QUARTERLY REPORT ON THE EURO AREA

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Highlights in this issue:

- Focus: The knowledge drivers of total factor productivity
- The impact of the crisis on household savings in the euro area
- Accounting for inflation dynamics in the euro area
- How vulnerable are emerging market economies to the slowdown in advanced economies?

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Boxes

The euro area economy is moving in dangerous territory. The sovereign debt crisis has now reached a new, contagious quality – deep losses of confidence and extreme risk aversion are driving up yields, ipso facto threatening the sustainability of previously manageable debt burdens. Given the considerable policy efforts already undertaken at the national and EU level, room for policy manoeuvre is becoming more limited just as market tensions are mounting further. The sheer speed of the deterioration is placing heavy demands on national governments and the euro area as a whole, as well as on all other stakeholders.

The European response to the crisis cannot afford itself the luxury of focusing purely on immediate challenges, for instance those transmitted by financial markets. Policy action must involve both 'fire-fighting' as well as medium term reforms to secure growth and debt sustainability if confidence in the euro area is to be reinvigorated. At a national level, new political impulses can give a decisive impetus for the required fiscal consolidation and growth-boosting reforms. At the euro area and EU level, the recent December European Council has resulted in an agreement among euro-area Member States on the way forward, which will be further bolstered through the participation of many other EU Member States as well.

The achievements of the European Council meeting on 9 December reflect shared economic interests and will complement national policy efforts in a number of ways. The way to a fiscal stability union is now paved, with a new fiscal rule at its heart. Government budgets shall in future be balanced or in surplus, and this requirement will also be transposed into national legislation. An additional strengthening of the Excessive Deficit Procedure will guide Member States' progress towards the steady state of sustainable and balanced budgets. Furthermore, in future all major economic policy reforms planned by euro-area Members will be jointly discussed and coordinated so as to establish benchmarks for best practice. Heads of State or Government also agreed to strengthen the stabilisation tools by confirming the rapid deployment of the two options for the leveraging of the EFSF and by accelerating the entry into force of the ESM (July 2012 instead of mid-2013), while also making its governance more flexible. During the period of coexistence of the EFSF and ESM (until mid-2013), a combined effective lending capacity of EUR 500bn will be ensured. The adequacy of the overall EFSF/ESM ceiling will be reassessed in March 2012.

Through this array of policy actions the summit added further momentum to the overhaul of economic and fiscal coordination and surveillance, which the wide-ranging legislative changes embodied in the 'six-pack', i.e. the economic governance reform package that came into effect on 13 December, had set in motion. Two draft regulatory proposals by the Commission published on 23 November aim to strengthen the six-pack reforms further. The first proposal reinforces the surveillance of countries receiving financial assistance via the EFSF and ESM and of those at serious risk of financial instability, while the other provides for deeper fiscal surveillance of euro-area Member States – including the advance examination of national budgets – and for systematic in-year budgetary monitoring of countries in excessive deficit procedure.

Rarely have economic governance and macroeconomic prospects in the euro area been more closely intertwined that at the current juncture. Over the past six months, the outlook for the EU and the euro area has deteriorated. The recovery of the EU economy has come to a standstill. The Commission's Autumn 2011 forecast, published on 10 November, shows that the protracted sovereign-debt crisis has taken its toll on confidence in the euro area and beyond, thus harming investment and consumption. Furthermore, a significant loss of global growth momentum is weighing on prospects for exports. The first signs of improvements for GDP are projected for the second half of 2012, however, with very limited impact on job creation.

Moving to a more robust economic governance framework in the euro area will be essential to resolving the debt crisis and can thereby rebuild confidence. The policy measures decided over the past months are expected to be effective in reducing the uncertainty related to the sovereign-debt and financial-market crisis towards mid-2012, and this will gradually release deferred investment and consumption. Annual GDP growth in 2012 is forecast at 0.5% in the euro area, and will remain lacklustre in 2013 at 1.3%. No Member State will escape the expected slowdown, while growth differences will persist.

Any slippage in implementing the aforementioned reform measures could pose a significant downside risk to this central outlook.

The extent to which growth can be revived over the medium term will depend crucially on productivity developments in Member States. There is increasing evidence that total factor productivity (TFP) is a major explanatory factor for growth divergences within the euro area. This Quarterly Report investigates TFP determinants in depth. The focus section looks into the TFP deceleration in the euro area since the mid-1990's and the role it has played in influencing overall euro-area potential growth rates over this period. By explicitly accounting for skills as well as innovation capital, the section presents a model to gain greater insights into the determinants of euro-area TFP performance. From a policy perspective, the upshot of this analysis is that improving TFP performance is critical in lifting the euro area out of the crisis and allowing the necessary balance sheet adjustment to be less painful.

Further special topics in this edition are devoted to themes surrounding the economic outlook. Our first contribution aims to provide a better understanding of recent developments in the euro-area household savings rate, concluding that current aggregate saving levels in the euro area are broadly consistent with fundamentals. The household saving rate has been mostly on a downward trend since the trough of the recession in 2009Q2 and, despite a recent pick up, remains comparatively low and thereby supportive of spending. Recent house price falls are found to actually lead to a decrease in savings via the 'downpayment channel', which in combination with the limited importance of equities in household wealth and low interest rates explains the broad fall in savings in the recovery. Looking forward, however, more restrictive lending practices by banks could affect savings by restricting consumer credit and mortgages. Finally, recent losses in consumer confidence could also pave the way for a temporary rise in precautionary savings.

We further turn to inflation developments, where consumer prices over the course of 2011 have displayed considerable volatility. Our second special topic aims to assess the contributing factors to this year's consumer price inflation, examining in particular the pivotal role of energy and other commodity prices. Furthermore, the section reviews the effect of methodological changes to the measurement of the harmonised consumer price index (HICP) as well as labour cost developments and recent signals from survey- and market-based inflation expectations.

A final topic looks beyond our Member States to emerging market economies, which have proven rather resilient during the great recession. Although emerging market economies are likely to experience higher trend growth than their developed counterparts, a major downturn or an outright recession in advanced countries is likely to have a detrimental impact on growth in emerging market economies, given underlying globalisation trends. The empirical evidence presented in this section rejects to a large extent a 'cyclical decoupling' hypothesis, especially with regard to recessionary periods. Business cycle spillovers may occur via various channels, including trade, financial linkages, and confidence. Furthermore, banking sector linkages are considerable between emerging and advanced economies. This is especially the case in (non-euro area) Eastern Europe, which would be threatened in the case of a major cross-border retrenchment of foreign banks seeking to improve balance sheets. Beside traditional trade linkages, confidence spillovers appear to increasingly act as a force for business cycle co-movement between advanced and emerging economies.

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DIRECTOR-GENERAL

Focus

I. The knowledge drivers of total factor productivity

Over the past 15-20 years, the euro area's productivity record has been hampered by a significant deceleration in the growth of total factor productivity (TFP). In the long run, TFP is the main driver of income per capita. The decelerating trend is all the more worrying given that the euro area is facing a number of serious medium-to long-term growth challenges, including population ageing and the negative effect of the crisis on potential output. Tackling the deceleration in TFP growth requires a good understanding of its main causes. This focus section offers new empirical insights into the key knowledge determinants of TFP. It shows that a significant part of the deceleration of trend TFP in euro-area Member States can be explained by changes in the skill composition of the labour force as well as by trends in domestic and foreign knowledge capital stocks. In particular, most Member States show a declining contribution from skill improvements to TFP. In many euro-area Member States, the contribution of knowledge capital to TFP has been depressed by adverse trends in domestic knowledge investment. Finally, the analysis also shows the importance of cross-border knowledge spillovers. Slower accumulation of knowledge capital at the world level, reflecting in particular a slowdown in US R&D efforts, has weighed on TFP growth in the euro area.

This focus section looks into the deceleration of total factor productivity (TFP) in the euro area since the mid-1990s and the role it has played in influencing overall euro-area potential growth rates over this period. The sharp reversal in euro-area TFP fortunes over the last 15-20 years is in marked contrast to equivalent US trends. It is particularly worrying given the crucial role of TFP in driving sustainable per capita income trends, but also in the light of the likely impact of the financial crisis on potential output and of the economic 'headwinds' emanating from an ageing population structure.

Tackling the deceleration in TFP growth is at the top of the agenda for policy makers in the euro area. This does, however, require a deeper understanding of its main causes. This focus section offers new empirical insights into the key knowledge determinants of TFP. Its main aim is to assess the extent to which overall trends in TFP can be explained by factors such as the skill composition of the labour force and trends in domestic and foreign knowledge capital stocks.

I.1. Recent developments in potential growth

Any meaningful analysis of cyclical developments, of medium-term growth prospects or of the stance of fiscal and monetary policies is predicated on either an implicit or an explicit assumption concerning the rate of potential output growth. Such pervasive usage in the policy arena reflects the fact that potential output constitutes the best composite indicator of the aggregate supply-side capacity of an economy and of its scope for sustainable, non-inflationary growth.

In the production function (PF) framework used in this section, potential output is estimated by combining the inputs of labour, capital and TFP. ([1]) Whilst the primary focus is on deepening our understanding of TFP trends, it is important to place these trends in the wider perspective provided by overall potential growth rate developments. The remainder of this introductory section draws on Graph I.1 to identify some important stylised facts regarding overall potential growth and its underlying determinants over the last few decades. It first looks at trends in the pre-crisis period and then discusses the impact (so far) of the crisis on potential.

Pre-crisis trends in potential growth

When we examine potential growth rate developments in the euro area and the US in the decades leading up to the crisis, a number of key facts emerge:

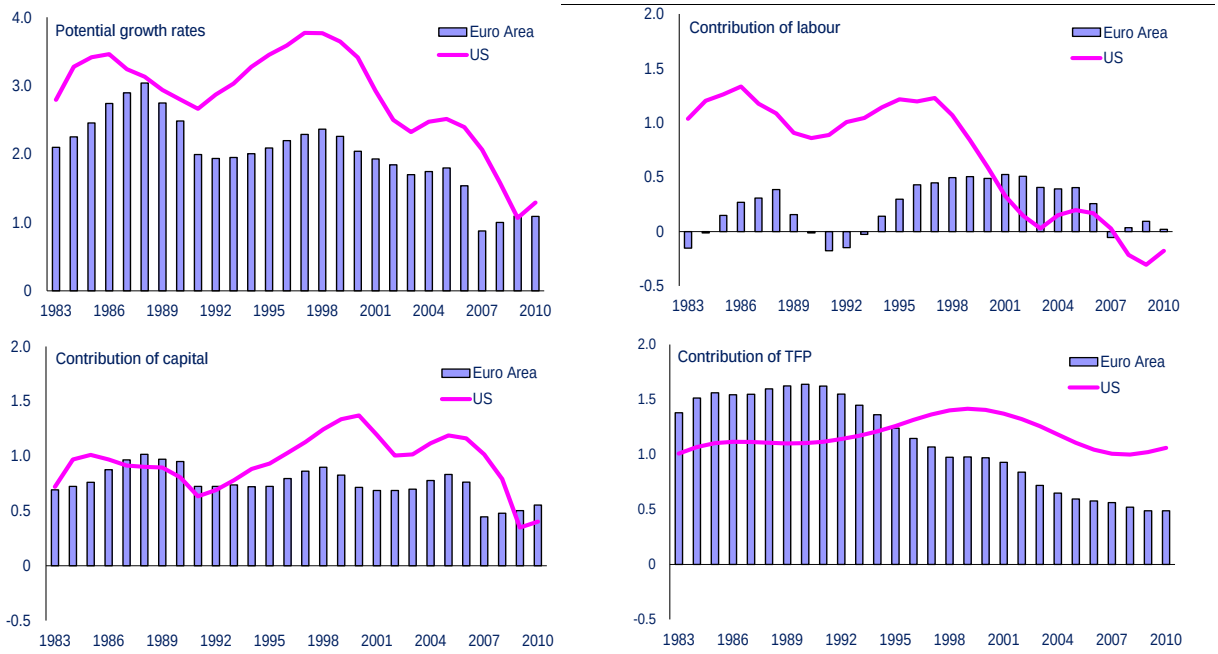
- Firstly, the US has clearly had higher potential growth over the period considered (1983-2007), with rates of growth of 3 % compared with 2¼ % in the euro area and this growth rate differential expanding to a full percentage point over the period 1995-2007. ([2])

- Secondly, there have been dramatic shifts in the contributions to growth from labour, capital and TFP in both regions over the period

([1]) See Solow, R.M. (1957), 'Technical change and the aggregate production function', *Review of Economics and Statistics*, Vol. 39, No 3, pp. 312-320.

([2]) Growth rates refer to aggregate potential. When population dynamics are taken into account, GDP per capita income trends in the US and the euro area have been broadly comparable in recent decades.

Graph I.1: **Comparison of euro-area and US potential growth rates and determinants (annual growth rates in %, 1983-2010)**



Source: Commission services.

1983-2010. Whilst the US outperformance over the first half of the period was driven by more favourable labour input trends, over the second part it was labour productivity developments that were the key driver, with US investment spending (relative to labour input growth) and TFP trends easily outperforming those of the euro area. ([3])

- Regarding labour market developments, the US outperformance for 1983-1994 was striking, with a contribution to overall potential growth of 1.1% pp compared with 0.2% pp for the euro area. This US performance was driven by much stronger demographic developments (also owing to higher inward migration), by lower rates of structural unemployment and by substantially higher labour force participation rates. Differences with the US in the contribution of labour have, however, been significantly reduced since the mid-1990s, with a number of euro-area Member States pursuing significant labour market reforms that have resulted in both reduced rates of structural unemployment, especially in the post-2000 period, and a large increase (i.e. of the order of 6% pp) in participation rates to levels close to those of the US.

- Regarding labour productivity trends, whilst US/euro-area growth differentials were generally small for the period 1983-2007 as a whole, this relatively reassuring picture evaporates when one looks at the development of productivity over the second half of this period, i.e. 1995-2007. Since the mid-1990s, the US has experienced substantially higher contributions to growth from both total investment spending and TFP. As shown in Graph I.1, the deterioration in the euro area's productivity performance was not due to the contribution from capital accumulation, which remained remarkably stable over the period as a whole. The deterioration reflected a sharp downward movement in TFP growth rates, from a situation where the euro area was outperforming the US by close to half a percentage point, on an annual average basis, to the exact opposite situation where the euro area was experiencing TFP growth rates that were half a percentage point lower.

Impact of the financial crisis

A review of the literature on past financial crises, including the experiences of countries such as Finland, Sweden and Japan in the early 1990s, points to a number of important influences on the development of the different components of

([3]) Van Ark, B., M. O'Mahony and M. Timmer (2008), 'The productivity gap between Europe and the US: Trends and causes', *Journal of Economic Perspectives*, Vol. 22, No 1, pp. 25-44.

Box I.1: **Knowledge as a source of growth**

Standard growth models emphasise the role of physical capital and total factor productivity (TFP) as sources of growth. In fact TFP has always been regarded as the fundamental driver of growth and essentially the only determinant of long term per capita GDP growth (see, for example Solow (1957). Unfortunately, TFP was a black box and its determinants not further specified. This picture has changed with contributions from Romer (1986 and 1990), Lucas (1998), Aghion (2006), Jones (1995a and 1995b) and others who have introduced new growth enhancing factors, in particular knowledge creation, into growth models.

There are various ways in which one can look at knowledge creation. Broadly one can distinguish models which emphasise human capital formation or skill upgrading in the form of time spent on education and training (e.g. Lucas), whilst other models directly focus on R&D investment. The former approach models knowledge as a human capital formation problem at the household level whilst the latter approach emphasises knowledge investment decisions at the firm level. Both approaches are complementary and only focus on different aspects of knowledge creation. This explains the focus of the empirical analysis presented in this section on both skills and R&D.

By linking TFP to knowledge investment, these models opened the way to also empirically assessing knowledge as a source of growth. However, alternative models make radically different predictions about the impact of knowledge inputs on growth. In particular early generations of endogenous growth models (e.g. Romer) predicted a link between a (permanent) change in the level of knowledge inputs and the (long-run) growth rate of productivity, whilst later vintages of growth models (the so called semi-endogenous growth models) pioneered by Jones, for example, predict that changes in the level of knowledge will only lead to temporary (albeit rather persistent) growth effects, with the economy eventually settling down at a permanently higher level of productivity.

Consequently, the endogenous and semi-endogenous views on the impact of knowledge inputs have obviously drastically different growth implications. Whilst the endogenous view is optimistic concerning the impact of knowledge on generating growth, the semi-endogenous view arrives at the conclusion that only rising knowledge efforts can sustain past growth rates of productivity. Potentially the semi-endogenous growth view could explain why productivity in the EU has a tendency to decline despite either constant R&D shares or increasing efforts to lift the level of education. This view is also consistent with the observation that fairly constant growth in productivity over more than a century in the US is associated with ever increasing shares of knowledge inputs (see Jones (2002)).

Eventually the decision as to which model is correct is an empirical matter and one has to look at the crucial parameters which determine the growth dynamics. In fact, the crucial parameters that have been identified by growth economists are values for the output elasticity of physical capital (in models focussing on education) and parameters determining the elasticity of R&D in the creation of knowledge. Consider for example the effects of skill upgrading in an otherwise standard neoclassical production function :

(1) $$Y_t = K_t^{\alpha}\left(L_t H_t\right)^{\beta} A_t^{\theta} \quad with \;\; \alpha \le 1, \beta > 0, \theta > 0$$

where *Y, K, L* and *A* denote GDP, capital, physical labour and TFP respectively and where *H* is a human capital or skill index. Assume the skill index is increased by x%. This leads to a direct increase of *Y* by $\beta * x\%$ but it will also have sustained second round effects, since it increases the marginal product of capital (MPK), which leads to higher physical capital. Notice, however, that this can only set in motion a sustained increase in the growth of GDP if the increase of capital does not lead to a decline in MPK i.e. only in the borderline case $\alpha = 1$. For all other parameter values, growth will eventually level off and the long run output multiplier is given by:

(2) $$\frac{dy}{dh} = \frac{\beta}{1-\alpha}$$

where *dy* and *dh* are % changes in *Y* and *H* respectively. Empirical estimates for the output elasticity of capital (α) (from growth regressions) clearly support the view that α is well below one, supporting the more pessimistic view.

Similar considerations apply to models that stress R&D as a source of growth and consider TFP as being proportional to a knowledge capital stock which is produced with R&D inputs/labour (*LA*) via the following knowledge production function:

(3) $$\Delta A_t = A_{t-1}^{\phi} L A_t^{\rho} \quad \text{with} \quad \phi \le 1, \; \rho > 0$$

(Continued on the next page)

Box (continued)

For this model too, it can be shown that only if $\phi = 1$, will a level shift in R&D inputs lead to a sustained increase in the growth rate of knowledge/TFP, while for all other parameter values a permanent increase in the level of R&D will only increase the level of TFP, with :

(4) $$\frac{da}{dla} = \frac{\rho}{1-\phi}$$

Also in the case of knowledge production functions, the empirical evidence points in the direction of $\phi < 1$ (Bottazzi & Peri 2003, Jones 1995a & 1995b), i.e. decreasing returns from new knowledge with respect to existing knowledge.

The empirical analysis from which the results in this focus section are derived follows the semi endogenous paradigm, i.e. the standard specification of capital in the production function is retained by imposing an output elasticity of capital which is close to one minus the wage share. A knowledge accumulation equation is estimated which imposes the constraint that level shifts in R&D inputs only lead to long run level shifts of output. In addition, a distinction is made between domestic knowledge A^D and foreign knowledge spillovers A^F. For each country, foreign knowledge is a positive function of the knowledge stock in the rest of the OECD area. Finally, the model allows for exogenous shocks to TFP (U).

(1') $$Y_t = K_t^{\alpha} \left(L_t H_t\right)^{\beta} A_t^{D,\theta d} A_t^{F,\theta f} U_t$$

The skill index H is defined as a function of the skill composition between low, medium and high skilled workers L_L, L_M and L_H respectively.

(5) $$H_t = \frac{\left(L_{L,t}^{\gamma L} L_{M,t}^{\gamma M} L_{H,t}^{\gamma H}\right)}{L_t} \qquad \text{with } L = L_L + L_M + L_H$$

In the index, skills are ranked by their respective output elasticities ($\gamma L < \lambda M < \gamma H$) and these output elasticities are measured using information about average skill wage differentials.

Thus the measure of (trend) TFP is given by :

(6) $$\log(TFP_t) = \gamma_L \log\left(\frac{L_{L,t}}{L_t}\right) + \gamma_M \log\left(\frac{L_{M,t}}{L_t}\right) + \gamma_H \log\left(\frac{L_{M,t}}{L_t}\right) + \theta_d \log(A_t^D) + \theta_f \log(A_t^F) + u_t$$

This equation forms the basis of the TFP growth accounting exercise.

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potential growth in the post-crisis period. ([4]) With respect to labour, available research suggests that the length of the downturn in the aftermath of the crisis is pivotal in determining the extent of damage to an economy's underlying labour potential. A crisis can also reduce potential output in the short term through its adverse effects on investment. Given the unprecedented financial market problems, it is expected that the price and volume of capital will be affected but there is also a distinct risk of having an impaired capital allocation system. Deficiencies in the allocation function may result not only in a more anaemic investment trend in the recovery phase but also in a less than optimal reallocation of capital resources to aid the crucial restructuring of economies. With respect to TFP, economic theory and pre-crisis empirical evidence do not give a clear answer as to what the expected impact of the crisis on long-run TFP might be. Besides a number of mechanisms that tend to dampen TFP in the immediate aftermath of a crisis, including pro-cyclical R&D spending and higher risk premiums for venture capital financing, there are also arguments that downturns can have a positive TFP impact via a process of constructive restructuring and cleansing in the economy. ([5])

A look at the post-crisis evidence to date tentatively suggests that the severe economic shock has led to a significant downward revision in euro-area and US potential growth over the short run, with both euro-area and US rates falling by three quarters of a percentage point in 2010 compared to 2007. In terms of the components of growth, the results are broadly in line with the expected effects for labour, capital and TFP:

- Regarding labour, the crisis has produced substantial, short-run reductions in the growth contribution from labour in both the euro area and the US. The US has been relatively more affected on this front, with structural unemployment rising significantly compared with the pre-crisis period, compounded by a sharp fall in participation rates. ([6])
- As to capital, in keeping with the conclusions of the literature and the experiences of countries such as Finland, Sweden and Japan, the contribution of capital to growth in both the US and the euro area has been markedly reduced over the short run, with again the US being relatively more affected.
- For TFP, the results need to be assessed against the *a priori* assumption that the final long-run outcome is dependent on a range of offsetting positive and negative factors. In the short run, this balancing act would be expected to produce a negative overall impact, with one-off downward level shifts in TFP in a few crisis-related industries being a possible explanation. This is what appears to have happened so far, with both US and euro-area TFP growth rates declining compared with the pre-crisis period. It is hoped that these losses will be gradually recouped over the medium to long term, as gains from restructuring efforts start to emerge.

In overall terms, the results for the period since the start of the crisis look to be broadly consistent with the mainstream predictions from the literature and from an analysis of a number of relevant individual country experiences. The crisis has resulted in a sharp, short-run downturn in potential growth rates. In addition, although the growth rate effects of the crisis are likely to be transitory, the initial fall in growth combined with a relatively slow return to pre-crisis rates over subsequent years is expected to produce a substantial loss in the euro area's level of potential output. Such losses in levels will have significant implications in terms of the living standards and fiscal capacity of the most affected euro-area economies.

Looking further ahead, concerns regarding potential output relate not only to unfavourable pre-crisis trends and to the negative impact of the crisis but also to the fact that, in the coming years, labour market developments will increasingly be dominated by the impact of ageing populations and its negative effect on labour supply. As capital accumulation is essentially driven over the long run by the emerging labour and TFP trends, it is clear that the euro area's future growth prospects, especially its per capita income trends, will be largely determined by what happens to TFP. ([7]) It is therefore critical to better understand the fundamental drivers of TFP. The next section goes on to look more deeply into the TFP concept

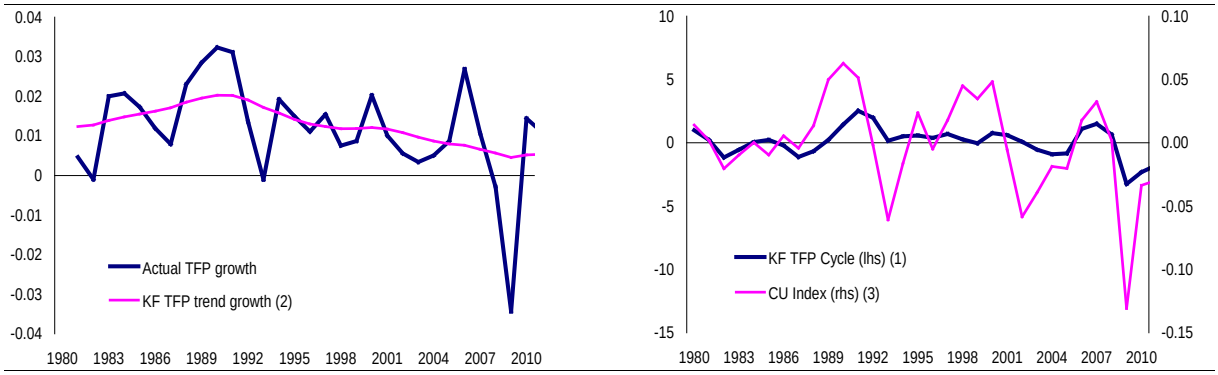
([4]) See, for example, Cerra, V. and S. Saxena (2008), 'Growth dynamics: the myth of economic recovery', *American Economic Review*, Vol. 98, No 1, pp. 439-57; Haugh D., P. Ollivaud and D. Turner (2009), 'The macroeconomic consequences of banking crises in OECD countries', *OECD Economic Department Working Paper*, No 683.

([5]) See, for example, Caballero, R.J. and M.L. Hammour (1994), 'The cleansing effect of recessions', *American Economic Review*, Vol. 84, No 5, pp. 1350-68.

([6]) See European Commission (2011), 'European economic forecast — Autumn 2011', *European Economy*, No 6.

([7]) See Easterly, W. and R. Levine (2001), 'It's not factor accumulation: Stylized facts and growth models', *World Bank Economic Review*, Vol. 15, No 2, pp. 177-219.

Graph I.2: **Official TFP estimates for Germany (annual growth in %, 1980-2010) (1)**



(1) TFP estimates calculated using the EPC's commonly agreed methodology for potential growth. (2) KF = Kalman filter (3) CU = Capital utilisation in level terms, normalised

Source: Commission services.

and, in particular, its key knowledge determinants, including the skill composition of the labour force, the scale and efficiency of domestic research efforts and the importance of spillovers from the technological frontier. ([8])

I.2. A deeper analysis of TFP and of its fundamental drivers

Estimating TFP is not straightforward since it is not a directly observable variable. There are two broad approaches to calculating trend TFP: an indirect approach, which focuses on isolating the cyclical component of actual TFP, and a direct approach, which focuses on isolating observable knowledge determinants of TFP. ([9])

Following an analysis by the EU's Economic Policy Committee (EPC) of the advantages and disadvantages of both approaches, it was agreed that the indirect approach was the better method for official EU policy surveillance purposes. This conclusion reflected the significant limitations with structural models in that it is difficult to be sure that all of the key drivers are taken into account, and structural breaks are common. Focusing on isolating the cyclical component of the TFP series ensures that the signals from the most recent data indicators can be taken on board and that turning points can be more quickly established. Whilst the indirect approach has many advantages, its key drawback is that it gives no explanation of the structural determinants that are driving trend TFP developments. Consequently, it is essential to supplement the official method with a more structural analysis of the determinants of TFP. This is what is done hereafter, with the first half of the section giving the official trend TFP estimates and the second half then providing an overview of the supplementary structural analysis, focusing on the role of the knowledge capital stock and the skill composition of the labour force. Whilst this supplementary analysis has been carried out for 11 EU countries, the US and Japan, the objective of this section is to illustrate the usefulness of this approach, with Germany (a good proxy for the euro area as a whole) and the US being discussed in some detail.

Official trend TFP estimates

The trend TFP calculations are a fundamental component of the commonly agreed methodology for estimating total potential growth rates for EU Member States. Trend TFP is estimated using a bivariate Kalman Filter model for 18 of the 27 Member States, with a simple HP filter being used for the remaining 9 Member States where short sample lengths preclude the use of the Kalman Filter. Both filtering approaches aim to isolate the cyclical component of actual TFP. In the case of the Kalman Filter, it does this by exploiting the link between the TFP cycle and the degree of capacity utilisation (CU). Survey data in manufacturing, services and construction are used to derive a CU index (see Graph I.2). ([10])

As shown in Graph I.3, German TFP growth rates have fallen by roughly 1 pp from around 1½% in the mid-1990s to ½% in 2010, a pattern almost identical to that for the euro area as a whole. The

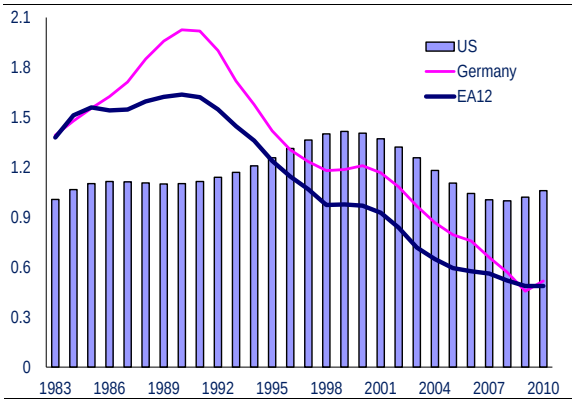
([8]) See Griliches, Z. (1979), 'Issues in assessing the contribution of research and development to productivity growth', *Bell Journal of Economics*, Vol. 10, No 1, pp. 12-116.

([9]) For examples of the latter see, for example, the work of Jones (1995b and 2002) cited in Box I.1.

([10]) The data come from the EU harmonised business and consumer surveys.

graph also shows that Germany and the euro area experienced a much greater decline in TFP growth rates compared with the US over the same period. ([11])

Graph I.3: **TFP growth rates for the euro area, the US and Germany (in %, 1983-2010)**



Source: Commission services.

Knowledge determinants of TFP

In order to isolate those factors which can explain this relatively poor German and euro-area performance, the cyclically focused analysis is supplemented with a more structural approach. The structural analysis has so far been carried out for 13 countries, but this focus section concentrates in particular on the specific cases of Germany and the US.

The structural analysis focuses on two main drivers of TFP: changes in human skills and in the quantity and efficiency of domestic and foreign knowledge investments. For the latter, an important result discussed further below is the marked slowdown in international innovation efforts, leading to lower international spillover effects for all countries via cross-border technology and scientific knowledge diffusion. In many countries this is aggravated by a low capacity to absorb new foreign technologies (e.g. because of insufficient investment when these new technologies are embedded in equipment). It is important to stress upfront that the structural approach produces results which are broadly consistent with the official (i.e. EPC-endorsed), cyclically focused estimates based on the Kalman Filter method in the sense that it can explain a large part of the changes in 'official' TFP trends. This confirmation provides greater confidence in the accuracy of the official estimates.

It is important to stress that whilst knowledge investments are a key driver of TFP, they are not the only driver, with the more efficient utilisation of factor inputs in production processes (i.e. static efficiency gains) also contributing. An economy's ability to exploit novel technologies and to adapt to a rapidly changing technological environment is essential to its prospects for improving standards of living. In assessing the impact of both of these TFP drivers (i.e. knowledge production and factor efficiency), the time dimension needs to be taken into account. For example, while over the short to medium term, factor efficiency considerations could be an important driver of TFP changes, over the longer run it is knowledge investments which are the key determinant. Awareness of this time dimension underlines the fact that TFP is not just about knowledge production – in fact the other determinants such as levels of competition, scale economies and organisational / managerial best practices can periodically be as important.

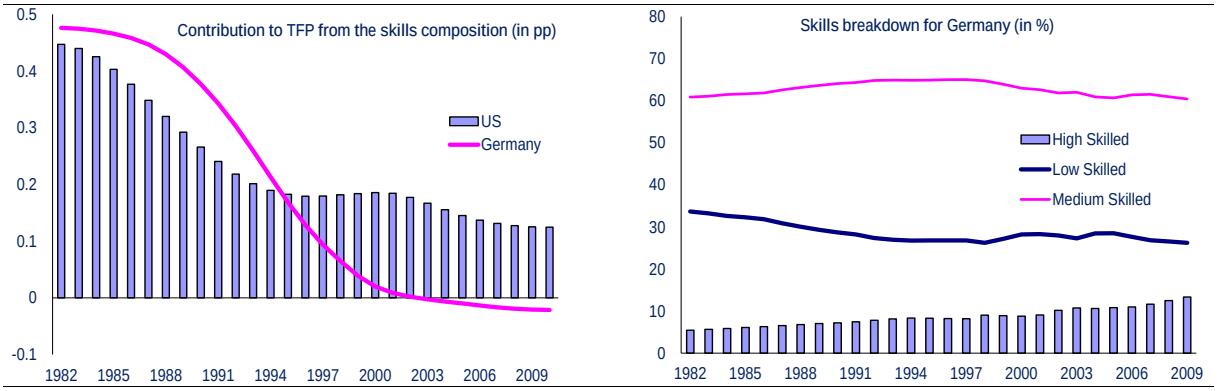
Contribution of skills to TFP trends. The current version of the official production function methodology uses a standard quantity measure of labour input (i.e. employment levels adjusted for hours worked) to calculate the contribution of labour to growth. The current approach should allow for differences in the productivity/'quality' of different workers but to construct such labour 'quality' measures, datasets for the breakdown of total employment and labour compensation by high-, medium- and low-skill groupings are needed. ([12]) Eurostat unfortunately does not currently produce validated data series for these skill breakdowns. Consequently, official TFP measures overstate 'true' TFP by including these skill composition effects.

In order to correct for this, observed TFP must be decomposed into a skill component and a residual TFP component. This is done by using an unofficial (i.e. not validated by Eurostat) skills-based breakdown of employment and labour compensation from EU KLEMS, with the weights used in the aggregation of the different skill groups reflecting the average share of each skill

([11]) Unlike the TFP estimates for Germany and the euro area, which are produced using the official Kalman Filter approach, the TFP estimates for the US are produced using a simple, univariate HP filter. The basic problem with such univariate techniques is that they tend to produce imprecise estimates at the end of the sample period (and especially close to turning points/'boom-bust' episodes). Consequently, preliminary HP trend TFP estimates are frequently and sizeably revised over time.

([12]) See for instance: Denison, E.F. (1967), 'Why growth rates differ: Postwar experience in nine Western countries', The Brookings Institution and Jorgenson, D.W. (1995), 'Productivity', MIT Press.

Graph I.4: **Contribution to TFP from the skills composition of the workforce and skills breakdown in Germany (1982-2010)**



Source: Commission services.

group in total labour compensation (see also Box I.1). ([13]) With this approach, a skills-based indicator of changes in the 'quality'/productivity of the workforce over time can be constructed. The results for this index for Germany and the US are shown in Graph I.4, including a skills breakdown of the German workforce. As can be seen from the skills breakdown, until the late 1990s there was an upward movement in the shares of medium- and high-skilled workers, with a reduction in the share of the low skilled. Since then, Germany has experienced an increase in the share of the low skilled and a reduction in medium skilled, with only the high skilled share continuing to increase. Part of the latter trend may be explained by the temporary effect of labour market reforms focused on low-skilled workers. But it also reflects a more persistent structural change as evidenced by the fact that it started before the major labour market reforms were put in place. It is also observable in a broad number of other euro-area Member States.

Contribution of innovation capital to TFP trends. In addition to skills, domestic and foreign innovation patterns are also playing a significant role in the German TFP story. To look at this question, the official TFP model adjusted for skills described earlier has been augmented so as to include intangible investment variables such as innovation capital, in order to try to directly explain the skills-adjusted actual TFP series. The specification for both the skills-adjusted official model and the knowledge-augmented variant are discussed in Box I.1. The augmented model is estimated as an unobserved components model where overall trend TFP (as derived from the skills-adjusted official model) is decomposed into an observable component, driven by domestic and foreign knowledge investments, and an unobserved trend component, which is essentially driven by everything else affecting trend TFP. The key coefficients are those which measure the strength of the relationship between domestic knowledge investments and domestic TFP and the extent of technology spillovers from abroad, linked to worldwide knowledge investments. ([14])

In estimating this model, a fundamental question to ask at the outset is which indicator of innovation capital to use, with the choice being between using total intangible investments or just a proportion of the total, namely scientific R&D investments. ([15]) This is not a simple choice since the literature informs us that non-scientific intangible investments may be particularly important for explaining TFP trends in market services. However, given the ongoing conceptual

([13]) EU KLEMS stands for EU-level analysis of capital (K), labour (L), energy (E), materials (M) and service (S) inputs. EU KLEMS provides a system of analysis at industry level which encompasses internationally harmonised, national accounts-based statistics and indicators, as well as an analytical framework for interpreting this information based on input-output analysis and growth accounting.

([14]) See for instance:
Coe, D. and E. Helpman (1995), 'International R&D spillovers', *European Economic Review*, Vol. 39, No 5, pp. 859-887.
Griffith, R., S. Redding and J. van Reenen (2004), 'Mapping the two faces of R&D: productivity growth in a panel of OECD industries', *Review of Economics and Statistics*, Vol. 86, No 4, pp. 883-895.
Guellac, D. and B. van Pottelsberghe de la Potterie (2004), 'From R&D to productivity growth: do the institutional settings and the source of funds of R&D matter?', *Oxford Bulletin of Economics and Statistics*, Vol. 66, No 3, pp. 353-378.

([15]) According to Corrado et al., intangible investments should be broken down into five key areas: (1) scientific R&D; (2) non-scientific R&D (measured by resources devoted to innovation and to new product/process R&D which does not draw on a scientific knowledge base); (3) computerised information systems (essentially investments in computer software); (4) firm-specific resources (including human capital investments — such as training — and organisational/restructuring skills); and (5) brand equity. See Corrado et al. (2006).

and data availability problems with non-scientific investments, the analysis presented here focuses only on scientific R&D, which for many of the countries analysed amounts to roughly 50 % of total intangible investments. ([16])

Another choice to make is between R&D expenditures or R&D volumes, as proxied by the amount of human resources devoted to science and technology (S&T). Since cross-country comparisons of the R&D expenditure data can sometimes suffer not only from exchange rate issues but also from wage inflation pressures in the research sector, it was decided to opt for the volume of human resources devoted to research. Further choices had to be made between the widest definition of the amount of human resources in S&T (which would include all people with both a tertiary level education and an S&T occupation) and the narrowest definition, namely researchers. It was decided to opt for the narrowest definition on the grounds that, of all the human resources devoted to S&T in an economy, the researchers sub-grouping is central to a country's R&D effort. Like in Germany, it is not surprising that this sub-grouping often makes up little more than 1 % of total employment since, to be included in this group, the OECD's Frascati manual states that the researcher must be 'engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned'.

Using the data for R&D researchers, a stock measure of the physical innovation inputs in the different countries was constructed, with a world total being created by aggregating the results for each of the countries. ([17]) The numbers of researchers are cumulated in order to construct the domestic and foreign stocks of knowledge, using the perpetual inventory method and an assumption of a 10 % depreciation rate. The foreign knowledge stock series for each country is the world total excluding the country itself.

Using the calculations for domestic and world innovation capital stocks, Germany's innovation performance can be directly compared to that of the US. Regarding trends with respect to foreign R&D capital stocks, developments in Germany are broadly comparable to those of the US, with both countries being faced with an apparent slowdown in the growth rate of the global stock of knowledge. However, since the US has a dominating share of the global total, the relatively dramatic slowdown in the growth rate of domestic researchers in the US has implications for all of the other countries in the sample, due to cross-border knowledge spillovers. This slowdown in the growth rate of the domestic knowledge capital stock in the US may be partly linked to the US entry restrictions put in place following the 9/11 tragedy, with knock-on effects in terms of the numbers of foreign students taking up advanced-level studies in US universities. This may have reduced the supply of qualified personnel for US private and public research labs.

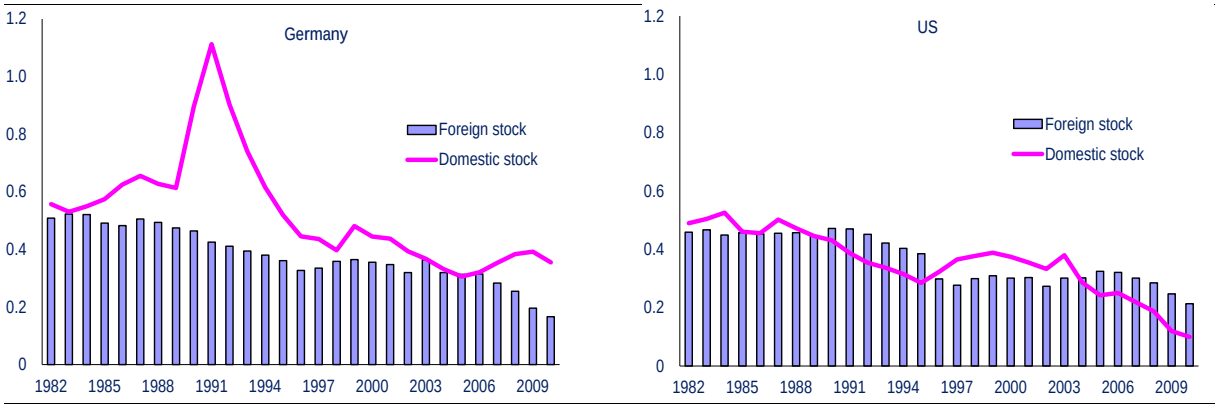
Turning to domestically driven innovation, the evidence for Germany is relatively positive, with annual growth rates of German knowledge investments being broadly comparable to those of the US over the last 30 years (apart from an unusual pattern around German unification). There was a slight acceleration in US knowledge investments in the post-1995 period which was not really replicated in Germany, with most of the differences over this period due to the US's higher investments in a few critical ICT-producing manufacturing industries. The acceleration proved temporary, however, with growth rates of domestic R&D capital stocks slowing rapidly in the US from around 2004 onwards.

In addition to the quantities of innovation capital, the estimates of elasticities/rates of return on those knowledge investments suggest that there are only small efficiency differences between Germany and the US, with foreign R&D elasticity almost identical in both countries and with domestic R&D elasticity in Germany being somewhat higher (see Table I.1). Similar domestic knowledge elasticities to those of Germany have been obtained for the Netherlands and Ireland. For Finland, the elasticity lies between those of Germany and the US. Belgium and France have elasticities which are close to those of the US. The output elasticities for Italy, Portugal and Spain are slightly lower than in the US. Finland has the highest output elasticity for knowledge spillovers, followed by Germany, the Netherlands and Belgium. The remaining countries in the sample have somewhat smaller coefficients. Interestingly, the knowledge spillover parameters are not (inversely) linked to the size of the economy, but may rather reflect the degree of international integration in the production of high-tech products.

([16]) See references in the box such as Griliches (1992); Cincera and Van Pottelsberghe (2001); van Ark et al. (2009).

([17]) Due to data limitations, the world total is in reality only an 'OECD' world total and clearly further work in this area will be needed to construct a truly global measure of world R&D efforts.

Graph I.5: **Contribution from domestic and world innovation capital stocks to TFP growth for Germany and the US (in pp, 1982-2010)**



Source: Commission services.

Table I.1: **Coefficients for domestic and foreign R&D capital**

	Domestic R&D Elasticity	Foreign R&D Elasticity
Germany	0.15	0.12
US	0.11	0.11

Source: Commission services.

There is a strong link between these estimated elasticities and rates of return on knowledge investments in terms of output. A rough rule of thumb suggests that a 0.1 elasticity would equate to a rate of return of 55%, assuming an R&D expenditure intensity of 2% and a depreciation rate of 10%. ([18]) Using this rule, the implied rates of return on domestic German and US knowledge investments are reasonably similar, with rates in both countries estimated to lie between 60% and 90%. These rates are in keeping with the estimated rates of return in the literature, as shown in Table I.2.

When the knowledge stock growth rates and the estimated elasticities shown in Table I.1 are combined, the percentage point contribution from domestic and world innovation capital stocks to TFP growth can be calculated for the last 30 years (Graph I.5). The graph shows, for example for Germany, that there has been a sharp decline in the contribution from world innovation capital to German TFP growth. Since the US has such a large weighting in the world total, this German trend is clearly heavily influenced by US domestic developments. This is of course partly explained by the large decline in the contribution of US domestic innovation capital to US TFP growth. This rather alarming US trend with respect to domestic knowledge investments is not replicated in Germany, where domestic R&D investments have continued to contribute, on an annual average basis, around 0.4 pp to total TFP, compared with 0.1 pp in the US.

Table I.2: **Estimated rates of return to private R&D (in %)**

Author (year)	Private return	Social return (private return + knowledge spillovers)
Sveikauskas (1981)	7-25	50
Bernstein-Nadiri (1988)	10-27	11-111
Bernstein-Nadiri (1991)	15-28	20-110
Nadiri (1993)	20-30	50
Mansfield (1977)	25	56
Goto-Suzuki (1989)	26	80
Terleckyj (1974)	29	48-78
Scherer (1982,1984)	29-43	64-147

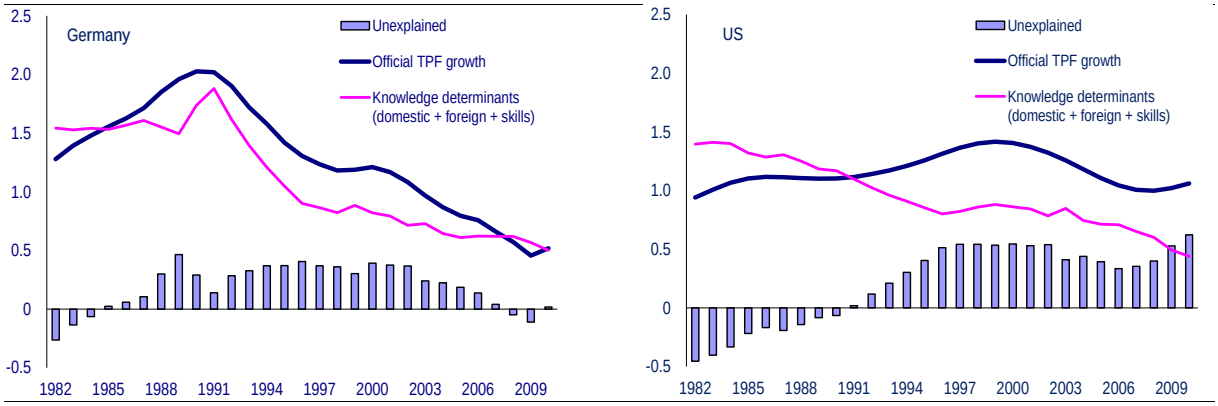
Source: Fraumeni, B.M. and S. Okubo (2005), 'R&D in the National Income and Product Accounts: A first look at its effect on GDP', in Corrado, C., J. Haltiwanger and D. Sichel (eds.), 'Measuring capital in the new economy', Studies in Income and Wealth, Vol. 65, NBER.

On the basis of the analysis so far, Table I.3 and Graph I.6 bring together the results from the skills analysis and from the domestic and knowledge capital stocks to show that this structural TFP approach can effectively supplement the official TFP analysis (which focuses on isolating the cyclical component of TFP).

Table I.3 shows part of the normal output from the official production function approach and then it adds an additional section which shows a decomposition of the official TFP series into the contribution from skills, from domestic R&D capital and from spillovers from the foreign R&D capital stock. If one subtracts these three columns

([18]) The output elasticity is the percentage change in GDP divided by the percentage change in knowledge capital, while the rate of return is the absolute change in output relative to the absolute change in knowledge (the derivative of output with respect to knowledge). Therefore the elasticity must be divided by the knowledge-to-TFP ratio to arrive at the rate of return. Since knowledge is a stock it can be expressed as the R&D flow divided by the depreciation rate.

Graph I.6: **Comparison of official TFP trends with those based on knowledge determinants, Germany and the US (in %, 1982-2010)**



Source: Commission services.

from the official total trend TFP, one is left with the unobserved trend component — in other words, that part of the trend which the structural model cannot explain. For example, if one looks at the decline in German TFP growth of around 1 pp between 1995 and 2010, one sees that over half of the decline can be explained by changes in the observable knowledge determinants of TFP, with the greatest declines coming in the contribution from skills and from foreign spillover effects. The same factors are clearly at play at the level of the euro area as a whole.

Table I.3: **Potential growth and its determinants in Germany (1991-2010)**

	Total potential growth	Contributions to potential growth			Trend TFP decomposition (structural / knowledge determinants)			
		Total labour (hours) contribution	Capital accumulation contribution	TFP contribution (1)	Skills	Domestic R&D capital stock	Foreign R&D capital stock	Unexplained trend component
1991	3.2	0.3	0.9	2.0	0.3	1.1	0.4	0.1
1992	2.9	-0.1	1.0	1.9	0.3	0.9	0.4	0.3
1993	2.4	-0.2	0.8	1.7	0.3	0.7	0.4	0.3
1994	2.0	-0.5	0.9	1.6	0.2	0.6	0.4	0.4
1995	1.9	-0.4	0.8	1.4	0.2	0.5	0.4	0.4
1996	1.8	-0.3	0.7	1.3	0.1	0.4	0.3	0.4
1997	1.7	-0.3	0.7	1.2	0.1	0.4	0.3	0.4
1998	1.7	-0.2	0.7	1.2	0.1	0.4	0.4	0.4
1999	1.8	-0.2	0.8	1.2	0.0	0.5	0.4	0.3
2000	1.8	-0.2	0.8	1.2	0.0	0.4	0.4	0.4
2001	1.7	-0.1	0.6	1.2	0.0	0.4	0.3	0.4
2002	1.5	0.0	0.4	1.1	0.0	0.4	0.3	0.4
2003	1.3	0.0	0.4	1.0	0.0	0.4	0.4	0.2
2004	1.2	0.0	0.3	0.9	0.0	0.3	0.3	0.2
2005	1.1	0.0	0.3	0.8	0.0	0.3	0.3	0.2
2006	1.2	0.0	0.4	0.8	0.0	0.3	0.3	0.1
2007	1.3	0.1	0.5	0.7	0.0	0.4	0.3	0.0
2008	1.2	0.1	0.5	0.6	0.0	0.4	0.3	0.0
2009	0.8	0.1	0.3	0.5	0.0	0.4	0.2	-0.1
2010	1.2	0.2	0.5	0.5	0.0	0.4	0.2	0.0

(1) The official method focuses on isolating the cyclical component.

Source: Commission services

Finally, Graph I.6 gives an overview of the total results for Germany and the US, showing the official trend TFP estimates together with the observed trend component (driven by skills and domestic and foreign knowledge capital) and the unobserved trend component. Graph I.6 suggests that the structural approach produces relatively plausible results for Germany, with the observed trend component closely tracking the official trend TFP estimates. Part of this result could be due to our focus on scientific R&D researchers, which are a key driver of TFP trends in manufacturing industries, this sector being pivotal in explaining Germany's overall innovation performance.

The approach is less successful in explaining US trend TFP developments. This could be due to our exclusion of non-scientific intangible investments from our intangible investments total. As explained earlier, these investments (such as non-scientific R&D, firm-specific resources, brand equity and computerised information systems) have been cited in the literature as being a key driver of the productivity revolution in US service industries, such as retail and wholesale trade and financial services. An alternative explanation is that the official model may be overestimating trend TFP in the US over this period, with historical trend revisions likely in the future as the evidence on underperforming investments from the post-1995 period starts to accumulate. An assessment of the 'real' underlying rate of TFP growth in the US is also complicated by the fact that, unlike the calculations for Germany, the official estimate is not based on the Kalman filter approach. It could turn out that with future data revisions, and with better filtering techniques, perhaps a greater part of actual TFP developments in the US since the mid-1990s reflected cyclical

factors rather than a genuine structural break in the US private services sector. ([19])

Overall, over half of the TFP decline in Germany since the mid-1990s can be explained by a deterioration in the contribution to knowledge production from skills and from domestic and foreign capital stocks. Despite domestic innovation levels holding up reasonably well over the period, there has been a sharp deterioration in the contribution from foreign innovation capital, reflecting in particular the slowdown in US R&D efforts. The combination of these innovation patterns with the deterioration in the skill composition of the German labour force produces knowledge-induced TFP results that are very much consistent with the results for Germany from the official, cyclically focused TFP methodology. Finally, whilst this section has focused on Germany (given its influence on overall euro-area patterns), the analyses carried out for some other Member States confirm the useful complementary role which this structural approach can provide in better understanding TFP patterns in all those euro-area countries for which data currently exist. Similar results to those for Germany also hold for other euro-area countries in the sample. In particular, there is a slowdown in the contribution of skill upgrading to TFP as well as a slowdown in the growth rate of R&D inputs.

I.3. Conclusions and policy implications

Trends in total factor productivity in the euro area since the 1990s are worrying and call for determined policy action. In the long run, TFP is the main driver of income per capita and the deceleration of TFP growth by about 1 pp over the past two decades is in itself a serious source of concern. But it is particularly worrying at the present time given that the euro area is facing a number of serious medium- to long-term growth challenges. These include the negative effect of the crisis on potential output, persistent downside pressures on demand due to balance sheet consolidation in the private or the public sector in many Member States and the impact of population ageing on labour supply and investment.

To tackle these challenges, the Commission has placed productivity growth at the centre of its Europe 2020 strategy. In its recent 'Initiative for growth, governance and stability', it has renewed its call for growth prospects and productivity to be enhanced by pursuing strong structural reforms, acknowledging that progress so far has been slow.

Against this background, the structural analysis of TFP presented in this section offers further empirical backing for calls for rapid implementation of productivity-enhancing structural reforms. Focusing on knowledge investments, it identifies three areas where policy measures could have a substantial effect on productivity.

First, it confirms previous empirical work regarding the importance of the skill composition of the labour force for productivity. It also highlights the negative contribution of the skill composition to growth since the beginning of the previous decade. Though part of this result reflects the temporary effect of reforms aimed at bringing back low-skilled workers into employment, it is also an indication of a more enduring structural trend. This clearly backs the call for better educational attainment and, in particular, the Europe 2020 targets of reducing school drop-out rates below 10% and lifting the share of 30-34-year-olds with third level education to at least 40%.

Second, the analysis also shows quantitatively the importance of innovation capital for growth and highlights the high rate of return on public R&D. Although recent trends in R&D investment have been rather conducive to productivity gains in some euro-area Member States, this is not the case for others where further effort is needed to counteract a trend towards decelerating knowledge investments. It is also important to make sure that ongoing public finance consolidation does not excessively affect public R&D spending as this would weigh on productivity prospects further down the road. Overall, the analysis vindicates the Europe 2020 target of lifting the combined share of public and private investment in R&D and innovation to 3% of EU GDP.

A final finding of the analysis is the important role of cross-border knowledge spillovers. A worrying decline in innovation capital at the world level is weighing on TFP growth in all the euro-area Member States. In some of them, the trend is magnified by a low capacity to absorb cross-border spillovers. Further work is needed to better understand the determinants of the absorption capacity for technology and to design policy measures that could enhance it. In any

([19]) The results for the US are not representative for the total sample of countries for which results are currently available. Results similar to those for Germany, in terms of closely tracking the official trend TFP estimates, have been found in a significant number of the sample countries.

event, strong knowledge spillovers, combined with a declining trend in the accumulation of innovation capital worldwide, support the case for concerted international coordination in this area, both at the European and the world levels. Efforts to boost the stock of knowledge in a country would bring higher returns in terms of growth if matched by similar efforts in other countries.

Overall, the analysis shows that policies aimed at fostering knowledge investment and technology absorption should be an important part of productivity-enhancing reforms. It is, nevertheless, important to stress that knowledge investment is an important but not the sole driver of productivity. A comprehensive policy package to boost TFP growth should therefore also contain complementary measures aimed at a more efficient use of factor inputs in production processes, including the removal of obstacles to competition, the encouragement of entrepreneurship and enterprise creations and, more generally, the establishment of a more business friendly environment.

II. Special topics on the euro-area economy

The impact of the crisis on household savings in the euro area

This section provides an analysis of euro-area households' savings behaviour since the onset of the global economic crisis. It concludes that the current level of the saving rate is broadly in line with its fundamental drivers (housing and financial wealth, interest rates, etc.) although the dynamics of savings since the crisis also seem to have been affected by temporary precautionary motives related to fluctuations in confidence. Asset price developments between the onset of the crisis and summer 2011 have not been a major cause of a rise in savings in the euro area. This is explained by the comparatively small weight of equity in total household assets and the positive effect of falls in house prices on consumption via the 'down-payment channel'. Looking forward, however, the risks of an increase in savings are significant. Recent falls in equity prices are likely to push up savings. More restrictive lending practices by banks could also affect savings via more difficult access to both consumer credit and, more significantly, mortgages (down-payment channel). Finally, recent losses in consumer confidence could also pave the way for a temporary rise in precautionary savings.

Accounting for inflation dynamics in the euro area

Consumer price developments over the course of 2011 have displayed considerable volatility and surprised on the upside. This section assesses the contributing factors to this year's consumer price inflation, examining in particular the major role that energy and other commodity prices have played in driving inflation. Despite global GDP growth momentum fading since early 2011, commodity prices have declined only moderately and the pass through to consumer prices is still ongoing. In addition, headline and core inflation in 2011 were driven by unusually strong seasonal variations for clothing and footwear products, reflecting the temporary effect of a methodological change concerning the compilation of the HICP statistics in several Member States. Looking forward, labour cost developments and recent signals from survey- and market-based inflation expectations show that underlying inflation pressures remain contained. Taking into account weak economic growth and the diminishing impact of high commodity prices, headline inflation is expected to return to below 2% in the euro area in 2012 and 2013.

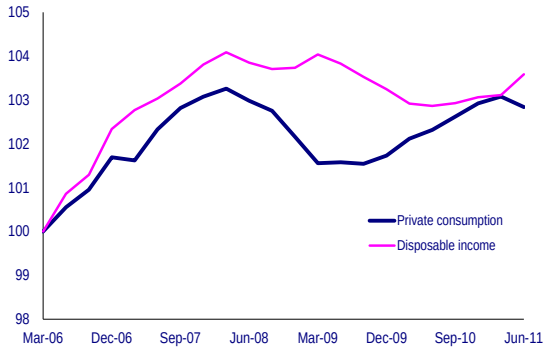
How vulnerable are emerging market economies to the slowdown in advanced economies?

This section assesses the vulnerability of emerging market economies (EME) to the ongoing slowdown in advanced economies. Even though EME have proved resilient during the 2008-09 recession, evidence so far suggests that GDP growth tends to be increasingly correlated globally. As a result, a major downturn or an outright recession in advanced countries is likely to have a detrimental impact on growth in emerging market economies, although the negative effect is likely to be partly cushioned by emerging economies' high trend growth. Business cycle spillovers may occur via various propagation mechanisms, of which international trade linkages amplified by global vertical specialisation is the most obvious. International financial linkages constitute an additional contagion channel, for example through the high correlation of global stock markets or the exposure of US and European banks to emerging market economies. Emerging markets' reliance on banks of advanced economies remains relatively high although its degree varies with the regions concerned and is primarily high for a few Asian countries and Eastern Europe. Finally, confidence spillovers are increasingly seen as a further potential source of contagion which particularly applies to business sentiment.

II.1. The impact of the crisis on household savings in the euro area

Private consumption has been a major source of weakness in the recovery from the global economic and financial crisis. Since the cyclical trough in the second quarter of 2009, euro-area real consumption has increased by a cumulated 1.2%, compared with 3.8% for GDP. The significantly slower rate of expansion than in previous recoveries is attributable to sluggish growth in real disposable income (Graph II.1.1) rather than to adverse changes in the saving rate. Developments in households' saving rate have actually been supportive of spending since the trough of the recession in 2009Q2. After an abrupt increase of more than 1.5 pp in the early stages of the recession, the euro-area saving rate has fallen back progressively with the recovery, reaching pre-crisis levels at the end of 2010 before rising again somewhat during the first half of 2011 (latest available data) (see Graph II.1.2).

Graph II.1.1: **Household private consumption and disposable income, euro area (index 2006Q1= 100, 2006Q1-2011Q2)**



Source: Commission services.

These developments are at odds with the expected negative effects of sharp falls in asset prices on household consumption via wealth effects. Despite some gains with the recovery, equity prices in the euro area were still about 25% below their pre-crisis peak in the second quarter of 2011 (i.e. at the time of the latest available saving rate data). House prices have, on average, been more resilient to the crisis, incurring more limited losses during the recession and recovering moderately afterwards with an overall loss relative to the pre-crisis peak of about 1% in the second quarter of 2011. Their near stagnation over the past three years should, however, be seen against a trend of continuous rises in house prices in pre-crisis years with average annual gains of about 6% since the late 1990s.

Against this background, the present section sets out to better understand recent developments in the euro-area saving rate, trying to disentangle the effects of changes in fundamentals (mostly wealth) from other possible factors such as precautionary savings.

Graph II.1.2: **Household saving rate, euro area (% of disp. income, 2005Q1-2011Q2) (1)**

(1) Saving rate as used in the model in Box II.1.1. Calculated as 1 minus the ratio of household consumption to disposable income.
Source: Commission services.

Recent cyclical swings in savings can partly be explained by fundamentals

The analysis presented hereafter is based on an estimated model of household savings and mortgage decisions (see Box for details). ([20]) The model relates euro-area household mortgage and savings decisions to a limited set of fundamental determinants. It captures quite well trends in the euro-area saving rate since the 1980s.

The model makes it possible to identify a 'down-payment channel'. This channel postulates a positive (negative) link between house prices and savings (private consumption). It is directly related to the existence of constraints on mortgage borrowing. In most parts of the euro area, banks lend less than the full value of a housing acquisition (technically, loan-to-value ratios are below 1) in order to cover risks of cyclical changes in house prices and the costs of foreclosure. As a result, first-time buyers (together with owners who want to acquire a property of higher value) need to set money aside to cover the part of their acquisition that is not covered by the mortgage (i.e. the down-payment).

([20]) See Quarterly Report on the Euro Area, Vol. 8, No 3, 2009. A more detailed presentation of the model is also available in: Balta, N. and E. Ruscher (2011), 'Household savings and mortgage decisions: the role of the "down-payment channel" in the euro area', European Economy, Economic Papers, No 445 (September).

Box II.1.1: **A model of household savings and mortgage decisions in the euro area**

This box presents an update of an estimated model of household savings and mortgage decisions presented in an earlier issue of the Quarterly Report on the Euro Area. ([1]) The model relates euro-area savings and mortgage debt (as ratios of households' gross disposable income) to their respective medium-term determinants in a system of two co-integrating relations estimated in a VEC model with seven variables. All variables are in logarithms except for the two interest rates (in %) and inflation (in %). Net housing wealth is defined as housing wealth minus mortgage loans. Net financial wealth is defined as financial wealth minus non-mortgage credit. Data cover the period 1980Q4-2011Q2.

Elasticities of the co-integrating equations (1):

	Savings equation		Mortgage equation
	I	**I bis**	**II**
Savings/Disposable income	1.00	1.00	-
Mortgages/ Disposable income	0.33		1.00
Mortgages/Net housing wealth		0.33	
Net financial wealth/Disp. income	0.72	0.72	-
Net housing wealth/Disp. income	-0.25	+0.08	-0.65
Short-term real interest rate	-	-	3.70
Long-term real interest rate	4.89	4.89	8.68
Inflation	3.58	3.58	6.94
Constant	-6.56	-6.56	-0.48

(1)The variables are all non-stationary. The Johansen approach was used to test for the number of co-integrating relations and to estimate the equations. Over-identifying restrictions were tested, LR test for binding restrictions (rank=2), chi-square (7) =7.39.
All estimated coefficients are significant at 1%.
Sources: Commission services and ECB data.

The medium-term savings equation (I)

Net financial wealth comes out as the main determinant of the savings ratio in the medium-term in the euro area. A 1% increase in net financial wealth as a share of gross disposable income leads to a decrease of about 0.7% in the savings ratio (a drop of about 0.1 pp given its current level), boosting consumption by about 0.1%.

The net housing wealth ratio has an overall positive effect on the saving rate (i.e. an increase in housing wealth pushes savings). This apparently paradoxical effect (estimated consumption equations usually come up with negative or zero effect) can be explained by the co-existence of two channels via which housing wealth impacts savings. Equation I can be reinterpreted (Equation I bis) so as to allow the identification of i) a small but significant housing wealth effect, captured by the ratio of net housing wealth to disposable income, combined with ii) a credit-constraint effect ("down-payment channel") captured by the ratio of mortgages to net housing wealth. This ratio can be interpreted as a de-facto "loan-to-value ratio", capturing the extent to which the credit-constrained households need to save in the euro area in order to pay for the share of the acquired property value not covered by the mortgage. In the reinterpreted equation the estimated coefficients are as follows: (1) a 1% increase in the ratio of mortgage to net housing wealth will decrease the savings ratio by 0.33%; (2) a 1% increase in the net housing wealth leads to a 0.08% decrease in the savings ratio (i.e. 0.33*log(Mortgages/Disp. income) - 0.25*log(Net housing wealth/ Disp. income) = 0.33*log(Mortgages/Net housing wealth) +0.08*log(Net housing wealth/Disp. income). This shows a small traditional housing wealth effect from an increase in housing wealth at the level of the euro area. An interesting feature of the model is that it shows that a rise in houses pushes the savings of euro-area households down via the traditional housing wealth effect but the fall is more than offset by the down-payment channel (i.e. higher house prices force credit-constrained households to save more in order to cover a more expensive down-payment). Overall, **increases in house prices in the euro area tend to be associated with rises in household's saving rate**.

([1]) See Quarterly Report on the Euro Area, Vol. 8, No 3, 2009. A more detailed presentation of the model is also available in: Balta, N. and E. Ruscher (2011), 'Household savings and mortgage decisions: the role of the "down-payment channel" in the euro area', European Economy, Economic Papers, No 445 (September).

(Continued on the next page)

Box (continued)

The medium-term mortgage equation (II)

The medium-term determinants of mortgages as percentage of gross disposable income have been found to be the net housing wealth as percentage of gross disposable income, the short-term real interest rate, the long-term real interest rate and inflation. In the medium-term, 1% increase in net housing wealth increases mortgages by about 0.65%, showing the extent of the collateral effect of net housing wealth on mortgages. The interest rates and inflation variables have the expected signs. A 1pp increases in the short-term real interest rate and the long-term real interest rate decreases the mortgage ratio by about 4% and 9% respectively. This shows that long-term interest rates are playing a bigger role in the euro area in accordance with the euro-area mortgage markets where fixed-interest-rate contracts dominate. A 1pp increase in inflation decreases the mortgage ratio by about 7%.

An increase in house prices raises the value of the down-payment and thereby encourages property buyers to set more money aside, i.e. to increase their savings and reduce their consumption. The down-payment channel and the traditional housing wealth channel operate in opposite directions. In the case of the down-payment channel, an increase in house prices entails an increase in household savings, whereas in the case of the wealth channel it entails a drop in savings.

A surprising result of the model is that, in the euro area, estimates suggest that *the down-payment channel more than offsets the traditional housing wealth effect, leading to an overall positive relationship between house prices and savings*.

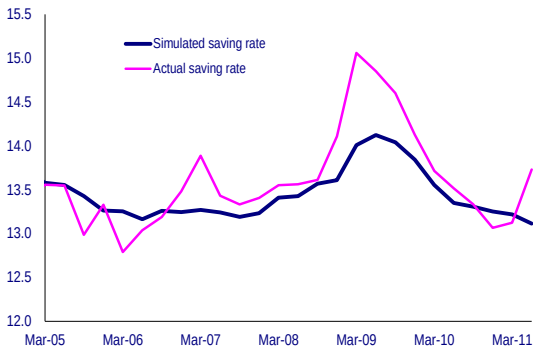
According to the model, pre-crisis trends in the euro-area saving rate can largely be explained by a combination of changes in financial wealth and the down-payment channel. A simultaneous increase in financial wealth and relaxation of credit constraints (i.e. lower down-payments) explain most of the substantial fall in the euro-area saving rate in the 1990s. During the pre-crisis years of the 2000s, developments in both variables were less supportive, with rapid rises in housing prices offsetting the effect of looser credit constraints and progress in financial wealth hampered by the bursting of the dotcom bubble. As a result, the saving rate fluctuated without showing a clear trend over that period.

Turning to the impact of the crisis, Graph II.1.3 displays the actual euro-area savings ratio alongside its simulated value according to the model. Two observations stand out.

First, the crisis has not entailed changes in the fundamental drivers of savings that are sufficiently large and lasting to bring about a protracted increase in the saving rate. In the second quarter of 2011, the saving rate implied by the model was actually clearly below its pre-crisis level.

Second, the model can explain the pattern of fluctuations in savings during the recession and the recovery, with an increase during the recession followed by a return to pre-crisis levels during the recovery. However, fluctuations appear more muted for the simulated saving rate than for the actual one, suggesting that fundamentals cannot fully account for the dynamics of the saving rate during the cycle.

Graph II.1.3: **Euro-area saving rate, simulated and actual values (in % of disposable income, 2005Q1-2011Q1)**



(1) The simulated value of the saving rate comes from the estimated model presented in Box II.1.1. for explanations. For the actual saving rate see footnote of Graph II.1.2.
Source: Commission services.

The remainder of the section discusses these two observations further.

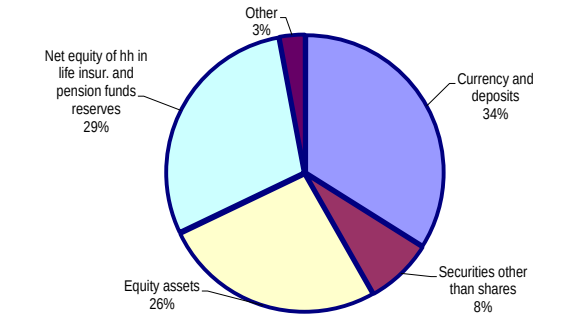
Wealth effects have remained limited since the crisis

Looking more closely into the impact of the fall in asset prices triggered by the crisis, the assessment is more benign than one might expect given the magnitude of the crisis. Overall, the model

suggests that the fall may have actually pushed the saving rate slightly lower. Traditional wealth effects of falls in equity and housing prices have, to some extent, exerted upward pressures on savings during the crisis but the pressures have remained small and have been offset by other factors, including the down-payment channel, which has operated in the opposite direction.

This conclusion may be surprising in the light of the overall large losses in equity markets registered over the period 2007Q4-2011Q2. It is, however, important to put equities in the broader context of households' total financial asset holdings, which also include deposits, bonds and holdings in life insurance and pension fund reserves. Equities actually amount to only a quarter of households' total financial asset holdings, with deposits or equity holdings in life insurance and pension fund reserves being of a comparable or higher importance (Graph II.1.4).

Graph II.1.4: **Composition of household financial assets, euro area (in %, average 2006Q3-2011Q2)**



Source: Commission services.

Price fluctuations in the non-equity asset categories are either limited or little correlated to equity prices. Consequently, even large falls in equity prices tend to have only a moderate impact on households' overall financial wealth. This is illustrated in Graph II.1.5, which displays valuation effects on households' holdings of total assets and equity assets. ([21]) In the second quarter of 2011, households had lost about 20% on the value of their equity holdings but only 6% on the value of their overall financial assets.

When assessing trends in household wealth, an additional dimension to bear in mind is that changes in household asset holdings reflect changes in prices but also asset acquisition. Since the onset of the crisis euro-area households have continued to accumulate financial assets, although at a lower pace than in pre-crisis years and while reducing their exposure to equity.

Graph II.1.5: **Valuation effects on household assets, euro area (index 2005Q1=100, 2005Q1-20011Q2)**

(1) Valuation effects are estimated from the financial balance sheet and financial transaction data of National Accounts. Changes in asset holdings are decomposed into a transaction component and a residual valuation component.
Source: European Commission.

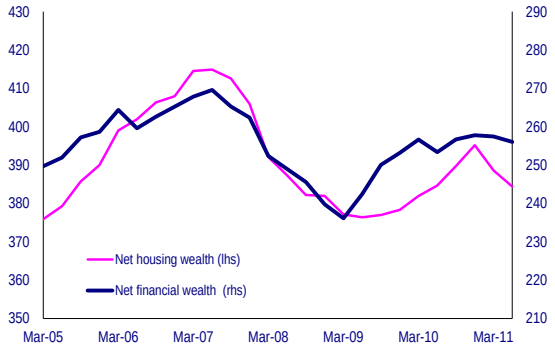
As shown in Graph II.1.6, the ratio of households' net financial wealth (defined as financial wealth minus the stock of consumer credit) to disposable income dropped during the recession but has since recovered significantly and in 2011Q2 was less than 5 pp below its pre-crisis peak. This implies only moderate negative financial wealth effects on consumption over the period. This limited effect is explained by the relatively low share of equity in households' wealth as well as the continuous accumulation of financial assets since the crisis.

Turning to households' net housing wealth (as defined by housing wealth minus mortgage debt), the impact of the recession has been relatively similar to what has been observed for financial assets. The ratio of net housing wealth to disposable income dropped as a result of the recession but has since partly recovered though at a more muted pace than net financial wealth. In the first half of 2011, the ratio fell back somewhat and was about 7 pp below its pre-crisis peak. This suggests a moderate upward push of the savings ratio due to traditional housing wealth effects since the onset of the crisis. Nevertheless, the estimated model of savings also shows that the easing of house prices brought about by the crisis has entailed a de facto easing of credit constraints

([21]) Valuation effects are calculated by deducting asset acquisitions from changes in the stock of assets. They measure the change in asset holdings that is attributable to changes in asset prices.

on mortgages ([22]) (down-payment channel) that has more than offset this upward push. Taking into account these opposing forces, developments in housing wealth since the onset of the crisis have led to a modest decrease in households' saving rate.

Graph II.1.6: **Household net financial and net housing assets, euro area (% of disposable income, 2005Q1-20011Q2)**



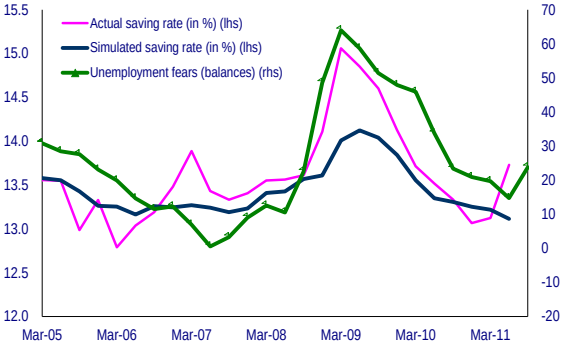
Source: Commission services, ECB.

Precautionary motives have probably also played a role

Whereas the estimated model of savings suggests that fundamentals such as wealth can explain the currently low level of the saving rate, it fails to fully track the swings of the savings ratio during the recession and the recovery. This suggests that the rapid increase in the saving rate during the recession and its similarly rapid decline in the recovery were not only driven by changes in the fundamental determinants of savings. As the phase of rapid increase in savings roughly corresponds to the contraction phase of the GDP cycle, it could be partly related to precautionary motives. In line with this interpretation is the fact that the swings in the saving rate during the crisis are, to some extent, correlated with some indicators of consumer confidence. This is illustrated in Graph II.1.7, which displays the actual saving rate and the simulated saving rate presented in Graph II.1.3 together with a measure of consumers' fears of unemployment.

The temporary rise in precautionary savings in 2008-09 probably reflects households' increased uncertainty about the economic outlook and deteriorating personal income prospects. It might also be an indication of their rising concerns about the sustainability of sovereign debt in the euro area and an anticipation of future hikes in taxes and cuts in government transfers. However, such Ricardian effects, if confirmed, would have been only temporary, as indicated by the return of the saving rate to the level dictated by wealth fundamentals in the second quarter of 2011.

Graph II.1.7: **Household saving rate and unemployment fears, euro area (2005Q1-20011Q2) (1)**



(1) The simulated and actual saving rates are the same as in Graph II.1.3. Unemployment fears come from the Commission consumer survey (question on unemployment prospects over next 12 months).
Source: Commission services.

Looking forward, the risks of an increase in savings remain significant

Looking ahead, the risks of an increase in households' saving rate, with depressing consequences for private consumption, remain significant for the second half of 2011 and the first quarters of 2012. Possible upward pressures on savings could come from three sources.

First, since the second quarter of 2011 (the most recent quarter covered in the analysis presented above) equity markets have again registered sharp losses, with prices 15-20% lower at the beginning of December than their average value in the second quarter. On the basis of the model used here, such a drop, if persistent, would push up the saving rate by close to half a percentage point (taking into account the relatively low share of equity in households' financial assets).

Second, because of the down-payment channel, recent developments in house prices through the crisis have been rather supportive of consumption. However, the existence of such a down-payment channel also implies downside risks to consumption related to credit constraints on mortgages. Because of this channel, the links between private consumption and credit constraints is far stronger than what could be assumed on the basis of the low importance of

([22]) For a given loan-to-value ratio, a fall in house prices means that a household will have to bring less cash (i.e. draw less on its savings) to acquire a given property.

consumer credit in the euro area. ([23]) Tighter credit constraints weigh on consumption not only directly via more restricted access to consumer credit but also, indirectly, via constraints on access to mortgages and the related need to save to acquire a house. Hence, if banks were to adopt more conservative mortgage lending practices, for example by raising loan-to-value ratios, negative implications for household spending would not be limited to housing investment but would also involve consumption.

Third, the crisis has also shown that, when faced with significant economic uncertainty, households may raise their savings above what is normally justified by changes in fundamentals such as wealth. The substantial fall in consumer confidence since the summer suggests that this precautionary motive might again be governing households' purchasing plans at the current juncture.

Finally, the necessary consolidation of public finances over the coming years may affect households' savings via Ricardian effects, although such effects appear so far to have been either small or temporary.

([23]) In the euro area, the stock of outstanding mortgages is more than five times bigger than the stock of outstanding consumer credit.

II.2. Accounting for inflation dynamics in the euro area

Introduction

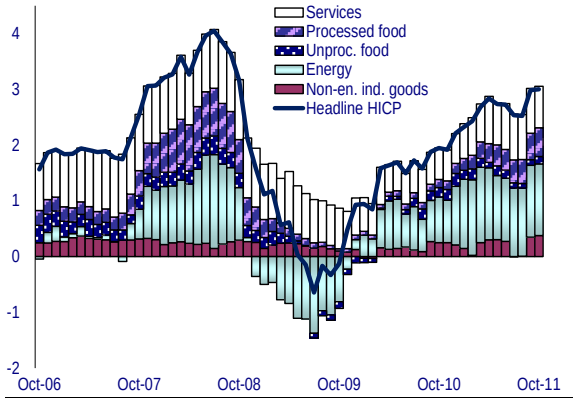
Consumer price developments over the course of 2011 have displayed considerable volatility and surprised on the upside. This special topic therefore aims to assess the contributing factors to this year's consumer price inflation. It examines in particular the role that energy and other commodity prices have played in driving inflation. This section also reviews the effect of methodological changes to the measurement of the harmonised consumer price index (HICP), takes a look at labour cost developments and examines recent signals from survey- and market-based inflation expectations. Finally, the latest inflation outlook from the European Commission's autumn 2011 forecast is presented.

Inflation developments in the euro area

Despite the overall weak growth performance, the annual headline inflation rate in the euro area stood at 3.0% in October 2011, unchanged from September and at the highest level since October 2008. HICP inflation in the euro area rose in the second quarter of 2011 to 2.7% from 2.5% in the first. Over the course of the year a number of idiosyncratic factors stood out in the euro area's inflation path: a 0.2 pp decrease in the July headline figure was due to unusual price developments for seasonal products, which were also largely responsible for the bounce-back in the headline figure in September. As such, prices of seasonal items have been affected by a methodological change concerning the treatment of seasonal products (see Box II.2.1). ([24]) On the other hand, indirect taxation changes had a small positive impact on inflation over this period. ([25])

As shown in Graph II.2.1, energy price movements have accounted for a large portion of HICP inflation since late 2007, and have also driven the change in overall inflation. Annual energy inflation accelerated to 12.4% in October 2011, having dipped to 10.8% in June from a peak of 13.1% in February. Sharp price rises for Brent crude in 2011Q1 have driven this surge in energy inflation. Since increasing sharply between December 2010 and March 2011, oil prices have hovered around 80 euros per barrel. Brent remained 33% more expensive in euro terms in the period from May to October 2011 compared to the same period in 2010.

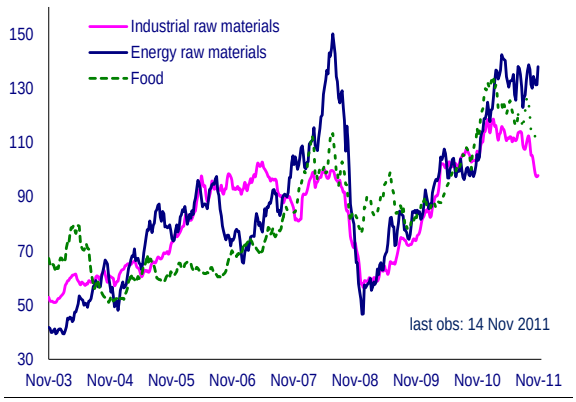
Graph II.2.1: **HICP inflation and contributions, euro area (% y-o-y, Oct 2006-Oct 2011)**



Source: Eurostat.

Geopolitical tensions in the Middle East and North Africa and changes in economic growth prospects contributed to these oil price developments. Arguably, the recent oil price shock since the end of 2010 can be considered more severe for the euro area than the one in 2007-08, due to its more protracted nature. ([26]) As Graph II.2.2 illustrates, other commodities prices followed a similar price pattern to oil until April, but have followed a declining trend since.

Graph II.2.2: **Commodities prices, euro area (HWWI indices, 2010=100, Nov. 2003-Nov. 2011)**



Source: Reuters EcoWin.

([24]) The estimated impact of this methodological change on the annual headline figure is 0.2 pp in July and August, but zero in June and September.

([25]) Assuming full and immediate pass-through of tax changes, the impact on the headline figure fell in August by 0.2 pp (from 0.3 in July to 0.1 pp) and remained unchanged in September.

([26]) For a detailed analysis of oil price developments in early 2011 and their impact on euro-area inflation differences, see European Commission (2011), 'Inflation developments in the euro area', Quarterly Report on the Euro Area, Vol. 10, No 1.

Box II.2.1: **The impact of the new treatment of seasonal items in the HICP**

A change in the treatment of seasonal items in the HICP basket entered into force in all EU Member States in January 2011. ([1]) It has led to significant one-off fluctuations in the inflation rate in the euro-area aggregate (up to 0.2 pp). At the level of individual Member States, this volatility has been much higher in some cases (up to -1.1 pp in Greece and -0.9 pp in Italy or +0.7 pp in Slovenia). In most other Member States the impact has been minimal.

In spite of their inherent volatility, seasonal products should be included in the HICP basket, but their correct price measurement requires special treatment. The new Regulation targets only 'strongly' seasonal items, which are available only part of the year. 'Weakly' seasonal items, which are available all year but at seasonally fluctuating prices and quantities, can also cause 'statistical fog' (in month-to-month and index figures) in the analysis of headline inflation.

The new standards for the treatment of seasonal items cover those goods and services that are not available, or purchased in small or negligible volumes, for certain periods in a typical annual cycle. Climate, traditions and institutional arrangements are the main causes of seasonal unavailability. Typically, these products can be found in the following COICOP ([2]) classes: fish, fruit, vegetables, clothing and footwear, which carry a combined weight of 10.5% in the euro-area HICP. Strongly seasonal goods may also appear in other categories such as sports equipment, recreational services or package holidays, as the list of seasonal products is not uniform across countries.

The aim of the new Regulation is to harmonise the statistical treatment of such items by restricting the choice of calculation methods, thereby delivering sufficiently comparable results at the level of all-items HICP. It allows two broad calculation methods to be applied, namely the strict annual weights method and the class-confined seasonal weights method. ([3])

The *strict annual weights method* applies the same expenditure weights for seasonal products in all months using imputed prices in the out-of season months. Within this method, prices of seasonal products that are in season can be used to estimate the index for out-of-season products (counter-seasonal estimation), or else the index of out-of-season products can be estimated using price developments of all available products in the whole COICOP class or a sub-category of it (all-seasonal estimation).

The *class-confined seasonal weights method* changes weights in various months according to the consumption pattern found in the base period for products that are out of season. The total weight of the COICOP class or group is constant throughout the year, allowing for zero weights for products that are out of season.

Overall, there is no entirely satisfactory way of dealing with seasonal items, particularly when estimating the monthly or quarterly HICP. The strict annual weights approach relies on potentially imprecise imputation of missing prices and its annual fixed weights will not be representative of monthly consumption patterns. However, its advantage is its ease of implementation and preservation of the annual basket methodology.

Alternatively, attaching a zero weight to the missing product classes complicates month-to-month comparisons and is conceptually inconsistent with a fixed basket index. In addition, the seasonal weights are determined by past consumption patterns, so that abnormal seasonal fluctuations are not taken into account. On the plus side, however, this approach respects changing seasonal consumption patterns and the reality of household spending, as well as reducing the need for price imputation.

Ultimately, both methods face the implementation challenge of accurately identifying seasonal items in the basket and carefully pre-defining the length of the seasonal cycle. This is not an easy task as the seasonal availability of products may vary between regions and seasons might change with weather conditions from one year to another.

In most euro-area Member States, the Regulation did not bring about major changes and had thus little impact on headline inflation. Only in Spain, Greece, Italy, Luxembourg and Portugal were the methods previously used

1 See Commission Regulation (EC) No 330/2009 of 22 April 2009.

2 COICOP signifies 'Classification of Individual Consumption According to Purpose' and is a reference classification published by the United Nations Statistics Division. In the case of the HICP used in the European Union, it comprises 127 positions at the first four levels and around 900 positions when adding a fifth and a sixth digit.

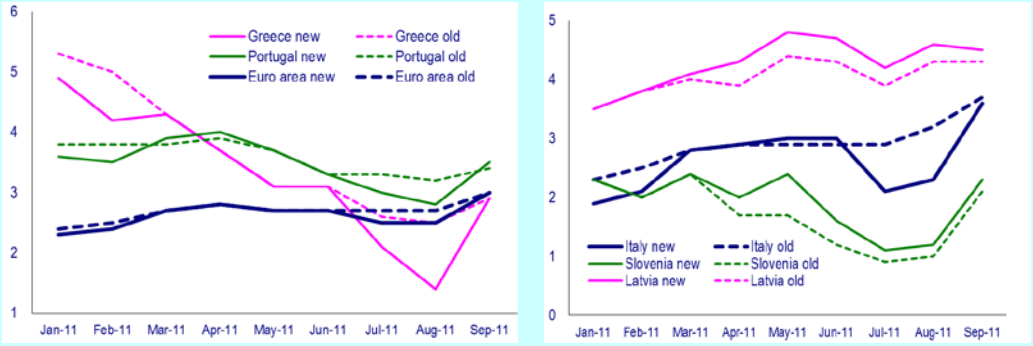
3 See Eurostat, Implementation of Commission Regulation (EC) No 330/2009 on the treatment of seasonal products — Information note and impacts on the HICP 2011; latest update: 16 November 2011.

(Continued on the next page)

Box (continued)

significantly different. In terms of timing, only Spain has revised HICP data for the year preceding implementation (i.e. 2010). Spain's annual average inflation rate for 2010 was adjusted from 1.8% to 2.0%, with large counteracting effects across different months of the year. In 2011 the impact has been largest in Greece, Italy, Portugal, Slovenia and (outside the euro area) Latvia (see Graph). The distortion of the annual HICP inflation rate in the euro area has been limited so far, although about 0.2 pp of the 0.5 pp increase in headline inflation in September 2011 can be explained by the impact of the new treatment of seasonal items (which had lowered the headline inflation rate in July and August, but had no impact in September). While for the rest of the year the changes in seasonal patterns make it more challenging to assess inflation changes, it is expected that the overall impact on the annual average HICP for 2011 will be minor.

Impact of seasonal items measurement on annual HICP inflation in selected EU Member States (in pp, Jan 2011-Sept 2011)



Given the freedom in the choice of the various methods for varying classes and due to deviations in the implementation date in some Member States, the ensuing volatility has temporarily impaired the comparability and transparency of annual HICP data. However, the methodological change affects annual inflation rates only during the year of implementation. While month-to-month volatility may increase, year-on-year changes can be expected to return to a relatively normal pattern as of 2012.

Among non-oil commodities, broad-based and sharp price rises have been visible in recent years, but especially since late 2010, due to a combination of demand pressures and weather-related declines in agricultural production in different parts of the world. Steep price rises during late 2010 and early 2011 only started receding for most major non-oil commodities in autumn, bringing their year-on-year inflation down to zero or negative territory in November 2011. Earlier price rises up to March 2011 saw wheat prices double in price compared to twelve months earlier. For industrial metals, year-on-year price increases in January and February ranged from +15 % for zinc to over 40 % for copper and nickel. China's role in these developments stands out as a significant factor in this surge via increased demand and production cutbacks (in the case of aluminium). Steel prices also soared in the first quarter following major floods in Australia.

At the same time, precious metals prices have also recently reached new peaks, in many cases driven by safe haven purchases against the background of concerns about the a possible economic downturn. Since the start of 2010 gold prices have been rising at annual rates of around 25%, all the way up to November 2011, and silver prices have risen even more steeply.

While upstream price pressures have intensified (although only temporarily in some cases), core inflation, which excludes the most volatile price components (i.e. energy and unprocessed food) and provides an approximate measure of underlying price dynamics, has so far remained moderate. Core inflation remained at 2.0% in October, thus remaining at the highest rate since December 2008. The pick-up in core inflation observed since August 2011 stems mainly from seasonal goods and partly from changes in taxation (see Box II.2.1).

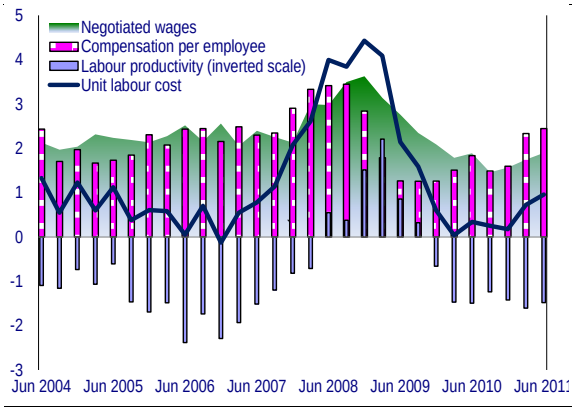
Looking ahead, core inflation is subject to diverging forces. On the one hand, the indirect impact of past commodity price increases - still visible in producer prices - may continue to feed through to consumer price inflation. Recent experience suggests that broad-based commodity rallies take between three and five quarters to

show up in core inflation. ([27]) Given that year-on-year commodity price inflation has only receded to broadly neutral territory in autumn, resulting indirect price pressures for core inflation may therefore persist until at least mid-2012. On the other hand, while second-round effects on general wages and prices might in principle also occur, weak economic activity in the medium term should greatly limit this risk.

Unit labour costs reveal no material threat to price stability

Up to mid-2011 labour market conditions in the euro area stabilised and signs of a tentative recovery in labour markets became visible. Employment growth was marginally positive in the last quarter of 2010 and in the first half of 2011. Despite some improvement in economic activity and employment, the unemployment rate has remained stubbornly high over recent months. The seasonally-adjusted unemployment rate has remained around 10% — i.e. close to the highest level since the launch of the euro (10.2% reached in April 2010) — since the end of 2009. This compares with an unemployment rate of 7.4% in the first half of 2008.

Graph II.2.3: **Labour cost and productivity, euro area (y-o-y changes in %, 2004Q2-2011Q2)**



Source: Eurostat.

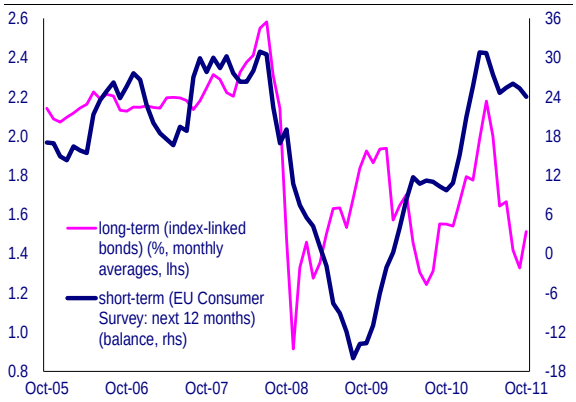
The slowing of the economic recovery in the second and third quarters of 2011 and the highly uncertain economic climate are broadly keeping wage increases in check in the euro area. Graph II.2.3 reflects this in key metrics of labour cost developments. After bottoming out at 1.5% in the third quarter of 2010 (the lowest rate since the euro's introduction), the annual rate of growth in negotiated wages in the euro area began to increase incrementally, reaching 1.9% in the second quarter of 2011. Despite the upward trend, negotiated wage growth has still remained below its average rate since 1999 (2.4%).

Year-on-year growth in compensation per employee also gradually picked up to 2.5% in the second quarter of 2011, from 1.3% in the last quarter of 2009. Since labour productivity growth reached 1.5% in the second quarter, unit labour cost growth accelerated to 1%, thus still remaining below the average of 1.5% since 1999. Going forward, labour cost pressures are likely to remain contained in the medium term in the light of continued slack on the labour market and a weak growth outlook.

Inflation expectations defy recent volatility

Various indicators of inflation expectations point towards inflation subsiding over the medium term from its currently high level. While the spike in inflation since late 2010 is contemporaneously visible in all expectation measures considered, longer-term expectations have almost entirely settled back to moderate levels. As shown in Graph II.2.4, consumer surveys by the European Commission suggest that in the near term households on balance still expect significant price rises over the coming 12-month period. But with the depicted positive balance reading for short-term expectations having eased from its March 2011 peak, the surge in inflation may be starting to fade from consumers' minds.

Graph II.2.4: **Inflation expectations, euro area (balances in %, Oct 2005-Oct 2011)**



Source: European Commission.

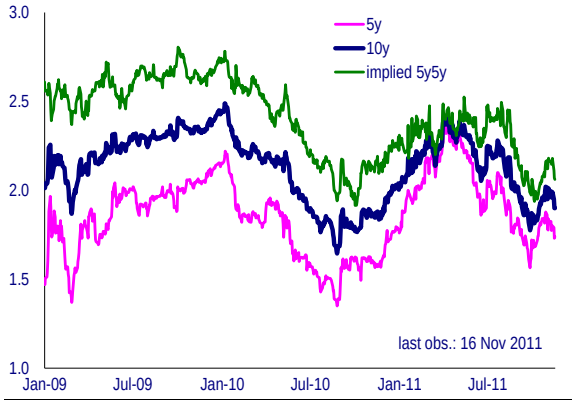
Evidence from inflation swaps points to a decline in longer-term inflation expectations. ([28]) The

([27]) Source: Commission calculations using Eurostat and Goldman Sachs Commodity Index (GSCI) data

([28]) As inflation swaps are unaffected by differential liquidity conditions in nominal and real bond markets or by flight-to-liquidity flows, they arguably provide more robust signals than those derived from inflation-linked bonds.

rates of zero-coupon inflation swaps, which provide a market-based measure of inflation expectations at different horizons, have all trended downward since April 2011, notwithstanding an uptick in October. As shown in Graph II.2.5, breakeven inflation rates across a range of maturities have trended downwards since mid-August. At implied inflation rates of around 1¾-2% in mid-November, these rates remain at a level consistent with price stability. This confirms the solid anchoring of inflation expectations in the euro area over the medium term.

Graph II.2.5: **Euro-area inflation swap rates (%, Jan 2009-Nov 2011)**



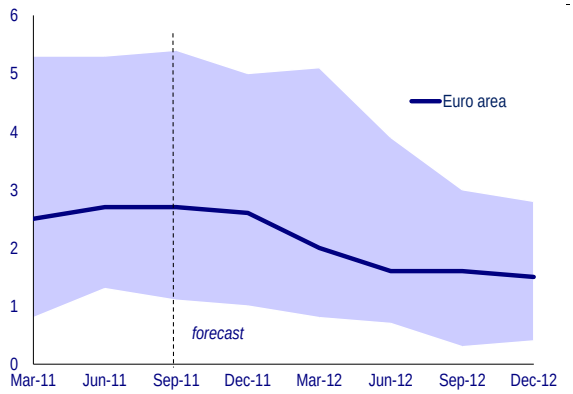
Source: EcoWin

Inflation outlook appears benign despite risks

The Commission's autumn 2011 forecast, released on 10 November, projects an annual euro-area inflation rate of 2.6% in 2011. Financial market tensions within the euro area intensified over the summer while global growth slowed down, driving down prospects for a sustained recovery of domestic demand. This should ease upward pressure on euro-area inflation over the coming months, when higher commodity prices will still be feeding through and indirect taxation will also likely have some upward effect. In addition, the recorded headline inflation rate may be lowered by base effects all the way until May 2012 (except in January).

Looking further ahead, the economic slowdown and persistent labour market weaknesses in several euro-area Member States are likely to put downward pressure on annual inflation, which is expected to fall to 1.7% in 2012. In particular, wages are not expected to fully catch up with the higher-than-previously-expected inflation of 2011, not least in view of the high unemployment. Additionally, weak demand conditions will limit firms' ability to pass on higher commodity prices to consumers, instead leaving them to absorb part of the shock in their profit margins.

Graph II.2.6: **Euro-area HICP inflation (% y-o-y, Mar 2011-Dec 2012) (1)**



(1) Shaded area represents the maximum-minimum range of euro-area Member States.
Source: European Commission

Base effects are projected to temporarily raise inflation between May and July 2012, but the overall rate is expected to follow a declining trend in 2012, falling below 2% from the second quarter on. The ongoing fiscal consolidation may increase headline inflation through indirect tax rises and administered prices, though the risk of second-round effects appears low. As the recovery in 2013 is forecast to remain moderate, HICP inflation is expected to remain low at 1.6% that year.

The risks around the inflation outlook appear broadly balanced and relate mainly to the uncertainty concerning economic growth and commodity price developments. Rising commodity prices, in tandem with potential further decoupling of emerging market economies from advanced countries or a weakening exchange rate, could put pressure on import prices and thereby on inflation, even if growth is anaemic in the euro area. Moreover, in the past few years commodity prices have shown a swift upward response whenever the global economic situation has started to improve. The key downside risk to the inflation outlook relates to lower-than-expected growth, which could further dampen price pressures amid weak demand and labour market conditions.

Conclusion

Inflation in the euro area has risen markedly in 2011 due to higher energy prices and signs of a strengthening economic recovery in the early part of the year. Despite the growth momentum fading

since, commodity prices — particularly oil prices — declined only moderately and the pass-through to consumer prices is still ongoing. Furthermore, both headline and core inflation were driven by unusually strong seasonal variations for clothing and footwear products, reflecting the temporary effect of a methodological change concerning the compilation of the HICP statistics in several Member States.

The slowing pace of economic recovery and the uncertain growth outlook are keeping wage increases in the euro area in check. Going forward, labour cost pressures are likely to remain contained in the medium term in the light of continued slack on the labour market. Meanwhile, inflation expectations remain firmly anchored at levels consistent with price stability, and both market-based and survey-based indicators of short-term and long-term inflation expectations have been trending lower since the spring. Headline inflation is expected to return to below 2 % in the euro area in 2012 and 2013, taking into account weak economic growth and the diminishing impact of high commodity prices. The risks around the inflation outlook appear broadly balanced and relate mainly to the uncertainty concerning economic growth and commodity price developments.

II.3. How vulnerable are emerging market economies to the slowdown in advanced economies?

Introduction

Although emerging market economies are now much more integrated into global trade and capital markets than in the past, they have proved more resilient during the Great Recession of 2008-09 than in previous recessionary periods. With the notable exception of the CIS countries and some Eastern European Member States, the emerging world, in particular Asia and Latin America, was apparently better able to cope with the repercussions of the trade collapse and the deep slump in advanced countries triggered by the Lehman meltdown in September 2008. At first glance, this seems to contradict the persistent trend of increasing globalisation: rising interdependence in the world economy would suggest closer co-movement of economic activity across regions and countries. Similarly, the two-speed recovery of the global economy since 2009 seems to have lent new support to the decoupling hypothesis which postulates that emerging market economies have become less dependent on advanced economies as export markets or creditors.

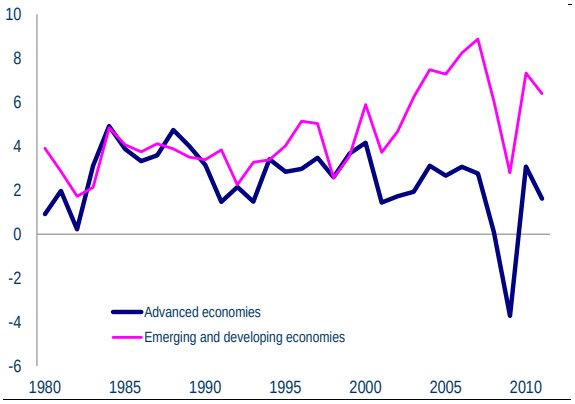
Decoupling is not just a theoretical issue: it may also have a major impact on the dynamics of global growth in the imminent future. With the global economy losing steam and the recovery in Europe put on hold what are the prospects for emerging market economies? To what extent will emerging market economies manage to shield themselves from the downturn in advanced economies?

This section attempts to shed some light on the revived decoupling debate with a particular focus on emerging markets economies' reaction vis-à-vis the expected downturn in advanced economies. In this regard, several transmission mechanisms are identified for the cross-border propagation of shocks. The most obvious ones are (1) through international trade and (2) via financial linkages related to the exposure to foreign banks, holdings of foreign assets and stock market contagion. However, during the Great Recession the world economy might also have been subject to a global confidence shock. For that reason, (3) spill-over effects of confidence indicators are also scrutinised. The rest of the section discusses each transmission channel in more detail.

Decoupling or (re)coupling?

Since the end of the 1990s, real GDP growth rates in emerging markets have become much more correlated with those in advanced economies. During the same period, however, GDP growth in the emerging world has exhibited a substantial upward level shift, which suggests markedly higher trend growth (Graph II.3.1). This is likely to be due to an underlying catching-up process and the implied shift of capital and labour from low-productivity to high-productivity sectors. Furthermore, some large emerging market economies, notably China and Brazil, appear to act increasingly as independent sources of global growth. ([29])

Graph II.3.1: **Real GDP growth, advanced and emerging economies (annual changes in %, 1980-2011) (1)**



(1) Country aggregation according to IMF definitions (WEO).
Source: IMF.

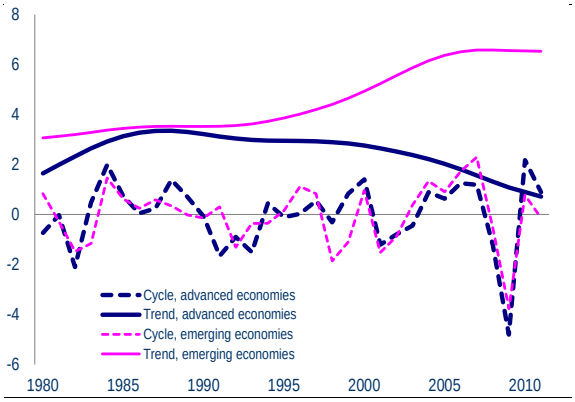
Regarding the recession of 2008-09, it is noteworthy that real GDP strongly co-moved in advanced and emerging markets and that the latter had to bear similar output losses when compared to potential output. In contrast to previous global recessionary periods however, emerging markets now appear to better absorb shocks from the rich world. This is associated with the implementation of improved macroeconomic policy frameworks and the strengthening of financial institutions in response to the debt and financial crises in the 1980s and 1990s. The scope thus obtained for anti-cyclical fiscal and monetary policy has been used to cushion the impact of the recession and thus sustain economic activity. Looking ahead, sound macroeconomic policies together with structural shifts and the still prevalent convergence gap might continue to shift growth

([29]) On the other hand, emerging markets geographically close to the rich world, for example Mexico or Eastern Europe, are still rather dependent on their developed neighbours.

drivers in emerging market economies further to consumption and investment.

One way to reconcile the opposing trends of rising global integration and increased regional resilience is therefore to distinguish between long-term shifts and cyclical co-movements. ([30]) The claim that activity in advanced and emerging economies substantially co-move is corroborated by decomposing GDP growth rates into cyclical and trend components using a Hodrick-Prescott filter (Graph II.3.2). Based on this methodology, long-term trend decoupling coincides with increasing short-term cyclical co-movement. This dichotomy is especially pronounced since the mid-1990s. ([31])

Graph II.3.2: **Trend versus cyclical decoupling, advanced and emerging economies (1980-2011) (1)**



(1) Cycle and trend components of annual GDP growth rates are estimated using a Hodrick-Prescott (H-P) filter (lambda=100). Trends are expressed in annual growth rates (in %) and cycles in % of trend.
Source: IMF, Commission calculations.

In a recent study, Yetman (2011) finds that business cycles strongly co-move during recessions, but are rather uncorrelated in non-recession periods. ([32]) In light of these results and referring to the current economic situation, a major recession in the US or in Europe would likely entail a slowdown in emerging economies. These suggestions are supported by a similar investigation by Imbs (2010) based on monthly industrial production data. ([33])

Using a dynamic factor model with 106 countries and annual data for 1960-2008, Kose et al. (2010) make a cautious case for decoupling. ([34]) They find some indication of business cycle convergence starting in the mid-1980s within industrial countries and emerging markets, but also divergence between these two groups. Although the authors identify a common factor (e.g. related to oil price shocks) in international business cycle fluctuations, the group-specific factor seems to have gained relative importance over the sample period. The predominance of regional factors over a global factor is also suggested by an IMF study based on a similar methodology. ([35]) According to the IMF, the increasing importance of regional factors from the mid-1980s onward is associated with the intensification of regional trade and financial linkages. However, both studies do not include the 2008-09 recession and might rather point to long-term trend divergence between advanced and emerging economies than short-term decoupling.

Overall, even though emerging market economies proved rather resilient during the last recession and recovered quickly afterwards, there is little empirical evidence so far suggesting a general business cycle decoupling. However, it is true that emerging market economies have featured higher trend growth rates than their more advanced trading partners and are likely to outpace their developed economy counterparts in the future. These diverging trends notwithstanding, GDP growth tends to be increasingly correlated globally, with co-movement particularly pronounced in recessionary periods. Thus, a major downturn or an outright recession in advanced countries is likely to have a detrimental impact on growth in emerging market economies. The underlying business cycle spillovers might occur through various propagation channels which are examined in the next section.

Cross-border transmission channels

Openness to trade and finance are well-established globalisation indicators and are likely

([30]) Canuto, O. (2010), 'Recoupling or switchover: Developing countries in the global economy', in: Canuto, O. and M. Giugale (eds.), *The day after tomorrow: A handbook on the future of economic policy in the developing world*, World Bank, 2010, p. 31-49.
([31]) A word of warning is in order when applying mechanical filters to identify permanent and cyclical components of time series. Apart from the well-known endpoint sample problem, a major drawback (not only) of the HP filter is that it may introduce spurious cyclicality into the irregular component of a series.
([32]) Yetman, J. (2011), 'Exporting recessions: International links and the business cycle', *Economics Letters*, Vol. 110, No 1, pp 12-14.
([33]) Imbs, J. (2010), 'The first global recession in decades', *IMF Economic Review*, Vol. 58, No. 2, pp. 327-354.
([34]) Kose, M. A., C. Otrok and E. Prasad (2010), 'Global business cycles: convergence or decoupling?', manuscript, revised version of *NBER Working Paper* No 14929, 2008.
([35]) IMF (2007), 'Decoupling the train? Spillovers and cycles in the global economy', *World Economic Outlook*, April 2007, pp 139-144.

to facilitate business cycle transmission between countries. ([36]) Additionally, cross-border confidence spill-overs have progressively come to be regarded as channels for the propagation of shocks from advanced to emerging market economies.

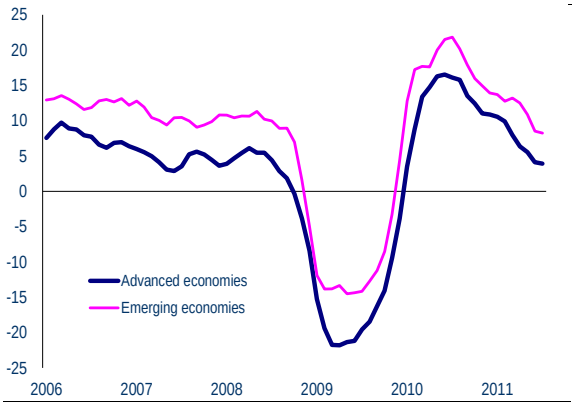
Trade relations

In 2010, emerging and developing economies accounted for almost 50% of world GDP and well over a third of world exports. From a theoretical point of view, increasing international trade can lead to business cycles that either converge or diverge across countries. On the one hand, a positive demand shock in one country may spill over to trading partners via increasing demand for exports, resulting in strong correlation between trade relations and economic activity across countries. On the other hand, increasing trade integration may induce greater specialisation of production across countries that eventually brings about less synchronised business cycles.

Turning to the empirics, integration of emerging markets into the world economy and the internationalisation of supply chains have led to increasing trade between the rich and the emerging world. ([37]) The 2008-09 recession has only briefly interrupted this trend. Overall, trade dynamics have been highly synchronised in recent years. Against this backdrop, a slowdown of growth in advanced economies is likely to impact significantly on emerging markets' exports (Graph II.3.3).

An important factor in the propagation of shocks is the internationalisation of production processes. In practice, global supply chains and vertical specialisation – i.e. the break-up of production into multiple stages across different countries – tend to amplify the impact of GDP fluctuations on international trade (*bullwhip effect*). ([38]) Given that exports and imports are recorded as gross flows, while GDP is measured in terms of value added, an initially small decline in GDP can cause a disproportionately high drop in trade, in both final and intermediate goods. Recent empirical evidence suggests that tight cross-border supply chain linkages reinforce the transmission of business fluctuations between countries. ([39])

Graph II.3.3: **Export growth, advanced and emerging economies (y-o-y changes in %, Jan 2006-Jul 2011)**



Source: CPB, Commission calculations.

Turning to particular emerging market economies, East Asia and Central and Eastern Europe appear exceedingly vulnerable to a slowdown in industrial output in advanced economies given for example their large clusters of subcontractors in the production of semiconductors and car components respectively. Therefore, business cycle co-movement is likely to depend on the specific structure of production and the degree of intra-industry trade. ([40])

As regards commodity-producing countries, mostly located in the emerging world, economic activity is closely related to commodity prices. Thus, these economies might be subject to negative terms-of-trade effects resulting from downward pressure on commodity prices due to the slowdown in advanced economies. However, commodity price movements may affect fuel exporters and non-energy producers differently depending on the relative size of commodity exports and imports. ([41]) Keeping this

([36]) Artis, M. and T. Okubo (2009), 'Globalization and business cycle transmission', *North American Journal of Economics and Finance*, Vol. 20, No 2, pp. 91-99.

([37]) The consequences of cross-border vertical integration have been demonstrated for instance by the supply shortages linked to the Tōhoku earthquake in Japan in March 2011.

([38]) This effect derives its name from the larger and larger swings in inventory further and further back in the supply chain in response to changes in demand for a final product. Since these amplifying oscillations are reminiscent of a cracking whip, it became known as the 'bullwhip effect'.

([39]) Arkolakis, C. and A. Ramanarayanan (2009), 'Vertical specialization and international business cycle synchronization', *Globalization and Monetary Policy Institute Working Paper*, 21, Federal Reserve Bank of Dallas; Artis, M. and T. Okubo (2011), 'Does international trade really lead to business cycle synchronization? A panel data approach', Discussion Paper, DP2011-05, Research Institute for Economics and Business Administration, Kobe University, 2011.

([40]) Calderón, C., A. Chong and E. Stein (2007), 'Trade intensity and business cycle synchronization: Are developing countries any different?', *Journal of International Economics*, Vol. 71, No. 1, pp 2-21.

([41]) Spatafora, N. and I. Tytell (2009), 'Commodity terms of trade: The history of booms and busts', *IMF Working Paper* 09/205, September.

qualification in mind, the overall impact of terms-of-trade effects on the economy crucially depends on exchange rate behaviour. For example, a real depreciation might dampen the potentially contractionary effect of terms-of-trade decreases resulting from a commodity slump.

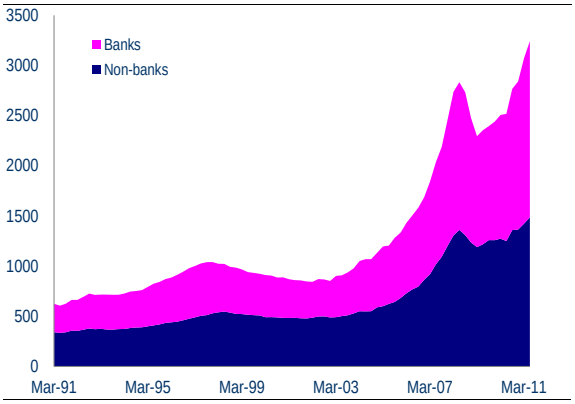
Generally, the gradual shift toward higher exchange rate flexibility in several emerging markets after the Asian crisis was conducive to price competiveness during the last recession and thus supported exports during the subsequent recovery. ([42]) Following this line of reasoning, rather than having decoupled from their advanced counterparts emerging market economies seem to have become relatively more flexible, a change that facilitates the absorption of shocks.

Financial linkages

As the global financial crisis has clearly demonstrated, financial linkages through stock and credit markets or via the banking system can amplify the propagation of shocks. Already during the financial crisis in 1997/98, the Western banks' precipitous retreat from emerging Asian economies highlighted the potentially devastating effects of short-term borrowing, especially in foreign currency. At first sight, these bank linkages should be even stronger now than in the late 1990s. According to the Bank of International Settlements (BIS), foreign bank claims on emerging market economies surged in the second half of the 2000s, fell briefly during the 2008-09 recession but have recovered since (Graph II.3.4). In the second quarter of 2011, they exceeded their level of mid-2008 by 14.5% and reached USD 3242 bn, with claims on emerging market banks accounting for 54% of total foreign lending.

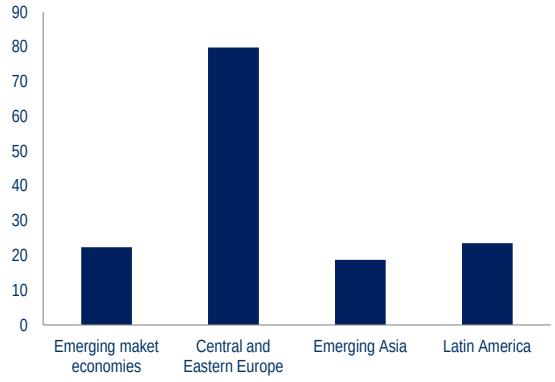
Based on the BIS consolidated banking statistics which additionally account for the exposure of banks' foreign affiliates and net out inter-office positions, international banks' adjusted claims to emerging markets (excluding offshore centres) were USD 5615 bn in June 2011 or 22.4% of emerging market economies' GDP (Graph II.3.5). Emerging economies' exposure to banks from advanced economies should, however, be interpreted with caution as it hides important regional disparities.

Graph II.3.4: **Cross-border bank claims on emerging market economies (bn USD, 1991Q1-2011Q2)**



(1) Excluding off-shore financial centres (e.g. Hong Kong and Singapore) to avoid double counting, as much of what banks lend to these financial centres is on-lent to other economies.
Source: BIS.

Graph II.3.5: **Cross-border bank claims on emerging market economies (in % of GDP, June 2011)**



(1) Cross-border bank claims on an immediate borrower basis.
Source: BIS, IMF; Commission calculations.

Having learnt the lessons from the Asian crisis in the late 1990s, several countries in the region have reduced their dependence on short-term bank lending, and they have thus become less prone to sudden capital outflows. An additional step taken by some was the adoption of more flexible exchange-rate regimes which has limited the risk of currency crises. ([43])

The stock of gross cross-border claims in 2011-Q2 amounts to 43% of the aggregate foreign exchange reserves of emerging economies. However, a large share of reserves is held by China and the oil-exporting countries in the Middle East. Emerging market economies with

([42]) However, foreign exchange interventions and exchange rate management are still prevalent in Asian emerging markets; see Rajan, R. S. (2010), 'The evolution and impact of exchange rate regimes', *ADB Economics Working Paper*, 208, July 2010 (revised January 2011).

([43]) IMF (2010), *World Economic Outlook*, October 2010, p. 13-15.

lower exchange reserves, not least those which have already abolished financial account restrictions, might be more exposed to balance-of-payment and exchange-rate crises if international banks retreat precipitously than average figures suggest. These risks are exacerbated by the still limited role of domestic-currency debt in the funding of external liabilities. This is particularly true in times of global liquidity constraints and high risk aversion. For example, the US dollar shortage resulting from a withdrawal of US dollar money funds from bank-issued paper in the wake of the Lehman collapse induced massive capital outflows in terms of a cutback in US dollar cross-border bank claims and local currencies, particularly in emerging Asia, plummeted accordingly. ([44])

Even though cross-border lending to emerging Asia has surged since late 2009, Central and Eastern European Member States appear to be the most vulnerable to a retrenchment of banks due to their much bigger exposure (Graph II.3.5). ([45]) Alongside a few Asian countries such as Malaysia ([46]), Taiwan, Thailand and Vietnam, Eastern European countries have by far the highest ratios of international bank claims to GDP. Especially non-euro area Member States with large shares of foreign-currency-denominated loans are at risk, given that domestic monetary authorities' ability to provide liquidity in foreign currency to the domestic banking sector is quite limited.

There is some evidence that international banks are reconsidering their presence in emerging markets, especially in Eastern Europe. ([47]) Despite European Banks' declared long-term commitment by European banks to Eastern Europe, as substantiated in the 'Vienna Initiative', ([48]) a strategic reorientation is also ongoing vis-à-vis this region. With banks freezing new lending, these countries are increasingly vulnerable to a credit crunch. This development is to a large part attributable to banks' current and extensive funding problems in a context of persistent tensions in euro-area sovereign debt markets. Policy uncertainty in some Eastern European countries with respect to a bank levy or the treatment of foreign currency loans was also not very helpful. High loan-to-deposit ratios and the net liability position of the banking sector in many Eastern European countries have already prompted several national regulators to require banks to curb new lending in these markets if it is not locally funded. ([49]) For Eastern Europe where about three quarters of the domestic banking system is controlled by banks mostly from Western Europe these prospects are particularly worrisome. ([50])

Large net capital inflows do not only expose countries to the risk of a sudden curb on lending and a credit crunch, but tend also to limit the margin for monetary policy when economies are overheating. Given the low interest rates and high liquidity provision in advanced countries capital flows have increasingly been channelled to emerging market economies. The resulting abundant supply of capital might fuel a credit bubble which eventually feeds real estate booms, as witnessed in China and India. Overall, many emerging market economies show clear signs of overheating which requires a more contractionary policy stance. However, the necessary monetary tightening would eventually result in even larger inflows. Admittedly, the ongoing global slowdown is likely to mitigate this policy conflict and support the cyclical cooling-off in emerging markets.

Turning to net capital exports, several emerging market economies have become large creditors as witnessed by the accumulation of foreign exchange reserves and solid net foreign asset positions with an average ratio of net foreign assets to GDP of about 30%. ([51]) The net foreign asset position is determined by current account transactions (trade balance channel) but also subject to asset price fluctuations (valuation

([44]) McGuire, P. and G. von Peter (2009), 'The US dollar shortage in global banking', *BIS Quarterly Review*, March, pp 47-63; Deutsche Bank Global Markets Research (2011), 'Money, credit and prices in Asia', *Global Economic Perspectives*, 3 November 2011.

([45]) European Commission (2011), 'European Economic Forecast – Autumn 2011', *European Economy*, Vol. 6, 2011, pp. 26-27.

([46]) Malaysian figures tend to be inflated by the offshore business in Labuan.

([47]) Jenkins, P. (2011), 'Eastern Europe has most to fear from banks' retreat', *Financial Times*, 14 November 2011; The Economist (2011), 'The euro crisis and emerging markets. Drought warning', 12 November 2011.

([48]) European Commission (2011), 'European Bank Coordination Vienna Initiative moves to meet new challenges', *ECFIN press release*, 18 March 2011.

([49]) Österreichische Nationalbank (2011), 'FMA und OeNB erarbeiten Maßnahmenpaket zur Stärkung der Nachhaltigkeit der Geschäftsmodelle österreichischer Banken', *Presse-aussendung*, 21.11.2011.

([50]) The fact that European banks must comply by mid-2012 with the new targets for capital ratios set by the European Banking Authority (EBA) might add to the pressure, at least in the short term.

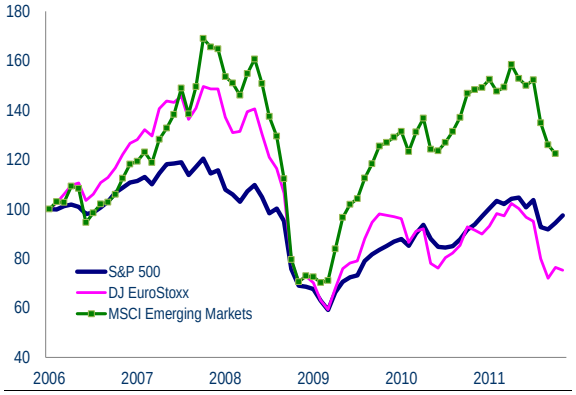
([51]) According to World Bank data, the net foreign asset position of China (including Hong Kong) amounts to 63% of GDP in 2010. Saudi Arabia and Singapore even have ratios of around 100%.

channel). ([52]) Facing a downturn in advanced economies, emerging market economies might thus not only be affected by lower exports but might also see a depreciation of their asset holdings abroad via exchange rate reactions and declining bond and share prices. The resulting negative wealth effects can be substantial. ([53])

An additional financial transmission channel is associated with global equity market declines which could weigh on private consumption and investment spending via negative wealth effects and a higher cost of capital. In practice, asset price declines in advanced economies might trigger sell-offs of emerging market assets by advanced-country investors.

Stock market movements in advanced and emerging economies have been highly correlated but have tended to diverge since the beginning of the global recovery in spring 2009 (Graph II.3.6). ([54]) Moreover, Granger causality tests can help to identify the predominant direction of causation. The tests indicate that the causation runs from advanced economies to emerging markets (Table II.3.1). The results point to both the US and the euro-area stock market as the driving forces behind equity price movements in emerging Asia, Latin America or Eastern Europe.

Graph II.3.6: **Co-movements of global stock market indices (Jan 2006=100, Jan 2006-oct 2011)**



Source: EcoWin, DataInsight.

Remarkably, these findings do not change substantially for the 2008-09 recession period or for the subsequent recovery. In all three periods, US and euro-area markets show strong evidence of Granger-causing emerging stock markets. These one-way connections suggest in turn that a recession-induced stock market slump in advanced economies might have significant negative effects on the world economy as a whole.

Table II.3.1: **Causality test on advanced and emerging market stock market indices**

		Jan 2006 - Jul 2007	Aug 2007 - Mar 2009	Apr 2009 - Oct 2011
US does not Granger cause emerging markets		0.0000 (reject)	0.0000 (reject)	0.0000 (reject)
Emerging markets do not Granger cause US		0.3502	0.1834	0.4596
Euro area does not Granger cause emerging markets		0.0013 (reject)	0.0384 (reject)	0.0960
Emerging markets do not Granger cause euro area		0.4099	0.1941	0.8077
Contemporaneous correlation	*US vs EM*	0.95	0.97	0.60
	EA vs EM	0.95	0.99	0.70

(1) p-values for the periods shown using daily data.
Source: EcoWin, DataInsight, Commission calculations

However, the integration of emerging market economies into global financial markets still seems to be uneven. According to a recent study based on an international capital asset pricing model, emerging financial markets overall still remain rather segmented from global markets and local risk premiums explain more than 50% of the total risk premium. ([55]) Latin America is found to be the relatively most integrated region in the global economy while, for example, emerging Asia lags behind. This latter result could be explained by the large weight of China, whose financial sector is still rather closed and where transaction volumes are relatively small.

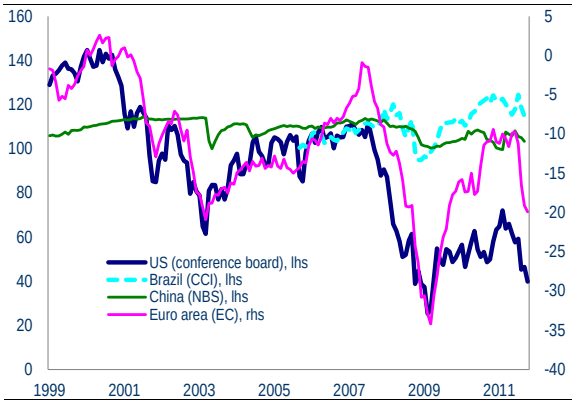
Confidence spillovers

Alongside the interactions or real and financial linkages, the co-movement of consumer confidence and business sentiment is also a non-negligible transmission channel of business cycle fluctuations. For example, US and euro-area consumer confidence indicators have been closely correlated over the last decade (Graph II.3.7) with a corresponding correlation coefficient of 0.86 for the period up to July 2007 and of 0.78 for the

([52]) Lane, P. and G. M. Milesi-Ferretti (2005), 'A global perspective on external positions', *IMF Working Paper*, No. 05/161, 2005.
([53]) Tille, C. (2008), 'Financial integration and the wealth effect of exchange rate fluctuations', *Journal of International Economics*, Vol. 75, No. 2, pp 283-294.
([54]) At this stage, the usual caveat applies that correlation is not causality. For example, consumer confidence in both advanced and emerging economies could just be hit by the same global shock.
([55]) Guesmi, K. and D. K. Nguyen (2011), 'How strong is the global integration of emerging market regions? An empirical assessment', *Economic Modelling*, 28, 2011, p. 2517-2527.

period thereafter. Turning to emerging markets, available data suggest that the extent of co-movement between consumer confidence in Brazil and China and in advanced economies has been increasing in recent years, but is still lower than among advanced countries.

Graph II.3.7: **Consumer confidence in selected advanced and emerging economies (balances in %, Jan 99-Oct 2011)**



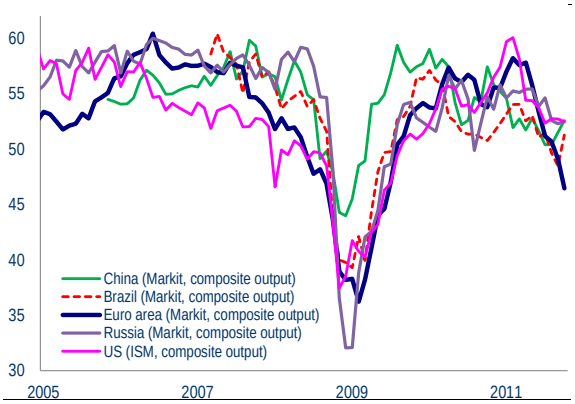
Source: EcoWin.

Unlike consumer confidence, business sentiment and most notably purchasing manager indices (PMIs) in emerging markets tend to be markedly correlated with their counterparts from advanced economies. This is likely to be related to the prominence of cross-border supply chains in global industrial production. When comparing US and euro-area PMIs with those from Brazil, Russia and China, the correlation appears to have increased since the onset of the financial crisis. However, activity in the euro area has been hit remarkably harder than in emerging markets or the US most recently.

Results from Granger causality tests between US and euro-area PMIs and the respective indices of the three emerging market countries indicate that industrial activity in advanced countries influences sentiment developments in emerging market and vice versa. In practice, the euro area PMI Granger-caused respective PMIs in Russia and China, with causation in the latter case also running in the opposite direction. Furthermore, there is evidence that US PMI Granger-caused its Brazilian and Russian counterparts but not the Chinese PMI index. Test suggests that causality is running from China to the US but not vice versa. ([56])

([56]) Results have to be interpreted with caution given the small sample size.

Graph II.3.8: **Purchasing manager indices (PMI) in advanced and emerging economies (Jan 2005-Oct2011) (1)**



(1) The ISM composite index is the weighted average of the ISM manufacturing index and the ISM non-manufacturing index, weighted by value added by industry.
Source: EcoWin, Commission calculations.

Concluding remarks

As the advanced world is heading for a severe downturn, emerging market economies, which account for about half of global output, have still been growing relatively robustly. This has led some observers to suggest that emerging economies have successfully decoupled from the rich world and that a recession in the US or Europe may not have the same devastating impact on the world economy as in the past. While it is true that emerging market economies has featured higher trend growth rates and might continue to outpace their developed economy counterparts due to a successful catching-up process, the empirical evidence presented in this section rejects to a large extent the hypothesis of a general cyclical decoupling. On the contrary, business cycle co-movements tend to have increased during the last decades and appear to be most pronounced during recessionary periods.

In this regard, emerging market economies continue to be vulnerable to a deep recession in advanced countries, which will directly impinge on world trade, whose immediate drop is further multiplied by the high degree of global vertical integration. International financial linkages constitute an additional contagion channel, for example through the high correlation of global stock markets or the exposure of US and European banks to emerging market economies. Emerging economies' reliance on banks from advanced economies remains relatively high although its degree varies with the regions concerned and is primarily high for a few Asian countries and Eastern Europe. The latter are

particularly at risk if European banks were to reduce their exposure in the region as part of their efforts to improve capital ratios. Finally, confidence spill-overs are increasingly seen as a further potential source of contagion which particularly applies to business sentiment.

Although being partly protected by stronger trend growth emerging market economies are likely to be affected by a downturn in advanced economies. Should the current slowdown in advanced economies prove more persistent than expected or even turn into an outright recession, emerging market economies will hardly be left unscathed.

III. Recent DG ECFIN publications

III.1. *Occasional Papers*

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 87. October 2011.
The Economic Adjustment Programme for Greece, Fifth review - October 2011
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp87_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 86. September 2011.
The EU's neighbouring economies: coping with new challenges
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp86_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 85. December 2011.
Progress towards meeting the economic criteria for accession: the assessments of the 2011 Progress Reports and Opinion (Serbia)
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp85_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 84. September 2011.
Economic Adjustment Programme for Ireland - Summer 2011 Review
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp84_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 83. September 2011.
The Economic Adjustment Programme for Portugal - First review - Summer 2011
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp83_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 82. July 2011.
The Economic Adjustment Programme for Greece - Fourth Review - Spring 2011
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp82_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 81. July 2011.
2011 Economic and Fiscal Programmes of potential candidate countries: EU Commission's assessment
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp81_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 80. July 2011.
2011 Pre-accession Economic Programmes of candidate countries: EU Commission assessment
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp80_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 79. June 2011.
The Economic Adjustment Programme for Portugal
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp79_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 78. May 2011.
The Economic Adjustment Programme for Ireland - Spring 2011 Review
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp78_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 77. February 2011.
The Economic Adjustment Programme for Greece - Third Review
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp77_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 76. February 2011.
The Economic Adjustment Programme for Ireland
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp76_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 75. February 2011.
Capital flows to converging European economies – from boom to drought and beyond
http://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp75_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 74. December 2010.
Joint Report on Health Systems
http://ec.europa.eu/economy_finance/publications/occasional_paper/2010/pdf/ocp74_en.pdf

EUROPEAN ECONOMY. OCCASIONAL PAPERS. 73. December 2010.
Progress towards meeting the economic criteria for accession: the assessments of the 2010 Progress Reports and the Opinions
http://ec.europa.eu/economy_finance/publications/occasional_paper/2010/pdf/ocp73_en.pdf

III.2. Economic Papers

EUROPEAN ECONOMY. ECONOMIC PAPERS. 446. October 2011
Lourdes Acedo Montoya and Björn Döhring
The improbable renaissance of the Phillips curve: The crisis and the euro area inflation dynamics
http://ec.europa.eu/economy_finance/publications/economic_paper/2011/ecp446_en.htm

EUROPEAN ECONOMY. ECONOMIC PAPERS. 445. September 2011
Narcissa Balta and Eric Ruscher
Household savings and mortgage decisions: the role of the "down-payment channel" in the euro area
http://ec.europa.eu/economy_finance/publications/economic_paper/2011/ecp445_en.htm

EUROPEAN ECONOMY. ECONOMIC PAPERS. 444. July 2011
Ignazio Angeloni, Agnès Bénassy-Quéré, Benjamin Carton, Zsolt Darvas, Christophe Destais, Jean Pisani-Ferry, André Sapir, and Shahin Vallée.
Global currencies for tomorrow: A European perspective
http://ec.europa.eu/economy_finance/publications/economic_paper/2011/pdf/ecp444_en.pdf

EUROPEAN ECONOMY. ECONOMIC PAPERS. 443. July 2011
Lukas Vogel.
Structural reforms and external rebalancing in the euro area: A model-based analysis
http://ec.europa.eu/economy_finance/publications/economic_paper/2011/pdf/ecp443_en.pdf

EUROPEAN ECONOMY. ECONOMIC PAPERS. 442. March 2011
Julia Lendvai, Laurent Moulin and Alessandro Turrini.
From CAB to CAAB? Correcting Indicators of Structural Fiscal Positions for Current Account Imbalances
http://ec.europa.eu/economy_finance/publications/economic_paper/2011/pdf/ecp442_en.pdf

EUROPEAN ECONOMY. ECONOMIC PAPERS. 441. March 2011
Matteo Barigozzi, Antonio M. Conti and Matteo Luciani.
Measuring Euro Area Monetary Policy Transmission in a Structural Dynamic Factor Model
http://ec.europa.eu/economy_finance/publications/economic_paper/2011/pdf/ecp441_en.pdf

EUROPEAN ECONOMY. ECONOMIC PAPERS. 440. March 2011
Paolo A. Pesenti and Jan J.J. Groen.
Commodity prices, commodity currencies, and global economic developments
http://ec.europa.eu/economy_finance/publications/economic_paper/2011/pdf/ecp440_en.pdf

EUROPEAN ECONOMY. ECONOMIC PAPERS. 439. February 2011
Pedro Gomes
Fiscal policy and the labour market: the effects of public sector employment and wages
http://ec.europa.eu/economy_finance/publications/economic_paper/2011/pdf/ecp439_en.pdf

EUROPEAN ECONOMY. ECONOMIC PAPERS. 438. February 2011
Jordi Suriñach, Fabio Manca and Rosina Moreno.
Extension of the Study on the Diffusion of Innovation in the Internal Market
http://ec.europa.eu/economy_finance/publications/economic_paper/2011/pdf/ecp438_en.pdf

EUROPEAN ECONOMY. ECONOMIC PAPERS. 437. February 2011
Ronald Albers and Marga Peeters.
Food and Energy Prices, Government Subsidies and Fiscal Balances in South Mediterranean Countries
http://ec.europa.eu/economy_finance/publications/economic_paper/2011/pdf/ecp437_en.pdf

III.3. Other publications

European economic forecast – autumn 2011
http://ec.europa.eu/economy_finance/publications/european_economy/2011/pdf/ee-2011-6_en.pdf

Tax reforms in EU Member States 2011– October 2011
http://ec.europa.eu/economy_finance/publications/european_economy/2011/pdf/ee-2011-5_en.pdf

The 2012 Ageing Report: Underlying Assumptions and Projection Methodologies – September 2011
http://ec.europa.eu/economy_finance/publications/european_economy/2011/pdf/ee-2011-4_en.pdf

Interim forecast – September 2011
http://ec.europa.eu/economy_finance/articles/eu_economic_situation/pdf/2011/2011-09-interim-forecast-final_en.pdf

European Economic forecast – spring 2011
http://ec.europa.eu/economy_finance/publications/european_economy/2011/pdf/ec-forecast-spring2011.pdf

Labour market developments in Europe, 2011 – spring 2011
http://ec.europa.eu/economy_finance/publications/european_economy/2011/pdf/ee-2011-2_en.pdf

Public finances in EMU – 2011
http://ec.europa.eu/economy_finance/publications/european_economy/2011/pdf/ee-2011-3_en.pdf

Convergence report 2010
http://ec.europa.eu/economy_finance/publications/european_economy/2010/pdf/ee-2010-3_en.pdf

III.4. Regular publications

Business and Consumer Surveys (harmonised surveys for different sectors of the economies in the European Union (EU) and the applicant countries)
http://ec.europa.eu/economy_finance/db_indicators/surveys/index_en.htm

Business Climate Indicator for the euro area (monthly indicator designed to deliver a clear and early assessment of the cyclical situation)
http://ec.europa.eu/economy_finance/publications/cycle_indicators/2011/pdf/3_en.pdf

Key indicators for the euro area (presents the most relevant economic statistics concerning the euro area)
http://ec.europa.eu/economy_finance/db_indicators/key_indicators/documents/key_indicators_en.pdf

Monthly and quarterly notes on the euro-denominated bond markets (looks at the volumes of debt issued, the maturity structures, and the conditions in the market)
http://ec.europa.eu/economy_finance/publications/bond_market/index_en.htm

Price and Cost Competitiveness
http://ec.europa.eu/economy_finance/db_indicators/competitiveness/index_en.htm

Contributors to this issue are:

Focus: The knowledge drivers of total factor productivity	*K. Mc Morrow*
The impact of the crisis on household savings in the euro area	*N. Balta and E. Ruscher*
Accounting for inflation dynamics in the euro area	*A. Breitenfellner and R. Kuenzel*
How vulnerable are emerging market economies to the slowdown in advanced economies?	*M. Sket*
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