8
Employment	2.8	2.6	1.2	2.1					
Denmark									
Population	0.7	0.1	0.4	0.4	GDP	4.4	1.3	2.4	2.9
Working-age population	0.7	0.4	0.3	0.3	Labour productivity	3.4	1.0	2.2	1.8
Labour force	1.0	0.7	-0.1	0.5	Technological progress	3.5	0.8	2.8	2.4
Employment	1.1	0.2	0.2	1.1					
Japan									
Population	1.1	0.8	0.3	0.3	GDP	9.4	3.9	1.7	1.3
Working-age population	1.6	0.9	0.1	-0.1	Labour productivity	8.1	3.2	1.2	1.2
Labour force	1.3	0.8	0.8	0.6	Technological progress	8.9	2.6	0.2	0.4
Employment	1.3	0.7	0.5	0.6					
Norway									
Population	0.8	0.4	0.5	0.5	GDP	4.3	3.4	3.5	3.4
Working-age population	1.4	0.6	0.4	0.2	Labour productivity	3.5	2.0	2.5	1.4
Labour force	0.7	1.6	0.7	1.4	Technological progress	2.9	1.5	4.3	2.7
Employment	0.7	1.3	1.0	2.0					

CHAPTER 2
AN ASSESSMENT OF ECB POLICY

This chapter turns to the analysis of monetary policy in the euro area. Section 1 provides a brief review of all policy decisions taken by the ECB Council since publication of the previous MPG report in June 2001. Section 2 employs several indicators to assess the degree of looseness of monetary conditions in the period under review. Section 3 addresses the question of whether the ECB systematically follows the US Federal Reserve and concludes that 2001 was the year of the de-coupling. Section 4 evaluates the ECB's monetary policy strategy as well as its communications policy. Section 5 evaluates the appropriateness of 2% as the upper limit of the ECB's definition of price stability.

1. Monetary policy decisions

June/July 2001

It was decided to make no changes to policy rates at the June and July 2001 meetings. The ECB noted the gradual increase in M3 growth, but felt that it was still close to the reference value once distortions were taken into account. This judgement was further supported by the deceleration of credit to the private sector. As regards the other factors affecting inflation, the slowdown in GDP growth was expected to '…contribute to a dampening upward pressure on consumer prices',[7] although there were risks that the decline in inflationary pressures could be…overshadowed by short-term increases in inflation [related] mainly to oil prices and the impact of animal diseases on food prices'. In public statements, it was emphasised that the ECB was following a 'wait-and-see' approach.

30 August 2001

At its meeting on the 30th of August, '…the Governing Council decided to lower the key ECB interest rates by 25 basis points' to 4.25% as largely anticipated by market participants (see below). The decision was made notwithstanding the acceleration of M3 to 5.9%, which was viewed as transitory and attributable to a change in liquidity preferences. With

[7] This and all other material quoted in this section has been taken from the ECB website.

regards to the second pillar, '…there were clear signals of lower inflationary pressures from the demand side.' Concerns were expressed about the '…emergence of second-round effects, via wages, of past increases in consumer price inflation' and '…the impact that slower growth might have on the determination of the governments of some countries to adhere strictly to the Stability and Growth Pact', given that '…short-term discretionary measures aimed at strengthening demand risked having an unwelcome impact on the economy' and 'undermined the credibility of the consolidation process'.

17 September 2001

'Following the terrorist attacks on the US, uncertainty about the US and the world economy has increased. The Federal Open Market Committee has reacted by lowering its target for the federal funds rate. In concert with this decision, the Governing Council of the ECB [decided to] reduce the minimum bid rate on main refinancing operations of the Eurosystem…by 0.50 pp to 3.75%.' The 50 bp cut demonstrated unambiguously that the ECB can act promptly and decisively if needed. The rate cut announcement, however, occurred only 30 minutes after the weekly tender announcement stating that rates would remain at 4.25%, rekindling the arguments about the effectiveness of the ECB's communications policy.

8 November 2001

After the Council '…chose to keep their powder dry' in the October meetings, at its meeting on the 8th of November, '…the Governing Council decided to lower key interest rates by 50 basis points' to 3.25%. 'In assessing the information which had accumulated over the past few weeks, [they] concluded that inflationary pressures had further diminished.' The decision to cut rates had de facto to be based on the second pillar given that M3 accelerated further, but this was viewed as '…a reflection of an increased liquidity preference by investors in an environment of a relatively flat yield curve'. There were '…much clearer signals of a further reduction of inflationary pressures from the demand side' but, once again, concern was expressed that countries might fall short on their fiscal commitments under the Growth and Stability Pact.

The decision to cut interest rates by 50 bp rather than by 25 was clearly at odds with public comments made by some members of the Council prior to the meeting. When questioned about that seeming inconsistency in the press conference, Wim Duisenberg explicitly responded that 'it is him market participants should listen to'. The point was further emphasised in

the hearing before the Monetary and Financial Affairs Committee of the European Parliament in December. It shows that the ECB Council came eventually to accept that too many public pronouncements by Council members hinder an effective communications policy. Since that time one can detect more discipline and coordination in statements by Council members. A further element of improvement in the ECB's communications was the decision that from December onwards, monetary policy issues would only be discussed at the first meeting of every month, thereby avoiding speculation on possible changes in policies to take place every fortnight.

7 March 2002

At its meeting on the 7th of March, the ECB chose to keep interest rates unchanged at 3.25% and, effectively, signalled the end of the easing cycle. In the press conference, Duisenberg stated that '…the trough in real economic conditions [had been] reached around the end of last year and the beginning of this year', and that 'the economy had started its way back to recovery.' The usual homage was paid to the first pillar, reiterating that it would only signal risks to price stability if fast money growth were to continue even when the recovery gains momentum. '…Some normalisation in the development of M3', however, could only be noted in the April meeting (although M3 growth was still more than 3 percentage point above its reference value).

2. The reaction of monetary policy to the downturn in activity

During 2001, monetary policy had to deal with a combination of a sudden deceleration in demand and a continuation of inflationary pressures. This already-difficult environment was compounded by the shock waves that rocked financial markets after the September 11th terrorist attacks on the US. The purpose of this section is essentially to describe and to analyse how the ECB reacted to these difficult circumstances. Three types of standard indicators are used in this section: monetary and credit aggregates, short-term real interest rates and monetary conditions indices (MCI), which directly take into account exchange rate movements.

Money growth

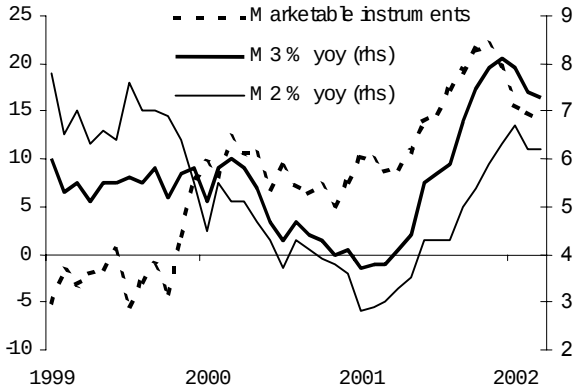
During the period under review, the measurement of M3 underwent the second stage of the methodological change designed to ensure that all money holdings of non-euro area residents were excluded from the aggregate in line with the definition of money chosen by the ECB. Following the exclusion in May 2001 of money-market fund shares and

units held by non-residents, in October 2001 non-residents' holdings of money market paper and short-term securities with an initial maturity of up to two years were also excluded.

Even though the exclusion of non-residents' monetary assets led to a lower measure of M3 growth, M3 accelerated strongly and reached a peak of 8.1% in December. Since then it has slowed, but it remains well above the threshold level of 4.5% (confirmed at the annual review by the ECB Council in December). The acceleration in M3 reflected the increased liquidity preference in an environment of considerable uncertainty (even before the terrorist attacks), weak performance by stock markets and the flattening of the yield curve that reduced the opportunity cost of holding money. Indirect evidence on the size of the portfolio shifts underpinning the acceleration in M3 is given by the dramatic rise in the rate of growth of marketable instruments – the type of assets that is the first choice in the case of portfolio shifts away from more risky and less liquid assets, even when spending decisions are not planned. As shown in the chart below, marketable instruments held by residents provided a sizeable contribution to M3 growth, as can be appreciated by the difference between M3 and M2 (on average 0.9% in the first half of 2001 and 1.7% in the second part), which is accounted for by this type of monetary asset.

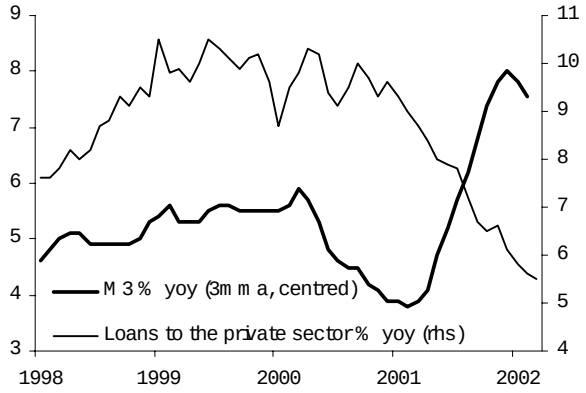
As the acceleration in M3 growth could be traced to increases in liquidity preference, fast money growth was not worrying from an inflation point of view – an interpretation that was supported by developments in credit aggregates, and most notably credit to the private sector, which decelerated throughout the period.

Figure 2.1 Euroland money growth



The shift in liquidity preference that took place in the period under review considerably impairs the reliability of money aggregates in conveying information about current economic developments. However, the ample liquidity conditions and the fact that credit growth, although slowing down, has consistently remained above nominal GDP growth do not point to the risk of monetary policy as being grossly insufficient to counteract the slowdown. Was it too generous? Other indicators of the monetary stance and developments in inflation can provide elements to answer this question.

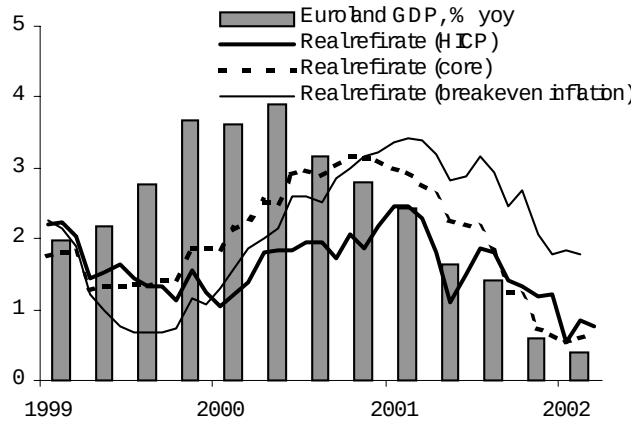
Figure 2.2 Euroland M3 and credit growth



The short-term real interest rate

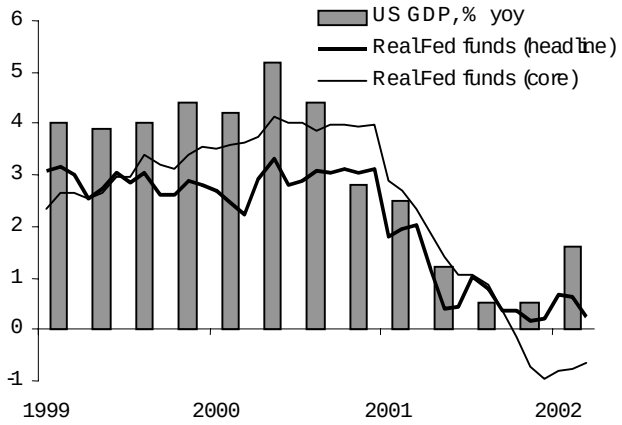
As usual, the assessment of the monetary stance based on short-term real interest rates depends critically on the inflation rate used for the deflation. We consider here headline inflation, core inflation and the break-even inflation from the inflation-linker OAT issued by the French Treasury. We then compare the resulting rates with output growth. As the chart shows, according to this type of indicator the monetary stance was eased substantially – indeed more so than in the 1998-99 slowdown, for the measures were based on actual as opposed to break-even inflation. The easing was quite rapid and, when scaled for the size of the slowdown, of a magnitude that does not lend support to the critique, levied in some quarters, that the ECB action has been too timid and slow, particularly when compared to the Federal Reserve. Moreover, as the analysis below shows, not even the view that the ECB followed the Fed finds support from the data. 2002 can be regarded as the year of the de-coupling of the monetary policies of the Fed and the ECB.

Figure 2.3 Euroland output growth and real interest rates



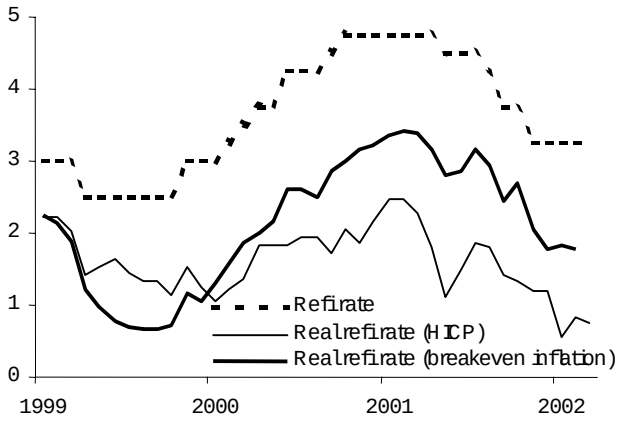
It has to be noted that a non-negligible part of the easing of monetary conditions in the euro area has came from the rise in the rate of inflation, rather than from the decline in nominal rates. In a way, the aftermath of the oil shock on inflation did a good part of the work for the ECB, thus limiting the scope for further reductions in nominal interest rates.

Figure 2.4 US output growth and real interest rates



Market participants shared with the ECB the view that the increase in inflation would be in large part temporary, as shown by the developments in the break-even inflation. This is at one time a very powerful indicator of the credibility of the ECB and a reminder that the extent of the easing of monetary conditions may be overestimated by the conventional measures of short-term real interest rates.

Figure 2.5 Euroland real refi rate



Monetary conditions index

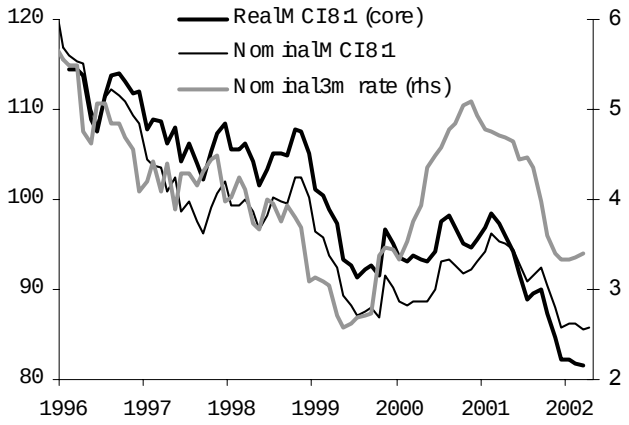
The monetary conditions index (MCI) is usually used as a tool of monetary analysis in small open economies. However, the movements in the euro since its introduction have been so pronounced that the exchange rate has had a significant effect on monetary conditions, even in a relatively closed economy such as the euro area taken as a whole. The MCI can thus provide a useful contribution to the analysis of monetary conditions. Moreover, as shown in last year's report (Gros et al., 2001, pp. 92-98), qualitative indications from the MCI for the euro area tend to be robust to alternative choices regarding the selection of the interest rate used in the MCI and the weight of the exchange rate component within a range reasonable for an economy as closed as the US.

An inspection of the recent developments in the MCI reveals two key findings:

1. The easing of monetary conditions that took place in the period under review is mainly due to movements in the interest rate; the extent of easing in any event is smaller than that which followed the inception of EMU as a result of the depreciation of the euro.

2. The decline in the MCI was more marked for the real than for the nominal index, further emphasising the point that a non-negligible part of the easing of monetary conditions was due to a fall in real rates brought about by the rise in inflation.

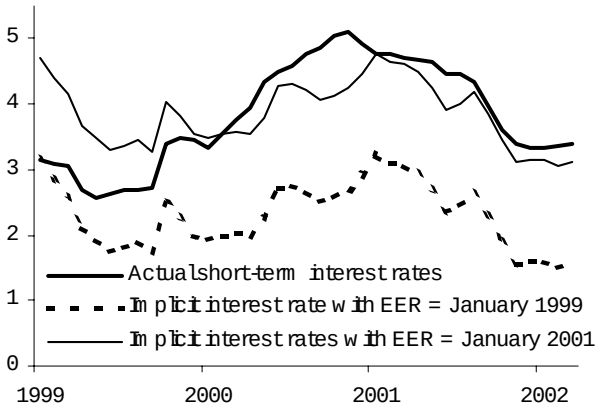
Figure 2.6 Euroland monetary conditions indicator



When considering this indicator, an important caveat has to be borne in mind. Movements in the exchange rate can be thought to have a direct link with demand conditions only in so far as the equilibrium exchange rate (EER) is taken to remain constant. Notwithstanding the well known problems in trying to proxy the unobservable EER, the standard usage of MCI indicators hinges on the premise that the EER is a slow-moving variable, whose variations at the business-cycle frequency are negligible. This hypothesis, however, may not be warranted for the euro area in the period since the introduction of the euro. This point can be vividly illustrated by comparing actual developments in the interest rate with those of two implicit interest rates. The latter can be defined as the interest rate that would have produced the actual monetary stance if the exchange rate of the euro had remained constant at its January 1999 and January 2002 levels, respectively.

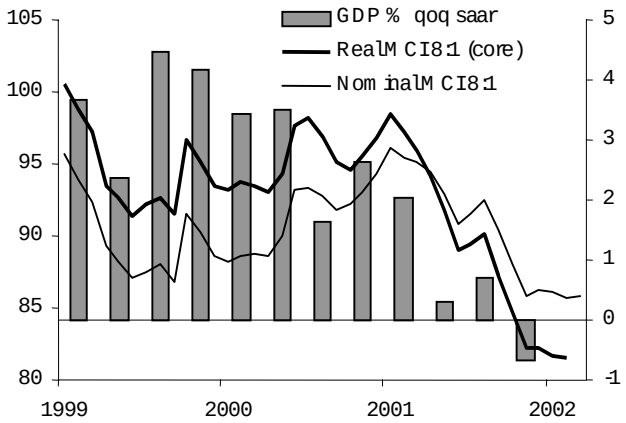
The chart shows that if the euro had remained at the average level in January 1999, the same monetary conditions that actually prevailed would have required short-term interest rates at below 3% for the past two years. It is equally evident that the difference between the actual and implied rates has remained constant since the beginning of 2001, which confirms that changes in monetary conditions have been mainly driven by interest rate movements in the last 12 months.

Figure 2.7 Euroland implicit interest rates for constant EER



When plotted against the quarter-on-quarter annualised rate of output growth, the MCI confirms that monetary conditions eased significantly in response to the slowdown and that the easing is more marked when the effect of inflation on real rates is taken into account. Once again, this indicator offers no support for the case against the ECB for being too slow and timid to react to the slowdown in aggregate demand. Whether the easing led liquidity conditions to an appropriate or a far too expansionary level is, as argued above, essentially contingent on an unavoidable judgement of whether the EER of the euro has changed since 1999.

Figure 2.8 Euroland output growth and monetary conditions



There are several elements that support the notion that a non-negligible part of the depreciation of the euro reflects a change in the EER:

- the widening of the productivity differential in favour of the US documented in Chapter 1 of this report,
- a far smaller pass-through of the depreciation to domestic inflation than historical experience would have suggested, and
- the rather limited increase in the euro area trade surplus despite the substantial real depreciation.

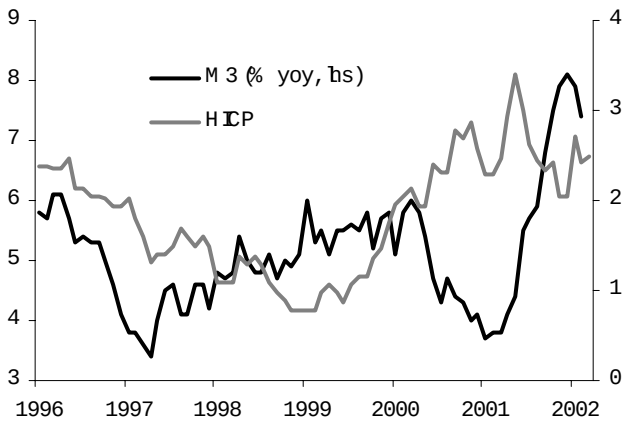
If the equilibrium real exchange rate has indeed depreciated, one could argue that the easing in monetary conditions as signalled by the MCI has been less generous than might appear.

Why has the fall in inflation been so slow?

The indicators discussed so far unambiguously point to an easing of monetary conditions in response to the weakening of growth and the perceived risk that, after the terrorist attack, the slowdown in the global economy could really turn into a major recession. Against the background of such weak demand conditions, it is quite remarkable that inflation has declined so slowly, surprising everybody with its persistence, particularly as regards core inflation.

Indeed, die-hard monetarists could argue that the persistence of both headline and core inflation at high levels is not that surprising in the light of the acceleration of M3. Were developments in M3 sending signals about inflationary pressures which should have received more attention?

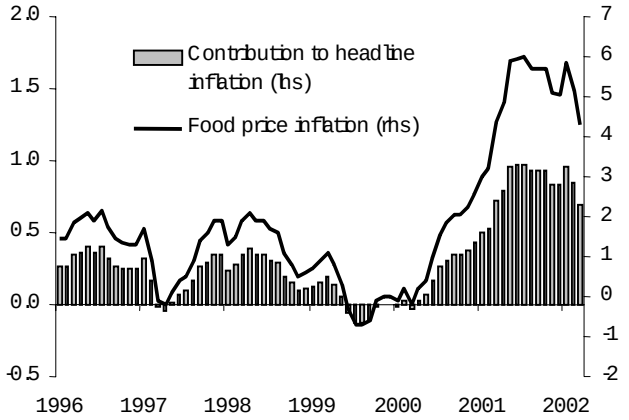
Figure 2.9 Euroland M3 growth and inflation



Unfortunately for monetarists and for the role of the first pillar of the monetary policy strategy of the ECB, this prima facie association does not withstand even a slightly closer scrutiny. The fact that the acceleration in M3 is following rather than preceding (with the typical lag of at least 6 and possibly as long as 18 months) the spike in inflation seems, in the event, to deprive money growth and the pairing of policy rates of a direct (or even indirect but traceable) connection with the rise in inflation.[8]

Why then has inflation been surprising everybody on the high side? Part of the explanation is certainly due to a succession of shocks to food prices and the renewed increase in the oil prices sparked by the escalating conflict in Palestine. The former provided a contribution to the overall headline inflation of a full percentage point, even though food makes up only 16% of the basket. The rise in food price inflation[9] has involved processed and unprocessed food alike and has been unexpectedly persistent.

Figure 2.10 Contribution of food to headline inflation

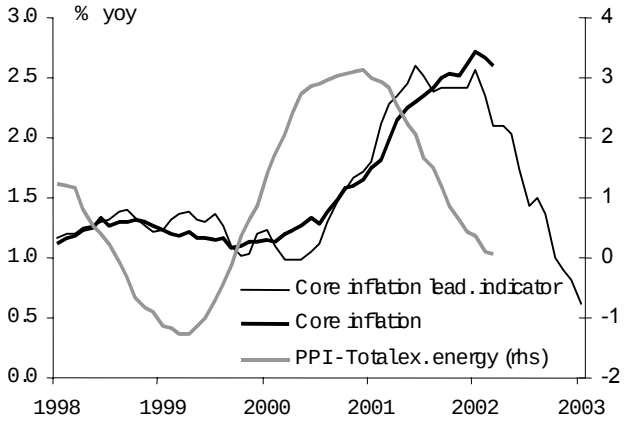


[8] Moreover, even a simplistic Granger causality analysis (conducted within the framework of a variety of VAR) fails to uncover even a minimal hint that money growth may have Granger caused inflation in the episode at hand.

[9] The three well known shocks that have taken place in the last 12 months are: BSE, which started in early 2001 but recurred at various times, foot-and-mouth disease (May 2001) and a spell of unusually cold weather in January 2002. The effect of these shocks, at least so far, has been surprisingly persistent compared to similar situations in the past.

Yet, in spite of its persistence, it is difficult to see this as heralding a generalised and sustained rise in the price level or as requiring a permanent change in relative prices. As of now, this unusual series of one-off shocks remains the most plausible explanation. If this view is correct, one would expect food prices to start falling relative to other prices during 2002.

Figure 2.11 Core inflation and producer prices



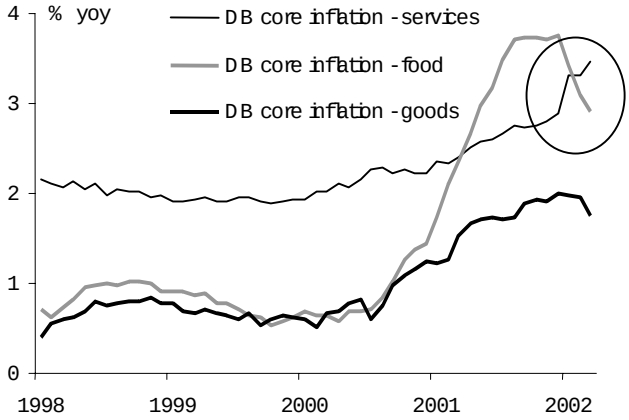
What is definitely more worrying is that the persistence of high inflation has not been confined to headline inflation but has also been evident in core inflation, which, by construction, factors out the direct impact of erratic movements in fresh food and energy prices. On the basis of producer prices (more articulated models provide basically the same indication), core inflation should have peaked in November/December, but in fact it peaked later and the decline in core inflation thereafter has been much slower than anticipated.

But where does the stubbornness of core inflation come from, given that demand conditions have been weak and, as discussed above, the timing of the acceleration in M3 does not really fit the explanation of ample liquidity as the primary source of inflationary pressure? An analysis of the sub-components of core inflation provides some clues.

The first thing to notice is that the food price hikes included processed food, the prices of which are typically linked more to demand conditions than supply shocks. This time, possibly because of the extraordinary number, magnitude and persistence of the disturbances, processed food inflation was involved too, with a peak close to 4%. Reassuringly the

worst seems behind us; core food inflation is now rapidly declining and should continue to do so in the following months.

Figure 2.12 Euroland components of core inflation



The most traditional part of the core inflation index, the goods component, has so far behaved more closely in line with expectations.[10] However, core goods inflation declined only very modestly in spite of the upstream downward pressures coming from the fall in PPI inflation, showing little sensitivity to weaker demand conditions, possibly as a result of the second-round effects of oil-price hikes and the depreciation of the euro. Inflation in services, instead, continued its upward trend notwithstanding the weakening of demand. There are special circumstances, such as the introduction of the euro, that may account, at least in part, for these developments, particularly with reference to services (see section 4 below). Yet, another, more compelling (and worrying!) explanation can be put forward. The slow decline in inflation could simply be the other side of the coin of the fall in productivity growth in 2001 that was documented in Chapter 1.

It is not yet possible at this stage to establish the persistence of the decline in productivity growth and the extent of the related upward pressures on costs and prices. The productivity shock may only be

[10] It has to be recalled that, as a result of a change in the methodology of recording the impact of end-of-season sales in Italy and Spain, the data since January have been affected by an unusual volatility (the seasonal pattern is changing because of the introduction of the new methodology).

temporary and, if it were permanent, a close link between productivity developments and wage determination could avoid the welfare loss of cost-push inflation and the ensuing reaction by the ECB. Nevertheless, the persistence of inflation in this environment of slow growth forcefully points to a deep-seated malaise in (most of) the economies in the euro area. A rigid economic structure that generates only sluggish growth is bound to react to shocks without persistent tensions on prices, notwithstanding both wage moderation and a credible central bank.

Conclusions on the assessment of the monetary stance

The analysis of this section does not point to major policy mistakes on the part of the ECB. We sketch below the general picture that is emerging.

After tightening from end-1999 to the end of 2000, monetary conditions were eased throughout 2001 as the economic situation deteriorated and the terrorist attack led to a collapse in consumer and business confidence. The easing of monetary conditions was largely due to rising inflation rates in H1, but was reinforced by historically rapid cuts in interest rates in H2.

A number of observers have argued that the ECB should have cut interest rates more (and more rapidly) because i) nominal interest rates remained higher than they were at any stage during 1999, although growth was much weaker, and ii) the US cut interest rates far more aggressively.

The above analysis shows that there is little support for this argument. Real interest rates in the euro area are currently lower than they have been at any time since 1996. If one deflates nominal rates by core inflation, real rates are more than half a percentage point lower than they were at the 1999 trough. US core inflation, by contrast, was roughly constant throughout 2001, thus requiring, other things being equal, a larger reduction of the nominal interest rate. But things on the two sides of the Atlantic were not equal, as the extent of the slowdown in the US was much larger than in the euro area (3 percentage points for the US versus a little above 1.5 for the euro area). MCI indicators confirm that the easing of monetary conditions was quite fast, while the rapid growth of money and credit aggregates practically rules out the possibility that there might have been a risk of deflation or a credit crunch.

Rather, the speed of money growth and the surprising persistence of both headline and core inflation trigger the opposite question: Is the monetary stance too loose in the euro area to ensure price stability? Or, to ask the question more poignantly, is the euro area on the verge of stagflation

given that growth is slow, productivity developments are disappointing, as we have seen in Chapter 1, and inflation is still high?

Stagflation is a highly charged word, which takes our collective memory back to the decades of the 1970s and 1980s, which were characterised by double-digit inflation rates and accommodating monetary polices in the (vain) hope of reducing the output cost of supply shocks. This type of policy response is, fortunately, behind us and so is, presumably, stagflation. The risk of a persistently poor growth performance accompanied by inflation bouts every time an adverse shock hits the euro area is instead very real.

Optimists can certainly submit that the slow decline in inflation merely resulted from a series of one-off, special shocks that happened at a moment of slow demand and that temporarily delayed the decline in core inflation that was expected on the basis of upstream downward pressures. They can also point to some hard evidence in favour of their argument and might feel vindicated if eventually core inflation falls decisively in the next few months. Nevertheless, it is difficult to totally dismiss the notion that the succession of negative surprises on inflation is the symptom of an inflexible economic system that can only generate disappointing improvements in productivity and sluggish growth. After all, it is surprising to see an industrialised economy so deeply affected by a shock to the food sector.

Monetary policy cannot solve the structural rigidities that underpin the euro area's tendency towards the 'new stagflation' apparent in recent developments. Nor can it generate the political resolve needed to implement appropriate reforms in sensitive areas. The actions and trade-offs that the euro-area economy faces, however, are shaped by the degree of its flexibility. The fall in productivity experienced in 2002 makes the objective of pushing inflation below 2% even more difficult to achieve.

3. Does the ECB follow the Fed?

The belief that the ECB follows the Fed is so entrenched in the minds of market participants and commentators that the search for empirical support would seem at one time a waste of energy and a trivial task. We engaged in this search and found it far less straightforward than conventional wisdom would suggest. To anticipate the conclusion, we found little support for the proposition that the ECB systematically follows the Fed (or its converse).

The starting point has been the analysis of the financial variable most representative of money market conditions, the 3-month interest rate. If

the ECB had systematically followed the evolution in the US,[11] this would be reflected in the data with changes in US interest rates leading changes in Euroland rates.

Figure 2.13 Three-month interest rates in the euro area and the US

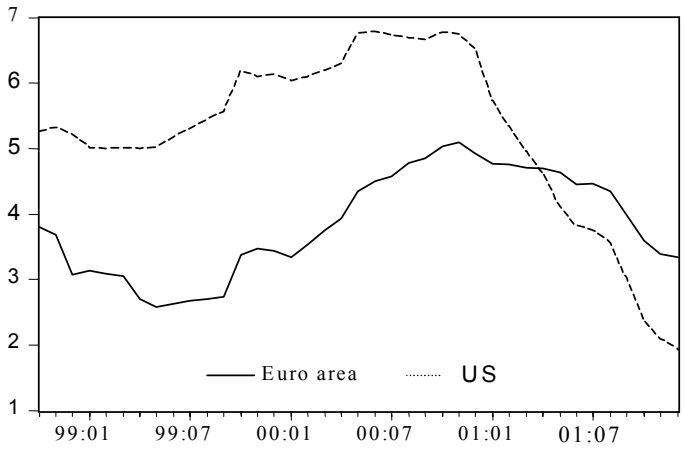


Figure 2.13 plots the two series in question since the start of EMU. At first sight, it would suggest that the US was leading Euroland both when interest rates were going up, from the trough in early 1999 and when they fell, starting in early 2000. Most observers conclude from this inspection that the ECB mimicked the Fed in its monetary decisions. However, this popular belief[12] cannot be corroborated by statistical analysis.

The procedure used here to ascertain the existence of a follower-leader relationship was Granger-causality tests. These tests can show whether

[11] The question of whether the ECB follows the Fed is intertwined with the question of whether the US business cycle leads and determines the European cycle. This is widely assumed, but it is not widely appreciated that this is not evident in the data. There is one simple fact that suggests that if there is a determining influence of the US cycle on Europe, it cannot have come via the traditional channels. This fact is simply that net exports did not contribute to the 2001 slowdown in Euroland (the contribution of net exports to demand growth was approximately the same in 2000 and 2001). The contagion must thus have come through other channels.

[12] See Begg et al. (2002, p. 42) see a time lag between Fed and ECB interest rate decisions. They attribute the reason for the Fed moving first to the US cycle leading the eurozone.

past values of a certain variable (e.g. US interest rates) influence another variable (e.g. euro interest rates) after one has taken into account the patterns that might link the second variable (euro rates) to its own past.

We ran a battery of statistical tests covering a variety of periods, for example the entire euro period (1999-early 2002).[13] All these tests gave the result that US interest rates influence (or rather are related to) euro interest rates during the same month. However, the US interest rate of the previous month did not have a statistically significant influence on this month's euro interest rate when all these other factors were taken into account.[14] This suggests that the visual impression of a US leadership over the entire euro period might be misleading.

All in all, it appears that there is no compelling statistical evidence proving that the ECB follows the Fed. But this absence of evidence also works the other way round. It is impossible to prove that the two are independent from each other because the moves on both sides of the Atlantic seemed to be so often contemporaneous. This is actually what one would expect if the most important shocks have come from global financial markets and both have been equally quick to respond to them. Our conclusion is supported by Peiró (2002, p. 149), who finds 'a preponderance of synchronic over dynamic relationships [which] can be regarded as evidence in favour of those theories that attribute the origin of world cycles to common shocks'.

Table 2.1 below gives a sample of the type of results we obtained. The Annex provides further details of dozens of regression results for different time periods which all lead to the same conclusion: there is no evidence against the hypothesis that the ECB does not follow the Fed. All in all, it thus appears that there is no statistical evidence that proves that the ECB follows the Fed. But this absence of evidence works also the other way round: It is impossible to prove that the two are independent from each other because the moves on both sides of the Atlantic seemed to be so often contemporaneous. This is actually what one would expect if the most important shocks have come from global financial markets and both have been equally quick to respond to them. Our conclusion is supported by Peiró (2002, p. 149), who finds 'a preponderance of

[13] We used first differences, i.e. changes in interest rates, since the level series seemed to contain a unit root. More details are provided in the Annex.

[14] Incidentally by looking at the behaviour of US interest rates over time, we found that euro interest rates also influence US interest rates, again during the same month.

synchronic over dynamic relationships [which] can be regarded as evidence in favour of those theories that attribute the origin of world cycles to common shocks.'

Table 2.1 Regression of the 3-month interest rate in the euro area on the 3-month interest rate in the US (in first differences)

Dependent variable: DI3MEUR (first difference in US 3-month interest rates)
Method: Least Squares
Included observations: 40 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.060981	0.019580	3.114509	0.0037
DI3MEUR(-1)	0.117330	0.093137	1.259759	0.2161
DI3MUSA	0.504483	0.074507	6.770927	0.0000
D9812	-0.596453	0.116671	-5.112250	0.0000
D9904	-0.401243	0.116463	-3.445241	0.0015

R-squared	0.742952	Mean dependent var.	-0.007250
Adjusted R-squared	0.713575	S.D. dependent var.	0.214380
S.E. of regression	0.114733	Akaike info criterion	-1.375941
Sum squared residuals	0.460732	Schwarz criterion	-1.164831
Log likelihood	32.51882	F-statistic	25.29034
Durbin-Watson stat	1.630207	Probability (F-statistic)	0.000000

4. ECB strategy: Too timid steps but in the right direction

The ECB strategy has two pillars. So have the critiques that have been levied at it. The first one – indeed the one shared by the vast majority of commentators – is the criticism of the prominent role assigned to money. The second one hinges on the contention that communications could be more effective, clear and transparent. Although no drastic and explicit change has taken place in the period under review, improvements on both fronts have to be acknowledged. The emphasis on money-growth developments when explaining monetary policy decisions has been vastly reduced, at least de facto, and ECB Council members have shown greater discipline as regards public statements, particularly after the November 2001 meeting. Nevertheless, shortcomings in the strategy remain. Indeed the improvements that took place last year demonstrate that progress is possible, strengthening the case for quick improvements to the current strategy and communications policy. As argued in last year's MPG report, we prefer a more straightforward strategy of keeping core inflation at 1.5% with a ±1% symmetric tolerance band', that can also provide the skeleton of a simple framework for effective communications.

Does the public need to understand arcane monetary analysis?

The massive shifts in liquidity preference that occurred in the period under review have exposed the weakness of the difference between money growth and its medium-term reference value as an indicator of inflation or activity. The importance of money growth in the ECB strategy has not led to major policy mistakes (imagine the ECB calling a press conference on September 17th to explain that, despite the worries about the possibility of an incipient recession, fast money growth made it impossible to cut policy rates…). However, the schizophrenia between the lip service invariably paid to the first pillar and actual policy decisions has irreparably undermined the notion of a reliable, straightforward link between developments in money growth and the setting of the interest rate. This in turn makes it impossible to assign a leading role to developments in M3 in the effective communications to the public of the rationale underpinning monetary policy decisions.

The gap between the strong acceleration in M3 and the 125-bp cut in policy rates in 70 days late in 2001 was so blatantly wide that it provided an ideal opportunity to take rapid steps to modify the strategy. It would have been uncontroversial to jettison the first pillar at that point in time. This would still have left the ECB free to exploit the information (if any) conveyed by developments in monetary and credit aggregates. Close attention to money growth, which we regard as part and parcel of central banking, need not be associated with the incessant repetition that the central bank must, and actually does, scrutinise M3 developments – often to discover that they convey no useful signals on inflation. Ultimately, a disproportionate amount of time and attention has been devoted in official documents and statements to explaining why money had de facto to be ignored and yet it had to remain a fundamental and indispensable element of analysis – and communications. This has added an unnecessary obstacle to clear communications with the public, particularly because statistical problems have once again plagued M3.

2001 was the *annus horribilis* for the intelligibility of money data. Statistics were changed twice to correct for assets held by non-residents. Moreover, stock/flow adjustments (i.e. statistical amendments to the raw stock series to correct for the effects of 'non-transaction-related' variations, due e.g. to changes in the exchange rate, reclassifications, re-valuations) were once again sizeable, even in a year when the exchange rate (a cause for the stock/flow adjustment that is immediately understandable) did not fluctuate much. What is gained by obstinately insisting that M3 plays a prominent role in monetary policy strategy?

Figure 2.14 Different corrections to M3 data

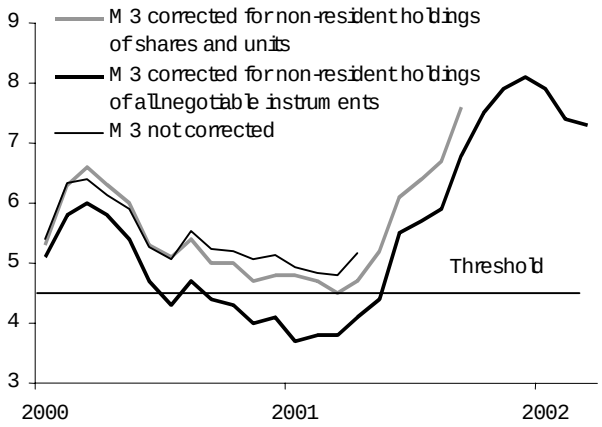
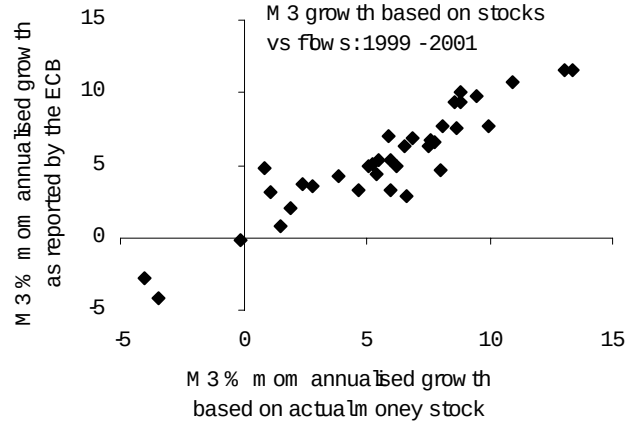


Figure 2.15 The effect of stock/flows adjustments on M3 growth



Transparency and communication

Last year's MPG report identified a huge gap between the formal and the perceived transparency of the ECB. A novel indicator put forward by Bini-Smaghi and Gros (2001) – which captures the way a central bank interacts with the public, market participants and the other institutions in the society – shows unambiguously that the ECB is formally a very transparent institution, definitely more so than the Federal Reserve. On the other hand, the ECB ranked at the bottom of the scale among major

central banks in surveys conducted with market participants. The limited track record of the ECB is certainly a reason for this gap. Other factors play a role too.

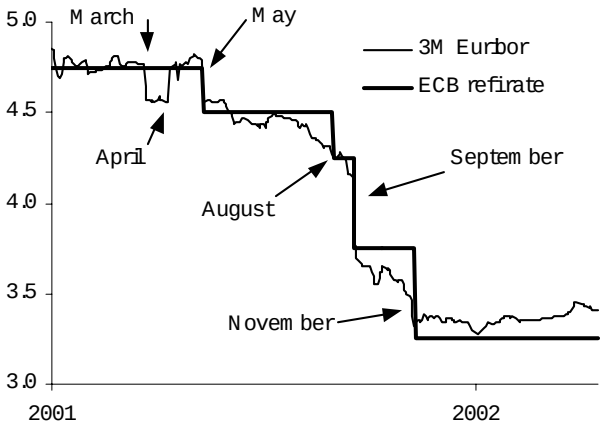
First, in several instances in the past,[15] the ECB surprised the market despite the fact it has explicitly rejected unpredictability as one of its goals (see Issing et al., 2001). As shown by the chart plotting the three-month rate against the refi rate, after the major surprise in April/May last year, the ECB did not wrong-foot the market again. This is undoubtedly a sign that communications between the markets and the ECB are getting better – whether because of improvements on the ECB side or the adaptation of market participants to the ECB's jargon and idiosyncrasies.

Secondly, the abundance of occasional public statements on the part of Council members has always been a source of confusion. Too many voices have at best diluted the effectiveness of the single message (soloists, in this context, are definitely preferable to choirs), and at worst have sent conflicting messages and created the impression of sharp disagreements within the Council. As recalled before, the problem of conflicting statements generating confusion in the market was particularly acute before the Council meeting of 11 November 2001. In the press conference following the meeting, the President explicitly stated that his role in communications would become greater – a point later reiterated before the European Parliament. In the wake of these announcements, Council members other than the President became less vocal in public on monetary policy matters, thereby providing a very useful contribution to the clarity of ECB communications.

Thirdly, the publication of forecasts has not proved to be the means to enhanced clarity and transparency of communications that many had hoped. The internal process preceding publication is far too long and by the time the forecasts appear in the public domain, they no longer reflect the current state of thinking in the ECB. Very wide and symmetric ranges accompany the forecast for the key variables, with little information on the balance of risks surrounding the central projection. Most importantly, it is not at all clear what role, if any, is played by the forecast in the decision-making process. In sum, the publication of forecasts is a missed opportunity to provide information on the framework adopted by the ECB to assess developments and the risks surrounding them. Why not take it?

[15] See Gros et al. (2001, p. 53).

Figure 2.16 Policy rates and market rates



Fourthly, market participants frequently lament blunders and glitches in communications from the ECB. An objective assessment of this sort of anecdotal evidence is, needless to say, impossible. We just want to note its existence and recall one major slip-up illustrating the phenomena. On the 17th of September, the routine weekly operational tender was sent out offering banks liquidity at a minimum bid rate of 4.25%. Later on the same day, the ECB released the statement announcing that the 'minimum bid rate on the main refinancing operations of the Eurosystem will be reduced by 0.50 percentage point to 3.75%. Differently from what was communicated in an announcement at 3.30 p.m. today, this change in the minimum bid rate will be effective starting from tomorrow's operation'.

Conclusion on Strategy and Communications

The ECB is learning from experience, no doubt, and its communications policy has improved. Shortcomings nevertheless remain – most notably, the insistence in making M3 developments a lynchpin of the way monetary policy decisions are motivated, despite the erratic link between the rate of money growth and actual interest rate policy. This critique is neither new (we put it forward in previous reports) nor original (plenty of other analysts have also levied it), but, alas, it still applies. In other areas, communications and transparency could also be improved – for example further strengthening the role of the President in signalling incipient changes in the assessment of the economic outlook or exploiting the opportunity offered by the publication of the ECB forecasts to convey information on the risks associated with the central scenario.

5. The key strategic objective: Is 'below 2%' too tight?

Although the ECB's monetary policy strategy is vulnerable to criticism on several accounts, it would be very difficult to argue that the deficiencies in strategy and communications have led to serious policy mistakes. This section addresses one key aspect of the strategy – the very definition of the objective of monetary policy. In this area, as argued below, the risk of flaws in the strategy seriously misguiding policy action potentially looms much higher.

Domestic Balassa-Samuelson

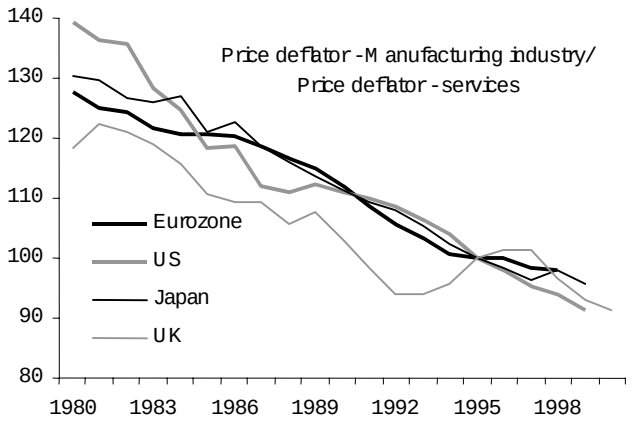
The discussion of why inflation has been so stubborn in the first months of 2002 pointed to the prices of services as the main culprit, given that they keep rising at well above 3%. This in itself would not be a problem since the target of the ECB is the overall consumer price index. And indeed the fact that goods prices generally increase much less than services prices is not a particularly recent development, but rather is a persistent longer-run phenomenon.

The reason for this long-run trend is well understood: the relative price of goods falls because productivity grows faster in goods production than in the provision of services (the famous example is that of haircuts, where it is difficult to envisage productivity increases). The long-term trend in relative prices is documented in Figure 2.17, which shows the ratio of proxies of goods and services prices, namely the implicit price deflator of gross value-added in manufacturing versus that in services for the euro area, Japan and the US. In all of these three large economies, this ratio shows a clear trend, with a rate of decline of about 2% p.a. (cumulative about 40% over 20 years). There is no reason to expect that this trend will stop, so that services inflation can be expected to continue to be higher than goods inflation.

The fact that services inflation is consistently higher than goods inflation – a necessary development to ensure the adjustment of relative prices – raises the question of whether one actually needs goods price deflation in order to achieve an overall inflation rate below 2%. To take a concrete example, assume that the weight of services in the HICP is 50% (with goods making up the remainder). With services inflation currently running at 3.2%, an HICP inflation of 2% would require goods price inflation of 0.8%. HICP inflation of 1.6% (which is still near the upper end of the 0-2% acceptable range) would require complete price stability (literally 0 inflation) in goods, and as this is an average across countries,

goods price deflation would have to take place in a number of countries for an average level of 0% to be achieved.

Figure 2.17 Manufacturing vs services prices



This suggests that the 2% upper bound to inflation chosen by the ECB might be too tight in order to allow for the normal trend developments in relative prices to take place without actually requiring widespread price falls in a large part of the economy. Although in principle there is no problem in achieving adjustments in relative prices through a fall in certain nominal prices, there is a substantive body of empirical evidence[16] (also for economic systems that can be expected to be more flexible than the euro area, e.g. the US) that this entails an unnecessary loss in output.

The numbers for the euro area are not quite as simple as suggested in the example above, but they are close: the ratio of prices of manufacturing to services has fallen by about 1.4% p.a. over the last two decades. Since services account for about 38% of the HICP, it follows that an HICP inflation rate of 1% (the middle of the 0-2% range of the ECB) and the current rate of services inflation leaves no room for inflation in goods prices. An overall HICP inflation rate of 1.5% leaves room for 0.5% goods price inflation, but one-half of one percentage point remains uncomfortably close to deflation, not only because it would be an average across the 12 countries of the eurozone, but also because it corresponds roughly to the size of the quality bias, i.e. the fact that inflation is

[16] See e.g. Akerlof et al. (1996), Fehr and Tyran (2001) and Levy et al. (2002).

generally held to be overestimated because quality improvements at constant prices correspond in reality to falling prices.

The argument made here that the inflation target of the ECB might be too tight is related to the results of other studies that yield similar conclusions but for different reasons, namely that differences in national price levels require differences in national inflation rates. For example, Sinn and Reutter (2001) argue that inflation in Germany should on average be 1% lower than the average of the euro area because the difference in productivity growth between traded and non-traded goods prices is much lower in Germany than elsewhere in the euro area. They conclude that inflation in the euro area has to be at least 0.94%, if Germany is not to experience deflation. Cross-country differences in sectoral productivity growth rates could thus compound the problem identified here for the euro-area average. If the CPI of Germany is constant, any differential in productivity growth would require deflation in manufacturing.

Will Germany normalise?

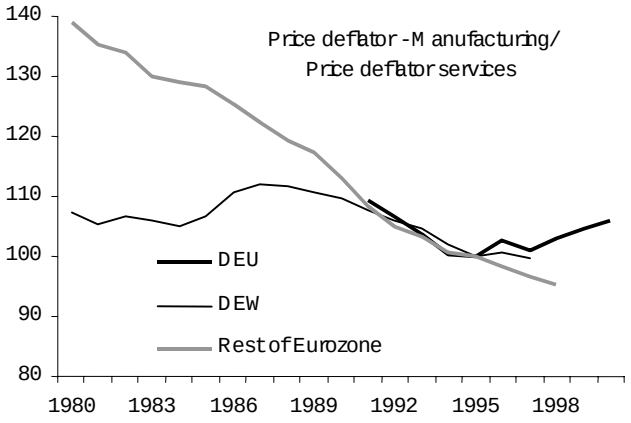
The conclusion of Sinn and Reutter (2001) and of other similar studies is based on data from the 1980s and early 1990s. In principle one should use a much longer-run time series to uncover structural trends, but this is rendered difficult by the break in data for Germany coming with unification. This is not only a data problem, but one has to ask whether it is reasonable to assume that the unified Germany will behave like West Germany in the past, i.e. with a difference in productivity, and hence relative prices, much smaller than in the rest of the Union, as shown in the chart below.

Unification brought important changes to the position of Germany relative to its European partners. In 1990, (West)Germany had, by a considerable margin, the highest GDP per capita (measured at PPP) among the group of countries that now form the euro area (excluding Luxembourg). In this context, it was reasonable to assume that Germany should have the highest price level for services and should thus constitute the 'anchor' country for the entire area. By now, however, Germany has lost its special position and is today exactly in the middle, almost tied for 5th and 6th place out of 11 with Italy. It is thus possible that from now on (united) Germany is no longer the anchor country in terms of prices.

If the relationship between manufacturing and services prices in Germany 'normalises', the argument made here would be reinforced. Figure 2.18 shows that for the rest of the eurozone the trend decline in the relative

price of manufacturing has been slightly over 2% p.a. over the last two decades.

Figure 2.18 Relative prices in manufacturing and services



Neo-Keynesians rejoice! Menu costs for real

The arguments discussed above provide the rationale for higher inflation in the services sector in the long run. In the period under review, this tendency was exacerbated by special, temporary factors.

Indeed as Figure 2.19 shows, services inflation accelerated briskly, moving from 3% to 3.5% in 2002. The acceleration was particularly pronounced in Spain and France.

Turning to the items that provided a major push to services inflation, more than 0.3 percentage points of the increase can be traced to the hike in prices of 'restaurants and cafés', which makes up 6.7% of the basket in Europe (but as high as nearly 14% in Spain) and 27.1% of core (core services). This acceleration is most likely to be related to the introduction of the euro, which has provided the opportunity to pass on to the consumer the increases in costs (food is an important intermediate good for restaurants) and some widening of the margin on the occasion of a major re-pricing exercise. After all, if menu costs do not provide a justification for 'lumpy' changes in prices for restaurants, where else should they?

Figure 2.19 Core service inflation by country, % yoy

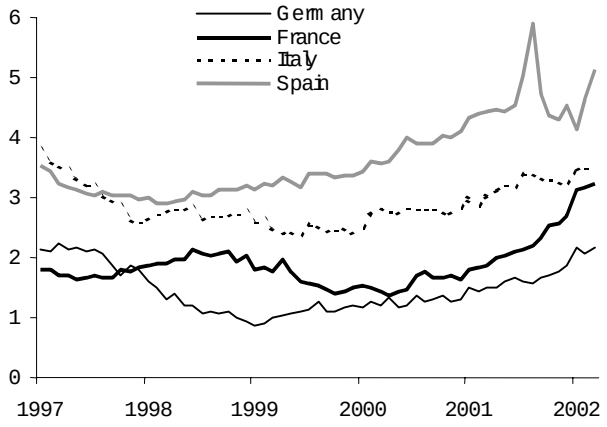
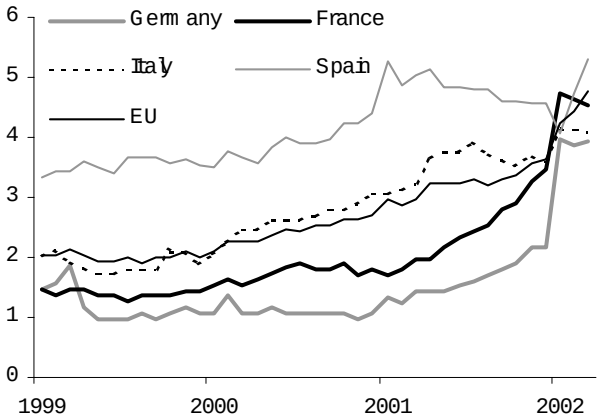


Figure 2.20 Inflation in restaurants and cafés



An international comparison

How does the ECB stack up compared to other central banks in mature economies? Table 2.2 shows a summary of the inflation objectives for seven industrialised countries. The key fact that emerges from this table is that the average of the inflation ceilings imposed among these countries is one percentage point higher than the ceiling of 2% set by the ECB. In this sense the ECB is a clear outlier. Another way to notice the extent to which the ECB is more ambitious than its peers is to note that all central banks that set quantitative objectives for inflation have upper limits higher than 2% and the lower limit is in only one other case equal to zero.

Moreover, except for Australia and New Zealand, all countries set a band around a central target. An easy way to allow for a higher inflation ceiling would be to simply set a band around a central inflation objective. A band of plus or minus 1%, for instance, would additionally help to raise the floor for inflation above the current 0%. Table 2.3 provides some further information on how inflation targets are being established and the inflation rate at the time the inflation target was selected. While in some cases inflation targets were used to lower inflation, it seems that in many cases the target reflected the inflation rate of the time.

Table 2.2 Summary statistics for targets and bands in inflation targeting regimes and a comparison with the ECB

	Target	**Band**	**Minimum**	**Maximum**
Australia [a b]	2.5	0.5	2	3
Canada	2	1	1	3
Iceland	2.5	1.5	1	4
New Zealand [a b]	1.5	1.5	0	3
Norway	2.5	1	1.5	3.5
Sweden	2	1	1	3
United Kingdom [b]	2.5	1	1.5	3.5
Average	2.2	1.1	1.1	3.3
ECB	-	-	0	2

[a] Since in these cases the precise target is not stated, only the range of price stability, i.e. the middle point of the range, was taken as the target.

[b] Target defined in terms of indexes excluding volatile components.

Is there any reason why the ECB should be more ambitious than other central banks in the world? The answer appears to be no on a number of counts. We agree with the arguments that are already well known, for example, as recalled above, that the heterogeneity of the eurozone means a low average inflation target might imply deflation in some countries. We can, however, add a new argument: the eurozone is less dynamic than many of the other inflation-targeting countries. This implies that, *ceteris paribus*, it will be more difficult to achieve price stability, especially during the adjustment period to lower productivity growth.

Table 2.3 Inflation targets at selected inflation-targeting central banks

Country	Index	Target	Actual Inflation[a]	1) 2)	Exceptions Consequences of failure to attain target
Australia	CPI (Underlying) [b]	2-3% on average	1.9%	1) 2)	None. Does not trigger any extraordinary procedure, but the CB must prepare an annual report, for presentation to the Treasurer and tabling in Parliament.
Canada	CPI [c]	2% (± 1%)	3.9%	1) 2)	Large increases in oil prices, natural disasters. Does not trigger any extraordinary procedure.
Iceland	CPI [c]	2.5% (±1.5%)	4.1%	1) 2)	Short-lived deviations, such as temporary supply shocks. Letter of explanation required.
New Zealand	CPI (until 1996) CPIX (since 1997)[d]	0-2% 0-3%	3.3% 1.8%	1) 2)	Significant changes in indirect taxes or government charges, import or export prices, natural disasters (and significant changes in interest costs up to 1996). Outcomes outside the range must be explained in policy statements.
Norway	CPI [c]	2.5% (± 1%)	3.0%	1) 2)	Direct effects resulting from changes in interest rates, taxes, excise duties, and extraordinarily temporary disturbances. A thorough assessment is required in the annual report.
Sweden	CPI	2% (± 1%)	1.8%	1) 2)	None. Does not trigger any extraordinary procedure.
UK	RPIX [e]	2.5% (± 1%)	4.0%	1) 2)	Effects of indirect taxes and subsidies and interest costs. Letter of explanation required.

[a] At the time of the announcement.
[b] CPI, consumer price index, excluding fruit and vegetables, petrol, interest costs, public sector prices and other volatile prices.
[c] In practice policy decisions are also based on underlying CPI - excluding food, energy and first-round effects of indirect taxes.
[d] CPI, consumer price index, excluding credit services. In practice decisions are based on a measure of underlying inflation.
[e] Retail price index excluding mortgage interest payments.

Note: Among emerging market countries, Brazil, Chile, the Czech Republic, Israel, Mexico, Poland, South Africa and Thailand have also adopted a formal inflation targeting framework.

Source: Almeida and Goodhart (1998) and Bank of Iceland Monetary Bulletin 2001/2.

How and when is the 2% ceiling to be raised?

The analysis in this section has provided another argument in favour of raising the ceiling of the ECB inflation objective. The secular trend in relative prices requires roughly 2% higher inflation for services than for goods. If 2% is the maximum admissible for the overall HICP inflation, monetary policy might end up forcing too-low inflation in the goods sector with a detrimental deflationary bias and an associated output and welfare loss. This argument is additional to the others that have been put forward in favour of raising the 2% threshold – namely the 2% for the whole area that might require 'quasi-deflation' in some countries to allow for the adjustment in relative prices across countries in the Union due to the Balassa-Samuelson effect; the overestimation of actual price increases due to neglected quality improvements when measuring prices.

Even though the arguments in favour are compelling, we are fully aware that the proposal to raise the 2% limit would involve very delicate issues in communications. Unavoidably, there is a risk that lifting the 2% limit is misinterpreted as a dilution of the resolve to fight inflation, eroding the credibility of the ECB with detrimental consequences on inflation expectations and asset prices, most notably long-term interest rates. A clear explanation of the rationale motivating the revision in the qualitative definition of the objective, while maintaining the Treaty remit of price stability, is the only way to tackle this issue and make clear that no weaker commitment to the ultimate goal of monetary policy is intended. The fact that all central banks that set quantitative objectives for inflation have upper limits higher than 2% should also be noted, which may help assuage some concerns.

Moreover, the choice of the timing for the introduction of the change could also help. By taking advantage of the fall in inflation below 2% that should occur later this year, one could allay the suspicion that the change was forced by the inability to respect the present upper limit for inflation.

In any event, no contrivance or argument, no matter how smart or sophisticated, can solve the communications problem entirely. The risk that raising the 2% threshold is misconstrued as a softer attitude towards inflation cannot be avoided and, in the short run, credibility may suffer. Yet, both possible alternatives to an explicit and motivated change in the inflation objective are definitely worse.

The first possibility would be to continue with the attitude adopted so far. The ECB might continue de facto to consider 2% not as an inviolable threshold but as a 'reference value', the overshooting of which need not

necessarily trigger the tightening of monetary policy. By invoking the reference to 'the medium term' (the qualifier of price stability providing flexibility to cope with temporary shocks), the ECB could maintain the current definition of its objective while avoiding unwarranted monetary restrictions when inflation and inflation expectations remain under control – even though somewhat above 2%. The arguments discussed above, however, suggest that such a situation is bound to become embarrassingly frequent over time and, ultimately, to build up a track record that defies 2% as an upward limit for inflation. Accepting that this happens would only erode the credibility of the ECB without addressing the issue in a sustainable way. With the benefit of hindsight, we know that the circumstances at the end of 1998, when the threshold was set, were exceptionally favourable for inflation to be kept below 2% (as well as for M3 growth to be very close to 4.5%). Clinging to the hope that similar circumstances will occur again (and sufficiently frequently!) does not look like a sensible, forward-looking option.

The second possibility would be to run monetary policy so as to ensure that inflation remains in the 0-2% range (nearly) always, accepting the costs that this might entail in the presence of sizeable secular changes in relative prices and substantive downward rigidities of nominal prices. Paying such a high price to respect a self-imposed discipline, decided at a quite peculiar moment in time, does not look like a sensible option either.

Raising the 2% upper limit for inflation is not an easy policy choice. The rationale for it is strong but a certain risk of misinterpretation as a reduced commitment to price stability is unavoidable. Even though distasteful, this choice is nevertheless much better than the alternatives.

ANNEX TO CHAPTER 2
DOES THE ECB FOLLOW THE FED?

In this Annex we will outline our statistical approach in more detail. As explained in the main text, we took the 3-month short-term interest rate of the US and the euro area, which is the most widely watched indicator of short-term monetary conditions.

Preliminaries

The first step in empirical work concerned the choice of the statistical procedure. We chose the simplest available procedure to ascertain the existence of a follower-leader relationship; i.e. the so-called Granger-causality tests (and related approaches). These tests can show whether past values of a certain variable (e.g. US interest rates) influence another variable (e.g. euro interest rates) after one has taken into account the patterns that might link the second variable (euro rates) to its own past.

In order to make sure that our results do not depend on the particular test period chosen, we ran a battery of statistical tests for a number of periods, e.g. covering the entire euro period (1999-early 2002) and different periods from 1995 onwards.

Before we ran our regressions, however, we had to take into account an important empirical caveat. Since the level series seems to contain a unit root[17] and Granger causality tests tend to give misleading results if the variables considered in the VAR contain unit roots, it was first tested whether the interest rates were actually stationary during the time period considered. The results of the unit root tests are summarised in the following two tables separately for euro and US dollar interest rates. It appears that the series have to be differenced once (to get the change in interest rates between two periods) in order to make them stationary. The null hypothesis in each case is that the variable under consideration is stationary.

[17] The level series does not fluctuate around a constant mean and its variance is not constant and finite.

Table A2.1 Unit Root Tests

Panel A
Augmented Dickey-Fuller unit root test for the euro interest rate (I3MEUR)

Levels			Differences		
Sample	ADF Test Statistic	Lag order	Sample	ADF Test Statistic	Lag order
1990:06 2002:04	-1.176552	4	1990:07 2002:04	-3.359015**	4
1995:01 2002:04	-2.418961	2	1995:01 2002:04	-3.903129***	2
1995:01 2000:12	-1.954167	2	1995:01 2000:12	-3.441197**	2

*** (**, *) indicates significance of the ADF test statistics at the 1% (5%, 10%) critical value. MacKinnon critical values for rejection of hypothesis of a unit root.

Panel B
Augmented Dickey-Fuller unit root test for the US interest rate (I3USA)

Levels			Differences		
Sample	ADF Test Statistic	Lag order	Sample	ADF Test Statistic	Lag order
1990:06 2002:04	-1.969106	4	1990:07 2002:04	-3.490301***	4
1995:01 2002:04	0.040917	2	1995:01 2002:04	-3.661004***	2
1995:01 2000:12	-1.636026	2	1995:01 2000:12	-4.706848***	2

*** (**, *) indicates significance of the ADF test statistics at the 1% (5%, 10%) critical value. MacKinnon critical values for rejection of hypothesis of a unit root.

The clear conclusion that one has to draw from the above standard unit root tests is that both the euro (I3MEUR) and the US interest rate (I3MUSA) cannot be rejected to be integrated of order 1 (i.e. a time series of the changes is stationary). This implies that the following Granger causality tests must be done in first differences, i.e. changes in interest rate. It is also a first indication that Figure 2.13 in the main text, which suggests a leader-follower relationship in levels, might be misleading.

Granger causality?

The next step was to use a standard statistical package to establish whether there is a follower-leader relationship between the changes in these two interest rates. The results are tabulated below.

We are well aware that the results often heavily depend on the lag structure. For robustness reasons and with an eye on our hypothesis of a possible break in the relation around the turn of the year 2000-01, we also use a variety of different sample periods. Thus a range of results is summarised below.

Table A2.2 Results of Granger causality test by sample period and lag length

Sample period	Lags: 2	Lags: 4	Lags: 12
1990:01 2002:04	0/0	0/0	0/0
1995:01 2000:12	0/0	0/0	0/0
1990:01 2002:04	0/0	0/0	0/0
2000:01 2002:04	0/0	0/0	NA
1999:01 2000:12	0/0	0/0	NA
1999:01 2002:04	0/0	0/0	NA

NA: Not available.

Source: Own calculations. N.B. an entry 0/0 means that that there is no statistically significant influence, neither from the US on the euro, nor vice-versa.

In no case does one have to reject the null hypothesis that the US interest rate does not 'Granger cause' the euro interest rate and vice versa. This result obtains if we operate at the usual 5% significance level. There is only one exception, using 12 lags and the sample period 1995:01 to 2000:12. Only in this one case is the US interest rate significant at the 10% level, in the equation for the euro interest rate. But using the same specification for the US interest rate, we also find that it is determined by the euro interest rate.

Bivariate VARs

One objection to the standard tests performed so far is that the 'normal Granger causality tests' might be unduly influenced by particular episodes. This is why we also looked a bit more into detail in the bivariate relationships. Vector autoregressions (VAR) allow us to identify the lag structure that seems to give the best econometric fit, as compared to other specifications. For the same reason as above, we stress regressions based on first differences here. Thus we take the euro interest rate change as the dependent variable and try to explain its variation by past changes of the euro interest rate as well as by contemporaneous and past changes of the US interest rate. The US interest rate can be said to 'cause' the euro interest rate if at least one of the coefficients on past US interest rate changes is significantly different from zero. Thus, a

significant effect of a positive sign implies that one can reject the hypothesis that the change in the US interest rate does not influence the current change of the euro interest rate at the usual confidence levels. Of course, our special interest is on the significance of the coefficient of the lagged change in the US interest rate.

Although we also ran regressions over the whole available sample, i.e. from 1990 onwards (and these regressions essentially gave the same results), we only display the results from the regressions over the sample 1995:01 to 2002:04. We present the best specifications (according to model selection criteria such as the Schwarz criterion) of three types of regressions. The first is the best specification possible without the implementation of dummies. In the second, dummies were used to capture the euro changeover and a surprise interest rate cut by the ECB. Although the lagged change in US interest rates were not found to be significant, we chose a third specification to test, whether a structural break in the coefficient on the lagged change of the US interest rate could nonetheless be identified.

Table A2.3 Bivariate Regression Results

Panel a) Sample: 1995:01 2000:12
Included observations: 72

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003735	0.016152	-0.231243	0.8178
DI3MEUR(-1)	0.261255	0.100069	2.610761	0.0111
DI3MUSA	0.572728	0.117752	4.863846	0.0000

R-squared	0.363610	Mean dependent var	-0.005500
Adjusted R-squared	0.345164	S.D. dependent var	0.169323
S.E. of regression	0.137019	Akaike info criterion	-1.096619
Sum squared resid	1.295422	Schwarz criterion	-1.001758
Log likelihood	42.47830	F-statistic	19.71202
Durbin-Watson stat	2.159143	Prob(F-statistic)	0.000000

Panel b) Sample: 1995:01 2000:12
Included observations: 72

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.011147	0.014272	0.781002	0.4376
DI3MEUR(-1)	0.271398	0.087336	3.107528	0.0028
DI3MUSA	0.520474	0.103885	5.010105	0.0000
D9503	-0.402973	0.119502	-3.372094	0.0013
D9812	-0.317231	0.121814	-2.604218	0.0114
D9904	-0.353868	0.119855	-2.952463	0.0044
R-squared	0.544651	Mean dependent var		-0.005500
Adjusted R-squared	0.510155	S.D. dependent var		0.169323
S.E. of regression	0.118507	Akaike info criterion		-1.348034
Sum squared resid	0.926898	Schwarz criterion		-1.158312
Log likelihood	54.52922	F-statistic		15.78876
Durbin-Watson stat	2.192639	Prob(F-statistic)		0.000000

Panel c) Sample: 1995:01 2000:12
Included observations: 72

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.010160	0.014330	0.709030	0.4808
DI3MEUR(-1)	0.227825	0.099514	2.289386	0.0253
DI3MUSA	0.507932	0.104905	4.841830	0.0000
DI3MUSA(-1)	0.106726	0.116367	0.917150	0.3625
D9503	-0.392562	0.120184	-3.266345	0.0017
D9812	-0.323598	0.122159	-2.649002	0.0101
D9904	-0.355953	0.120021	-2.965749	0.0042
R-squared	0.550468	Mean dependent var		-0.005500
Adjusted R-squared	0.508973	S.D. dependent var		0.169323
S.E. of regression	0.118650	Akaike info criterion		-1.333114
Sum squared resid	0.915057	Schwarz criterion		-1.111771
Log likelihood	54.99210	F-statistic		13.26583
Durbin-Watson stat	2.095068	Prob(F-statistic)		0.000000

Does the relationship change over time?

Both our pairwise Granger causality tests and, above all, our simple bivariate VARs gave the result that, if at all, US interest rates influence euro interest rates during the same month. However, the US interest rate of the previous month did not have a statistically significant influence on

this months euro interest rate when all these other factors were taken into account.[18] This suggests that the visual impression of a US leadership over the entire euro period might be misleading.

One might still argue that interest rates in Europe tended to be influenced by what had happened on the other side of the Atlantic but that this had changed during 2001. In that year the Fed cut interest rates at an unprecedented speed (and of an unprecedented magnitude) because it feared an unravelling of the financial equilibria in the US. The ECB took a more relaxed stance on this point as the eurozone economy did not show any of the (potential) disequilibria of the US economy (current account, consumer financial position, over-investment). Hence, one might be tempted to conclude that over the whole sample the lagged US interest rate change was insignificant in the regression equation for the euro interest rate change, while it would become significant if only a large sub-sample (namely until December 2000) had been considered. In order to test whether this kind of reasoning is correct, we took some efforts to search for breaks in the relation between US and euro interest rates around the turn of year 2000-01.

From the previous analysis the following specification of our regression equation looked best suited to us as a standard reference to test for breaks:

DI3MEUR = C(1) + C(2)*DI3MEUR(-1) + C(3)*DI3MUSA + C(4)*DI3MUSA(-1).

As stressed above, the coefficient C(4) of the lagged US interest rate is the coefficient of interest here. To start with, we conducted a Wald test of the coefficient restriction C(4)=0, a test which measures how different the unconstrained regression is against the regression with the above restriction.

Full sample 1995:1 - 2002:4

Wald Test: Null Hypothesis:	C(4)=0		
F-statistic	0.022836	Probability	0.880247
Chi-square	0.022836	Probability	0.879885

[18] Incidentally by looking at the behaviour of US interest rates over time we found that euro interest rates also influence US interest rates, again during the same month.

Limited sample 1995:1 - 2000:12

Wald Test:			
Null Hypothesis:	C(4)=0		
F-statistic	0.785224	Probability	0.378671
Chi-square	0.785224	Probability	0.375548

Both tests clearly fail to reject the null hypothesis of C(4) = 0, i.e. the (first difference of the) lagged US interest rate having no impact on the current difference of the euro interest rate.

Stability over time

We now examine:

(a) whether all the coefficients in the above regression equation are stable around our guess of the structural break, that is 2000:12,

(b) whether the parameter C(4), i.e. the coefficient of the lagged difference of the US interest rate, is stable across the sample without prior fixation of a breakpoint, and

(c) whether the coefficients are stable in general without prior fixation of a breakpoint.

Ad (a) At first, we conducted a Chow breakpoint test, i.e. we fit the reference equation separately for each sub-sample to see whether there are significant differences in the estimated equations, the latter indicating a structural change in the relationship. The new enact Chow's forecast test by estimating the model for the sub-sample 'until 2000:12' and then – based on this estimated model – predicting the values of the difference of the euro interest rate the dependent variable in the remaining data points from 2001:01 on. Large forecast errors would cast doubt on the stability of the estimated relation between euro and US interest rates.

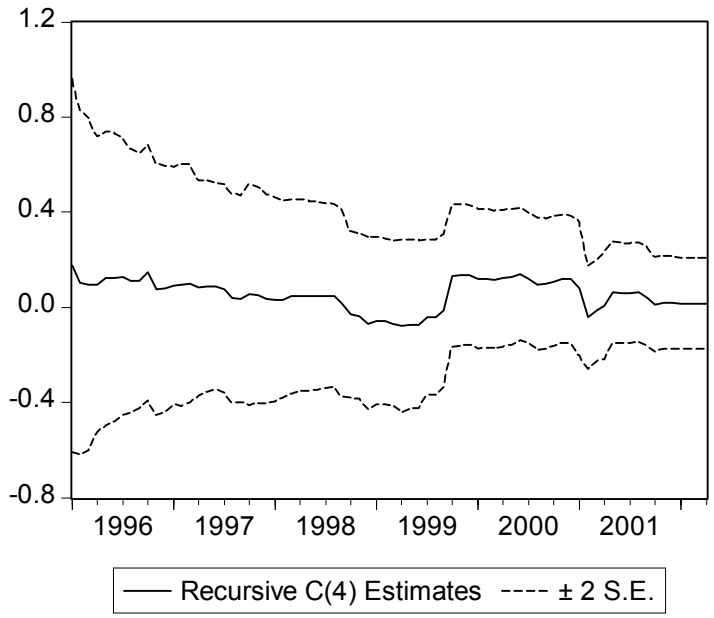
Chow Breakpoint Test: 2001:01			
F-statistic	2.606219	Probability	0.041799
Log likelihood ratio	10.77937	Probability	0.029159

Chow Forecast Test: Forecast from 2001:01 to 2002:04			
F-statistic	2.085986	Probability	0.019064
Log likelihood ratio	35.14074	Probability	0.003802

Both tests indicate a structural break in the relationship, which is located between 2000:12 and 2001:01. However, one has to be careful because breaks might be indicated for neighboured points in time as well. A sequential plot of the F-statistics over all data points in the sample would have been useful here, choosing the highest point as the 'true breakpoint'.

Ad (b) A simple approach is that of recursive estimates (of the coefficient of the lagged difference of the US interest rate) starting with the start of the sample period and adding observations over time. With this approach one can trace the evolution of this coefficient as more and more data are used in the estimation. From the graph it can be seen that the coefficient C(4) displays variation when more data is added, i.e. a sudden increase in the midst of 1999 and a fall at the end of 2000, there is a strong indication of instability and a structural break at the end of 2000. However, it has to be noted that the significance bands throughout embrace the null, meaning that the coefficient C(4) is never significantly different from zero (as mirrored by the regression results).

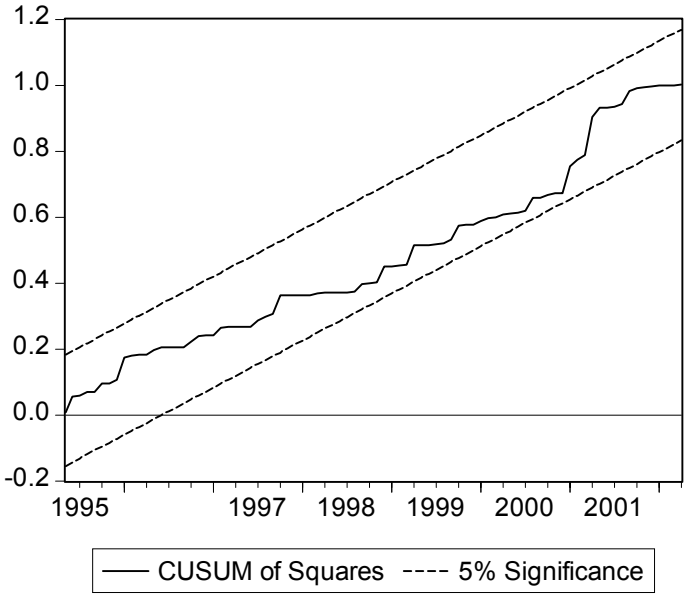
Figure A2.1 Recursive Coefficients



Ad (c) We also conducted a CUSUM of Squares test, which is essentially a combination of recursive estimation and a Chow test. Movements outside the critical 5%-lines would be suggestive of parameter instability.

Although not crossing the lines, our test statistic in fact indicates some instability in the equation at the end of 2000, since the test statistic nearly touches the critical line at that point in time.

Figure A2.2 CUSUM-Test



Conclusions

All in all, it thus appears that there is no statistical evidence that proves that the ECB follows the Fed. But this absence of evidence also works the other way round: It is impossible to prove that the two are independent from each other because the moves on both sides of the Atlantic seemed to be so often contemporaneous. This is actually what one would expect if the most important shocks have come from global financial markets and both have been equally quick to respond to them.

CHAPTER 3

THE MACROECONOMIC EFFECTS OF FISCAL POLICY: SOME EMPIRICAL EVIDENCE

This chapter turns to fiscal policy, which has been a source of much friction at the European level in early 2002. The main focus of this chapter is a simple question: how effective is fiscal policy as a demand management tool? One might surmise that a lot of empirical evidence already exists on this issue. But, as we show below, this is not the case. As some of the evidence we present is new and the results might contradict some widely held notions about the effectiveness of fiscal policy, we have preferred to outline the key technical aspects of our results in sections 2 to 6 of this chapter. However, section 7 provides a summary for the hurried reader who is prepared to trust the quality of the empirical work.

1. Why look at fiscal policy?

In principle this question should not be difficult to answer. Fiscal policy is always important, but its management becomes particular delicate in tough times, i.e. when growth slows. The standard view of fiscal policy is that higher public expenditure lifts demand, but this also puts pressure on prices, thus presenting the central bank with a dilemma.[19] This argument is intuitive enough, and needs little elaboration. But does it correspond to reality? There is surprisingly little hard empirical evidence on this point. This chapter presents some direct empirical evidence on the effects of fiscal policy on the main macroeconomic variables: GDP, prices and interest rates to put the debate about macroeconomic policies in EMU on a sounder footing.

At the level of the euro area, the problem is compounded by the unique position of the ECB among central banks, whereby it sets a common monetary policy but faces twelve independent fiscal policies. This creates further problems because the national fiscal authorities might fail to fully

[19] Another standard argument concerns the Maastricht Treaty and the Growth and Stability Pact, which has been motivated by the threat that large deficits and government debt would pose to the goal of price stability through various possible channels (see e.g. Beetsma and Uhlig, 1999, and Eichengreen and Wyplosz, 1998).

internalise the consequences of their fiscal actions on the area-wide monetary policy and interest rates.

The theoretical argument is again well known. Suppose inflation is a function of the deficit via a demand effect. If the Central Bank reacts to the increase in inflation by increasing the interest rate, when a country increases its deficit the other countries might be hit by an interest rate hike through no apparent fault of their own. In all these cases, a country does not fully internalise the effects of its expansionary fiscal policies on the other economies via the reaction function of the Central Bank.[20]

This is far from a purely theoretical scenario. In fact, it is probably at the root of the most controversial intervention to date by the European Council in matters of fiscal policy – the action against Ireland in February 2001. This action was not motivated by a concern about the sustainability of Irish public finances[21] (the country had a sizeable surplus), but by a belief that some small changes in Irish fiscal policy might have a measurable impact on macroeconomic performance that could be predicted accurately. In particular, the official motivation of the EU authorities (the ECOFIN Council in this case) speaks clearly of a considerable risk for inflation (see Box 3.1 for further details).

Box 3.1 The reprimand to Ireland, some background

Ireland's 2001 Stability Programme envisioned a reduction in the cyclically adjusted surplus by .3 percentage points in 2001 and by a negligible amount in 2002, starting from the highest surplus in the eurozone, 4.5% of GDP. Most of the reduction in the surplus would have been achieved via a fall in income and indirect taxes and a slight increase in investment. It is interesting to go back and read the Council decision to understand the motivation of this unprecedented measure:

> …the Council considers that the stimulatory nature of the budget for 2001 poses a considerable risk to the benign outlook in terms of growth and inflation.[…] The strategy of inducing labour force increases through an alleviation of the direct tax burden, which was recommended in the 2000 broad economic policy guidelines (BEPG)…may have become less effective than in the past,

[20] See e.g. Chari and Kehoe, 1998, and Beetsma and Bovemberg, 1998, for another variant which emphasises debt accumulation.

[21] The legal basis was therefore not the Stability Pact, but another, rather complex set of policy coordination procedures called 'broad economic policy guidelines' (BEPGs).

> because it took place in the context of an expansionary budgetary policy…Further, while indirect taxes cuts have a once-and-for-all effect on the price level, they probably have no lasting effect on the rate of inflation but clearly further stimulate demand (Official Journal C 077, 9.3.2001, p. 7).

Thus, in this passage, the Council makes several other important factual points on the empirical consequences of fiscal policy. It asserts that:

i) a reduction in the cyclically adjusted budget surplus by .3 percentage points of GDP has a measurable positive impact on inflation;

ii) on the other hand, an increase in government investment has a negative impact in inflation;

iii) indirect tax cuts cause a reduction in inflation, but only in the short run;

iv) a reduction in income taxes has a negative effect on inflation…

v) …but only if it does not take place in 'the context of an expansionary budgetary policy'.

Unfortunately, there is virtually no empirical evidence in support of any of these points, as will be shown later in this chapter.

But what was the basis for these fears that a small (about 0.3% of GDP in cyclically adjusted terms) reduction in the surplus would lead to a danger for inflation? In the light of the evidence presented below, we conclude that this episode illustrates effectively both our lack of knowledge of the effects of fiscal policy and the dangers of fiscal fine-tuning by any authority, whether national or supra-national.

In fact, the action against Ireland[22] points to a more general issue: we simply do not have strong empirical evidence on fiscal policy, of the kind that has accumulated on monetary policy. While the empirical analysis of this chapter is nowhere near the level of detail that would be necessary to address most of the specific points raised by the Irish case, it does try to take a step in the direction of illustrating the empirical relationship

[22] The action against Ireland certainly had its own peculiarities. It is true that inflation in Ireland was 5.3% in 2000 compared to less than 1% in 1999 in France. Yet, as the Council recognises in its opinion on Ireland, '…this upsurge in price inflation is partly due to external and temporary factors, which are expected to fall gradually out of the consumer price index'. It might also well be the case that there was a political dimension to this affair, but any exploration of that dimension would go far beyond the scope of this contribution.

between fiscal policy on the one hand and output and inflation on the other.[23]

Precisely because we know so little about the effects of fiscal policy, one should be cautious about calls for further coordination of fiscal policies in Europe. Almost invariably, coordination is associated with centralisation, in which a supra-national body would dictate fiscal policies to individual countries to a far greater degree than is the effect of the pressure currently being exerted in the framework of the Growth and Stability Pact and the major economic policy guidelines. Perhaps not surprisingly, in the recent proposal for an overhaul of the European Union by the Commission, this supra-national body is the Commission itself:

> Policy co-ordination should make it possible to attain a common assessment of the economic situation, agree on the orientation of the policy response and monitor its implementation. It should be regular, not limited to exceptional circumstances…The instruments of economic policy coordination, particularly the major economic policy guidelines and the opinions on the stability and convergence programmes should be drafted on the basis of proposals from the Commission rather than mere recommendations from which the Council may depart by qualified majority. (European Commission (2002, p. 7).

In light of our current ignorance of fiscal policy, entrusting more powers to an institution that has often tried to engage in fine-tuning without any supporting evidence appears unwarranted, and possibly dangerous.

2. Large-scale econometric models as guides to policy-makers

As seems to occur in all slowdowns, one hears increasingly vociferous calls for the use of fiscal policy as a counter-cyclical tool. Perhaps the most recurrent argument in favour of fiscal activism is the positive effects of a fiscal expansion on private consumption; and perhaps the most common counter-argument is the venerable cliché that fiscal policy just takes too long to display its effects. But does it? As plausible as it is, this notion is based on some intuition of the mechanism behind the multiplier rather than on any empirical evidence; and, at one level, it might easily be

[23] This is not of course the first contribution on this topic. Recent contributions that apply a similar time series methodology include Burnside, Eichenbaum and Fisher (1999), Fatas and Mihov (2001), Favero (2002) and Uhlig (2002).

wrong: government spending on goods and services is, after all, itself a component of GDP.

But our ignorance is deeper than that. Theory does not even give us the *sign* of the effects of fiscal policy instruments on the components of GDP with any reasonable confidence. Indeed, Keynesian and neo-classical theories make opposite predictions on the effect of a shock to government purchases on private consumption; and there is some recent evidence that this effect might switch sign, depending on conditions such as the debt/GDP ratio (see e.g. Giavazzi and Pagano, 1989, and Perotti, 1999).

Policy-makers are then often tempted to turn for guidance to the existing large-scale econometric models maintained and used by international organisations. It is not widely appreciated that these models, including that of the European Commission, largely assume the answer. Consider for instance the response of private consumption to an increase in government spending on goods and services. Many modern large-scale econometric models, including the European Commission's QUEST II and the IMF's MULTIMOD, specify private consumption as the sum of consumption by two types of agents: unconstrained agents of the 'Blanchard-Yaari' type, namely infinitely lived individuals who face a constant probability of death each period, hence effectively discounting the future at a higher rate than the rate of time preference; and constrained agents, who do not have access to credit markets and are therefore obliged to consume all their disposable income in each period. The 'Blanchard-Yaari' assumption effectively shuts off Ricardian Equivalence, and introduces a role for changes in taxes in affecting the consumption even of unconstrained individuals.

For this group of individuals, a permanent increase in government consumption causes a fall in consumption (if they do not discount the future too much), as the future increase in taxation causes their wealth to fall. For constrained individuals, future taxes are irrelevant and an increase in government consumption causes an increase in private consumption. Of course, the overall effect depends on the relative proportion of constrained and unconstrained individuals.

Let us take the models of the IMF and the European Commission as examples. It turns out that a key difference in the specification of the private-sector behaviour of MULTIMOD and QUEST II is precisely in the share of constrained agents they assume: QUEST II assumes a very small share, 0.3 in all countries; MULTIMOD a much larger share, ranging from about .5 in Germany and the UK to .75 in Canada. In fact, in QUEST II an increase in government spending financed by a future

increase in taxes causes a fall in private consumption; in MULTIMOD, an increase (see European Commission, 1997, Masson, Symansky and Meredith, 1990 and IMF, 2001). While there are other differences in the specification of the consumption function and in the simulation scenarios, the share of constrained individuals most likely plays an important role in these simulation outcomes. Considering that we have so little evidence on this parameter, it would seem rather dangerous to base any policy conclusion on such flimsy foundations.

3. Approaches to estimating the effects of fiscal policy

A more empirically grounded approach is called for. The main methodological innovation in the recent contributions that investigate the effects of fiscal policy consists of applying a time series approach that has long been applied to the analysis of monetary policy – Vector Autoregressions. VARs allow a relatively unstructured specification of the dynamics of the model, an especially attractive feature when, as in our case, one would like to first investigate the basic multivariate time series properties of the data.

The evidence presented in this chapter is obtained by estimating a model that includes government purchases of goods and services, net taxes, GDP (all in real and per capita terms), the GDP deflator and a nominal, 3-month interest rate. Each of these variables is regressed on four lags of itself and of all other variables, thus generating the reduced form of the system.

It is tempting to think of the residual from regression of government spending and of net taxes as fiscal shocks, which could be then fed through the whole dynamic model to generate the impulse responses of output, inflation and interest rates to fiscal shocks. This would not be quite right, however, because government spending and especially taxes respond to output and inflation. For instance, income taxes typically increase automatically when output increases: if the researcher regresses output on taxes, he is likely to find a positive coefficient. But it would be wrong to interpret this coefficient as evidence of a negative effect of exogenous changes in taxation on output; rather, it is only a manifestation of reverse causation.[24]

[24] This problem is not really different from the one encountered in monetary policy VARs, and from the more general problem of identification.

Thus, it is crucial to deal with the problem of endogeneity of fiscal policy; unfortunately, as is the case with all identification procedures, there is more than one possible approach.

The empirical evidence presented in this chapter is based on a methodology developed in Blanchard and Perotti (2002), extended to deal with interest rates and prices. The key to identifying shocks to government spending on goods and services (the sum of government consumption and government investment) is based on a simple observation of the institutional characteristics of fiscal policy-making: it takes more than one quarter for policy-makers to implement *discretionary* changes in government spending in response to shocks to output or prices. Hence, all the estimated effects of output and prices on government spending occur *automatically*. Now suppose that one has estimated a reduced form equation for real government spending as a function of its own lags and lags in other endogenous variables, such as output and prices; and suppose that one has some outside estimate of the elasticity of real government spending to prices. By subtracting the price shock multiplied by this elasticity from the government spending shock, what is left is an estimate of the discretionary shock to government spending. This can be then be fed through the estimated dynamic system to give an estimate of the response of all endogenous variables of interest to a government spending shock.

Thus, the key identifying assumption is that policy-makers cannot intentionally react to changes in output and prices contemporaneously, but only with a lag. This is plausible if one has data available at a sufficiently high frequency, say a quarter: by the time the policy-makers learn about a GDP shock, take a fiscal measure, pass it through Parliament and implement it, certainly more than a quarter has elapsed. This identifying assumption is less plausible with annual data.

To apply this logic, therefore, one needs data at least at *quarterly* frequency. In addition, what matters for the private sector is expenditure and taxation by the whole *general government*, not just the central government. Finally, economic theory suggests that different types of expenditure and taxation should have different effects and different elasticities. Hence it is important to use *disaggregated* figures. Quarterly disaggregated data for the general government are easily available only

for the US, which explains the almost exclusive focus on this country in the recent batch of studies.[25]

The present contribution uses quarterly figures for the general government that have been assembled from national sources, and are described in Perotti (2002). The dataset covers four countries: Canada, Germany, the UK and the US, and the period 1960-2001, except for Germany when it stops at 1989 due to the reunification.

While these countries have different government sizes, ranging from 31.5% in the US to 43% in West Germany in 1990, it is interesting to note that they have more similar average shares of government spending GDP ratios, ranging from 19.4% in the US to 25.5% in Canada in the same year (see Table 3.1 below).

Table 3.1 General government revenues and government spending as a share of GDP, 1990*

	Revenue/GDP	Govt. spending/GDP
Canada	41.1	25.5
UK	39.7	22.9
US	31.5	19.4
West Germany	43.0	20.5

* Defined as government final consumption + government gross fixed capital formation.

Source: OECD data.

Thus, currently only one Euroland country is in the sample – Germany – and two European countries in total. Ideally one would want to have more European countries in the sample, but this is not possible at the present time because of a lack of data.[26]

One should also keep in mind that the countries in the sample were on a flexible exchange rate regime (FER) during most of the estimation

[25] An exception is Favero, 2002, who uses half-year data for four European countries; only the data for Germany, however, are not interpolated from yearly figures.

[26] Among the remaining European countries, France also maintains a dataset of quarterly national income accounts covering a long enough period (since 1970). However, it is not yet clear which government budget series are really genuine quarterly data, and which are interpolated from annual data. We are currently investigating this question.

period. Thus, strictly speaking, the evidence presented in this chapter mostly applies to fiscal policy changes in Euroland as a whole, rather than in individual countries. As we will see, however, since the interest rate in general does not move much in response to fiscal policy shocks, it is unlikely that the exchange rate regime could make a dramatic difference in the estimated effects of fiscal policy shocks on output.

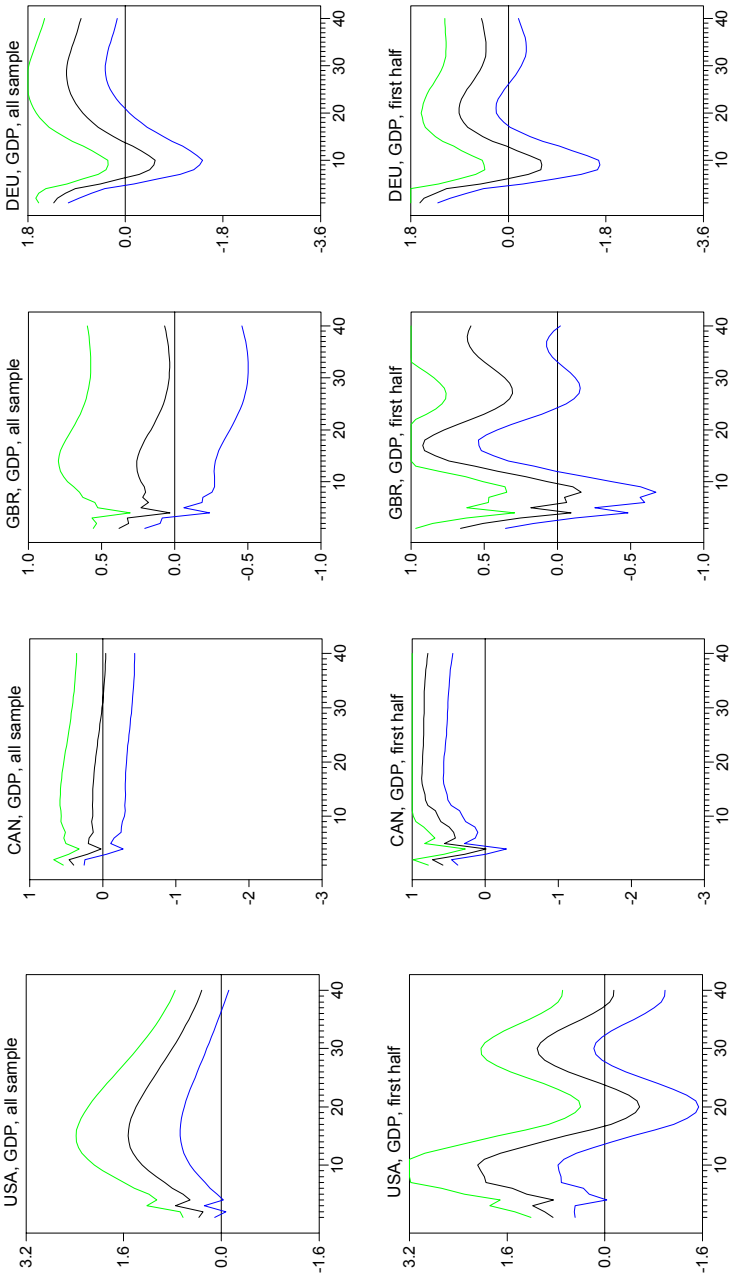
4. The effects of fiscal policy on output

We now begin by displaying the empirical evidence, based on the methodology briefly illustrated above, on the effects of government spending on output (Figure 3.1). Because the estimation covers a rather long period in most countries, with large swings in fiscal policy and occasional large changes, it is important to check the stability of the results in different sub-periods.

Consider first the US, the country that has been studied the most extensively so far. In the whole sample, the response of GDP to a positive shock to government spending on goods and services of one percentage point (pp) of GDP has an inverted-U shape: after an initial impact increase by about .4 pp, GDP keeps increasing steadily until it peaks at 1.5 pp after 15 quarters, and then starts dying out slowly. A very similar response obtains in the post-Bretton Woods (FER) sample, starting in Q2 of 1973, except that the impact effect is virtually 0.

This picture hides a very substantial difference between the first and second parts of the sample, however. In the first half, until 1980, the effect of a government spending shock on GDP is large and fairly precisely estimated, with an impact response of .8 pp, which peaks after 10 quarters at about 2 pp of GDP, and is significant. In the second half of the sample, the effect is zero or negative, and always insignificant.

In virtually all countries in our sample, fiscal policy was active between 1973 and 1976, with large positive and negative changes, at the same time that inflation also surged because of the oil shock. It is therefore important to check the robustness of the results to the exclusion of this period of high activity. In fact, in the whole sample, in the FER sample and in the pre-1980 sample, only the positive impact effect survives if the 1973–76 period is excluded; after the impact effect, the output response fluctuates around zero and is always entirely insignificant. It remains


DEU, GDP, all sample
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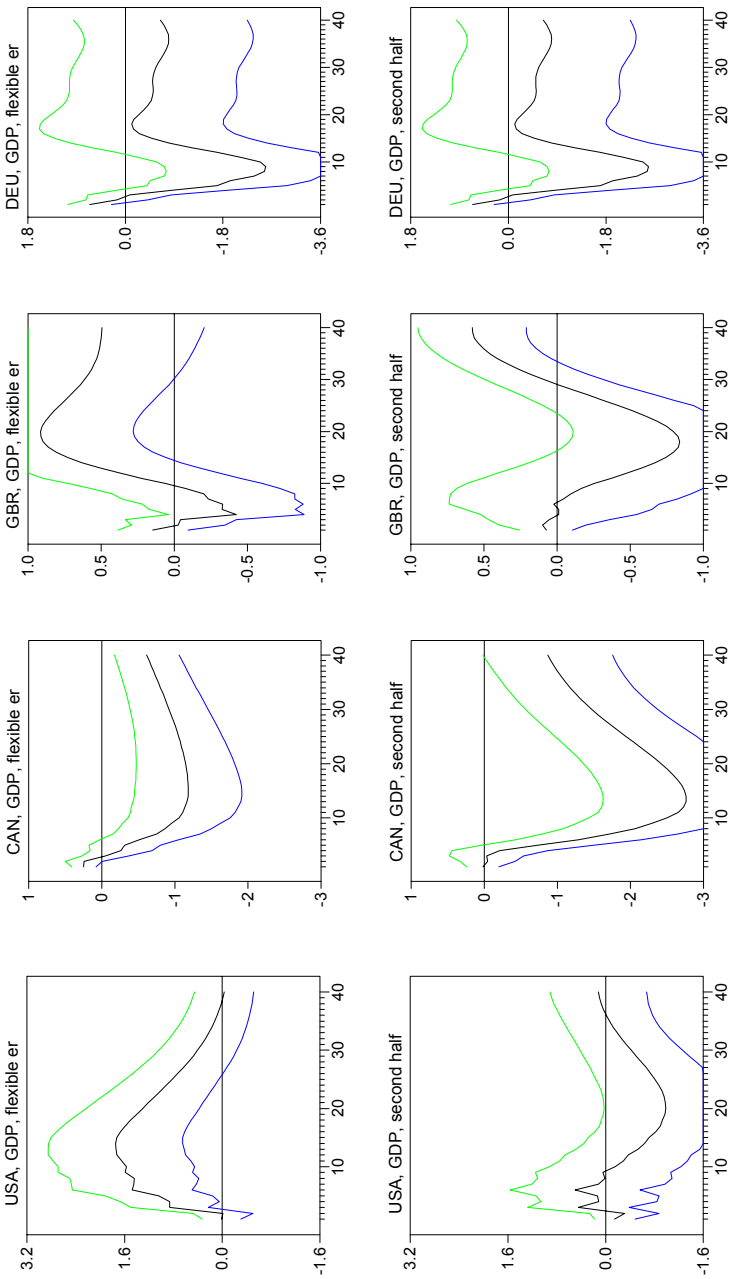
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USA, GDP, second half

true, however, that the impact effect is positive and significant in the first half, and negative and insignificant in the second half.[27]

Let us consider now the other countries. The impact effect on GDP in Canada is positive and significant, and of the same order of magnitude as in the US, i.e. about .4 pp of GDP. The effect stays positive throughout the horizon of the impulse response, but it becomes insignificant after a few quarters.

Once again, there is a considerable difference between sub-periods. In the first half of the period, both the impact effect and the peak effect are positive and significant, at .6 pp and .9 pp (after four years), respectively. Hence, the shape and timing of the response is similar to the US case, although the peak effect is about half that in the US. By contrast, except for a small positive initial impact effect, the output response becomes negative and significant after two quarters in the FER regime, with a negative peak of -1.2 pp after four years, and in the second half sample, where the negative peak is more than -2.5 pp.

Over the whole sample, the UK presents a similar picture to Canada, but a more muted one. Only on impact is the response of GDP significant, and similar in magnitude to that of the US and Canada, at about .4 pp; after that, it declines and quickly becomes insignificant. The response is slightly stronger in the FER period, with a peak at about .9 pp of GDP after about five years.

The pattern over the two sub-samples is by now familiar: in the first 20 years, one observes a positive impact and peak response at .7 and .9 pp after 4 years, hence very similar to Canada. In the second sub-sample, there is a negative response.

In Germany, the impact effect on GDP is positive and large, about 1.3 pp, but the response quickly becomes insignificant thereafter. Because of the reunification, Germany has only 30 years of observations, not enough to split the sample in two. But again the same pattern emerges when one compares results by excluding the last decades of the sample – the 1980s – and the first decade. The impact response is much larger in the period to 1979, about 1.6 pp, than in the period after 1970, about .6 pp. Even after the impact effect, the output response is consistently smaller in the period after 1971 (also the FER period) than in the period up to 1979.

[27] Of course, the treatment of outliers is a controversial statistical issue. One may argue that the 1973-76 period is precisely the more informative, and should not be thrown away.

To summarise, despite some variation, the evidence displays a few consistent results:

i) The impact effect on output of a government spending shock is very similar in all countries, at .4 pp of GDP, except for Germany, where it is about 1.3 pp; in the post-1980[28] period, however, the impact effect is however essentially zero, except in Germany where it is about .6 pp.

ii) The peak effect occurs on impact in all countries except the US, where it builds up for about four years, and it is smaller than 1 or slightly higher; however, in the post-1980 period, the peak effect becomes zero or insignificant.

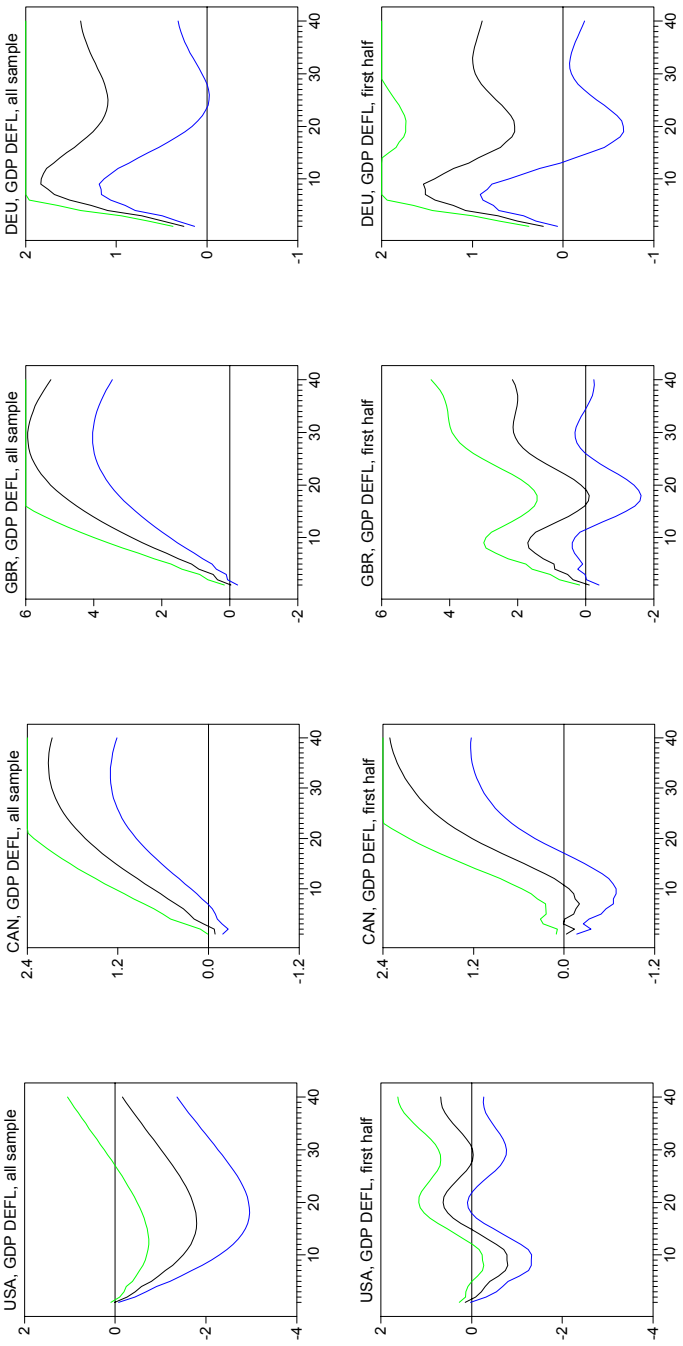
iii) A negative response of GDP is not unusual: in fact, in the post-1980 period the output response after some three to five years becomes consistently negative and statistically significant.

5. The effects of fiscal policy on prices

Estimating the response of prices to government spending runs into the same conceptual problem as the estimation of the output response. Holding constant the previous quarter's price level, a shock to this quarter's price level (that is, a shock to inflation) typically causes an increase in real tax revenues, because of the 'tax creeping' effect. If government spending is budgeted in nominal terms, it also causes a one-to-one fall in *real* government spending; if instead government spending is perfectly indexed, the inflation shock has no automatic effect on real government spending.

These arguments illustrate a key difficulty in estimating the effects of government spending on prices: we have even less information on the elasticity of government spending and taxes to inflation than on their elasticity to output. It is however likely that the elasticity of real government spending is between the two extremes of 0 and -1. The results presented below (Figure 3.2) refer to the case of an elasticity of -.5. The price level is taken to be the GDP deflator: results with the CPI are similar.

[28] In the case of Germany, the expression 'post-1980 period' should be interpreted as 'post-1970 period'.


DEU, GDP DEFL, all sample
DEU, GDP DEFL, first half
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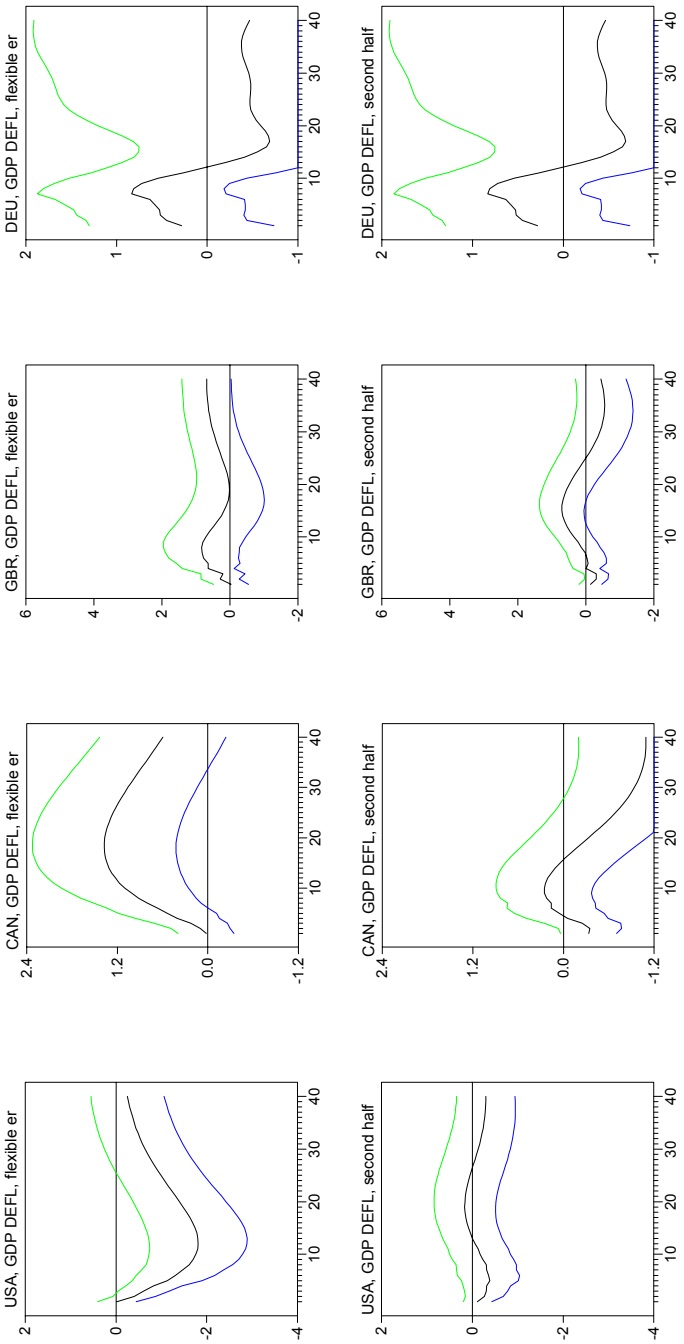
DEU, GDP DEFL, flexible er
DEU, GDP DEFL, second half
GBR, GDP DEFL, flexible er
GBR, GDP DEFL, second half
CAN, GDP DEFL, flexible er
CAN, GDP DEFL, second half
USA, GDP DEFL, flexible er
USA, GDP DEFL, second half

On impact, the effect of government spending on the price level is always essentially zero, except in Germany where it is positive, albeit small. Over time, the effect over the whole sample is positive in all countries except the US.[29]

The breakdown into sub-periods mirrors the findings for output. In all countries, in the first sub-period the response of inflation is positive and significant after some quarters, although it is significant on impact only in Germany. In contrast, there is no evidence of a positive and significant price response in the second sub-period, or in the FER period.[30]

6. The effects of fiscal policy on interest rates

It is typically assumed that shocks to fiscal policy are associated with increases in interest rates for two sets of reasons: the central bank is likely to react by increasing the interest rate under its control, and (for longer-term interest rates) the increased deficit creates expectations of future inflation.

In the present framework, it is not clear how to treat interest rate shocks relative to fiscal policy shocks. Within each quarter, one can think of the residual of a regression of the reduced form interest rate innovation on the reduced form output and price innovations as the structural shock to monetary policy, and of the reduced form government spending innovation as the structural innovation in fiscal policy. Which one comes 'first'? Do fiscal authorities react to policy innovations introduced by monetary authorities, or vice versa? There is no way to tell. Fortunately, it turns out that the assumption one makes in this regard has little consequence for the response of output; it does have some consequence for the response of the interest rate, but only in the first few quarters.

Let us first assume that the government spending shock comes first. Strictly speaking, this exercise obviously makes sense only in a flexible exchange rate regime (unless government-spending shocks represent common shocks to all countries).

Over the whole sample, the interest rate increases in all countries except the US, which again stands out as an outlier. Typically, the interest rate

[29] Thus, it appears that the results in Fatas and Mihov (2001) and Uhlig (2002), who find a negative effect of government spending shocks on prices in the US, are not representative of other developed countries.

[30] A partial exception is Canada, where after about two years the price response becomes significant in the FER period.

response takes a few quarters to peak, and then dies out. If however one takes only the FER period, only in Canada and Germany is there evidence of a very short-lived statistically significant increase in the interest rate after a government spending shock.

Now assume the interest rate shock comes first. In other words, we now look at the response of the interest rate to that part of the government spending innovation that is orthogonal to the interest rate policy shock.[31] Not surprisingly, the impact response of the interest rate is now slightly more muted; but the shape of the response is very similar, if also more muted.[32]

7. Conclusions

The starting point of our discussion in this chapter has been the fact that there is almost no direct empirical evidence of the impact of fiscal policy on output and prices. The existing large macroeconomic models are based mainly on assumptions concerning some critical parameters. There might be a reason for this state of affairs: somewhat surprisingly, the data one would need to estimate directly the effectiveness of fiscal policy simply does not exist for many countries. After a long and careful search for data, we were able to perform rigorous statistical tests for four OECD countries (Canada, Germany, the UK and the US). These are the only countries for which data is available at the required frequency.[33]

While these countries might at first sight not appear to be typical of the average euro area country, we are encouraged by the fact that the evidence displays a few consistent results across countries, which should thus be of a more general nature:

i) In all countries, GDP responds immediately to an increase in government spending; however, this response has been virtually 0 since 1980 and in the flexible exchange rate period.

ii) After this initial response, there is evidence that the output response builds up over time only in one country, the US; however, since

[31] The interest rate response is still different from zero, because the interest rate is allowed to move in response to changes in output and prices.

[32] It is important to emphasise that these results are robust to the introduction of a commodity price variable in the VAR.

[33] To repeat once more: some leading data sources appear to give quarterly data for many more countries. But a closer investigation revealed that these data are interpolated, and thus useless for our empirical work.

1980 even this delayed response is not present any more, and in all countries the output response is zero or negative.

iii) Indeed, a negative and significant response of GDP is not unusual. In fact, since 1980, it occurs in all countries in the sample three to five years after the shock.

iv) Whether the multiplier on total GDP is small, zero or negative, the implied effect on private GDP is negative. In fact, there is evidence of a negative response of both private consumption and private investment in the post-1980 period.

v) The impact on prices is, at least since 1980, never significant.

All in all, it appears that the power of discretionary fiscal policy to stabilise the economy in the face of short-term demand shocks is quite limited. But the reverse of this result is that fiscal policy also has little influence on inflation. This might imply that there is also less need for an explicit coordination of fiscal and monetary policy than often assumed.

A second important policy implication of these results is that they bear little support for the recent wave of arguments in favour of a revision of the Stability and Growth Pact. While the recent increase in budget deficits throughout the eurozone is small by historical standards in a recession, on the basis of our empirical evidence it appears that their benefits in terms of demand stimulus are also likely to be small, or negative.

In particular, one should be wary of proposed revisions of the Growth and Stability Pact that would allow countries to finance government investment by borrowing (the *Golden Rule*). Currently, there is little or no evidence that the returns to government investment are so high that it would simply 'pay for itself', as proponents of the Golden Rule maintain. In addition, a Golden Rule would create strong incentives for governments to reclassify large parts of current expenditure as capital expenditure.

CHAPTER 4
CONCLUSIONS

What is the key strategic issue for economic policy in the euro area today? In our view it is how to adapt economic policy to the tighter constraints implicit in a low-growth environment.

The first chapter of this report documented an important slowdown of productivity, which became particularly acute during 2001. Europe (at least in the north) has been gaining momentum in adopting information technologies. A lack of IT investment cannot be the full story. But the lack of labour market reform as well as the still unaccomplished internal market in services combined with some countries' unwillingness to make this sector more competitive may preclude euro-area economies from realising the full gains of their IT investment. Hence a productivity paradox could be emerging in Europe. Some observers have lauded the slowdown in productivity, seeing it as a sign for improving employment rates. We remain sceptical towards theories that explain worsening productivity as the transitional response to higher employment growth while adopting new technologies. Rather, we view the slowdown in productivity as a disquieting long-term trend.

The second chapter showed how the ECB has for some time now not been able to force inflation below its target of 2% because of a succession of shocks to inflation. The phenomena of low productivity and high inflation represent to a large extent just two sides of the same coin. Indeed both the slowdown in productivity and the animal diseases that caused a spike in food prices are adverse supply shocks – the former likely to be more persistent than the latter.

1. Disappointing productivity

Where does the drastic slowdown in productivity come from? The service sector seems decisive here. In Chapter 1 we argued that the differences in the adoption of IT technology across the EU often coincide with a reluctant service sector liberalisation. The detailed analysis of the component of the CPI basket performed in Chapter 2 also points to the services sector as a key factor. The importance of this sector, which accounts after all for roughly 70% of GDP, has been noted in a number of analyses of productivity in the EU and the US. For the US it has been estimated that most of the recent acceleration in productivity has been due to advances in the services sector, for example retail and wholesale

distribution. By contrast, the poor performance of the services sector in the EU is a theme that has been running through a number of reports. Most recently, the report on European competitiveness by the European Commission (2002, p. 93) states: 'Looking at market services only, one notes that between the first and the second half of the nineties productivity growth decelerated in European Union countries, while the United States recorded a strong acceleration of productivity growth.'

Services happen to be the one sector having so far been comparatively less affected by the internal market programme. Moreover, most services are very labour-intensive. Many labour market institutions may be an impediment to the adoption of new technologies or, if adopted, pose constraints to the realisation of their full benefits. If then companies decide to adopt new technologies such as IT, strong employment growth can have an additional dampening effect on labour productivity in the transition to a new balanced growth path. This brings us back to square one or rather Chapter 1 with the results already emphasised.

There are thus two factors that combine to hinder services productivity growth in Europe: lack of competition across borders and rigid (national) labour markets. The first factor should become less important as the internal market programme of the EU slowly extends to services. But the chances for progress on the second factor, i.e. labour market liberalisation, are low, as discussed in last year's MPG report (Gros et al., 2001) and we remain sceptical towards active labour market policies as initiated in the Lisbon process. We also remain sceptical towards the transitional trade-off between employment growth and productivity decline; rather we tend to view the productivity differential vis-à-vis the US as a phenomenon that is going to last for some time.

2. Monetary policy for a slow euro area

What are the implications of all this for monetary policy? Sluggish productivity growth, like all adverse supply shocks, makes the task of keeping inflation low more difficult for a central bank. This has to be taken into account when assessing the inflationary impact of wage settlements, developments in the external value of the euro and, more generally, the impact on inflation of special shocks like the one that hit Euroland in the period under review – from animal diseases to the opportunity to re-print menus offered by the euro cash changeover.

The ECB has steered its course mid-way. On the one hand, it eased monetary conditions in the face of the slowdown in activity (which in the event was less marked than initially feared), but without losing its nerve

and being unduly aggressive. On the other, it has accepted that shocks pushed the rate of inflation above the 2% threshold for 24 consecutive months, mainly because inflation expectations rose far less than actual inflation. So far so good. But can this continue indefinitely?

Since we think that the productivity slowdown is here to stay at least for some time, we do not expect overall inflation to be easily contained below 2%. Moreover, given that 2% is also the differential between services and manufacturing price inflation in Europe (with the notable exception of Germany), keeping the ECB's ceiling might too often require price deflation in an important sector. So the tension between sensible monetary policy actions and the violation of the self-imposed 2% limit is bound to recur and erode the ECB's credibility.

The ECB's definition of price stability is excessively severe in any event as no other country has such a low ceiling. Raising the 2% upper limit for inflation is the only sensible action. Delaying this action serves no purpose whilst making the unavoidable change increasingly difficult – even more so than it is now in order to mitigate the risk that increasing the 2% threshold is misinterpreted as dilution of the anti-inflationary discipline.

We therefore stand by our recommendation of last year, namely that the ECB should aim at 'keeping year-on-year core inflation at 1.5% with a tolerance band of ±1%'.

This would still make the ECB more ambitious than most other central banks with an explicit inflation target. But the explicit setting of this target would also provide a much easier framework of communications while maintaining an appropriate medium-term orientation for monetary policy, given that core inflation is much less volatile than headline inflation.

The change in the inflation limit would also offer the opportunity to modify other aspects of the strategy, in particular getting rid of the first pillar. Careful analysis of monetary developments is part and parcel of central banking. But should the public be forced to follow arcane technical explanations to understand why the ECB *cuts* policy rates when money growth is nearly twice the reference value?

3. Can fiscal policy speed up Europe?

With monetary policy fully engaged in hitting a difficult inflation target, could fiscal policy give the sluggish euro area a much-needed lift? The answer seems to be a decisive no. Chapter 3 showed that, since 1980,

government spending has had virtually no positive impact on overall demand. The mechanisms of demand management policies – which might have worked in the 1970s – seem no longer to hold. The fact that an increase in public expenditure does not lift overall demand means that such a 'stimulus' depresses *private* demand by the same amount, implying 100% crowding out. Looking at the medium-run response of GDP, we find an even stronger result. GDP falls three to five years after an increase in public expenditure in all countries in our sample.

We have insisted on the evidence that the power of discretionary fiscal policy to stabilise the economy in the face of short-term demand shocks has become quite limited. But the reverse of this result is that fiscal policy has little influence on inflation either. This implies also a less pressing need for an explicit coordination of fiscal and monetary policy than is often demanded. There is no need to create a new institution to manage and coordinate fiscal policies in the euro area. Even the existing, often rather complicated, procedures to discuss and coordinate fiscal policy at the European level are, at best, of little use.

Another important policy implication of these results is that they bear little support for the recent wave of arguments in favour of a revision of the Stability and Growth Pact. While the recent increase in budget deficits throughout the euro area is small by historical standards in a recession, it appears on the basis of our empirical evidence that their benefits in terms of demand stimulus are also likely to be very small, and perhaps even negative.

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