OUTPUT GROWTH DIFFERENTIALS IN THE EURO AREA: SOURCES AND IMPLICATIONS

Temporary differences in regional output growth are a normal feature of any monetary union, and thus also of the euro area. Such differences may reflect the existence of "catching-up" economies or natural temporary differences caused by asymmetric shocks. However, persistent differences in output growth may also reflect inappropriate national economic policies or, in general, structural inefficiencies in individual countries and malfunctioning adjustment mechanisms.

Against this background, this article reviews the main stylised facts regarding output growth differentials across the euro area countries and discusses possible underlying factors and the related policy implications. The article is structured as follows: Section 1 provides some factual evidence on output growth differentials across the euro area countries from a historical perspective; Section 2 presents some possible underlying explanations of these growth differentials; Section 3 discusses some policy implications in the context of EMU; and Section 4 draws a number of conclusions.

The analysis presented is subject to a number of caveats. In particular, since no single and comprehensive framework has yet been developed that would allow a fully integrated assessment of the numerous factors behind output growth differentials, the article uses various complementary but not unified approaches.

1 STYLISED FACTS OF OUTPUT GROWTH DIFFERENTIALS ACROSS THE EURO AREA COUNTRIES
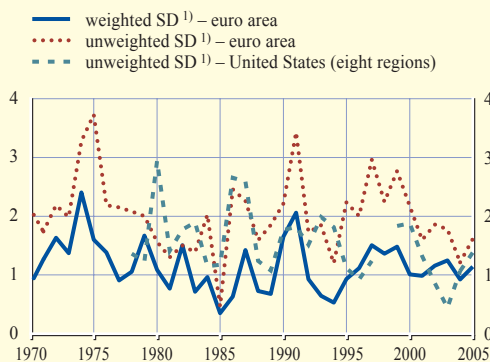
The current degree of differences in output growth across the euro area countries is not large, either by historical standards or by comparison with other benchmark geographical areas.

As can be seen in Chart 1, the dispersion of real GDP growth rates across the euro area countries[1], measured by the standard deviation in unweighted terms, has been fluctuating around a level of 2 percentage points and has shown no apparent upward or downward trend over the past 35 years. The same applies to output growth differentials measured in weighted terms, as the standard deviation of real GDP growth rates has fluctuated around 1 percentage point.[2] Since 1999, the start of Stage Three of EMU, the degree of dispersion in annual average terms has declined somewhat in the 12 euro area countries under review.

Compared with other currency areas, the current degree of output growth dispersion within the euro area, as measured by the standard deviation in unweighted terms, does not appear to be

Chart 1 Dispersion of real GDP growth across the euro area countries

(percentage points)

— weighted SD [1] – euro area
⋯⋯ unweighted SD [1] – euro area
- - - unweighted SD [1] – United States (eight regions)

Source: ECB computations based on European Commission and US Bureau of Economic Analysis (BEA) data.
Notes: Data for Germany refer to West Germany up to 1991. The euro area excludes Slovenia.
There is a statistical break in the US regional data in 1998. For the US states and regions, data refer to gross state product. The eight regions are defined by the BEA and cover the whole country.
1) SD = standard deviation.

1 Owing to the limited availability of data and the fact that it did not belong to the euro area prior to 2007, Slovenia is not included in the analysis.
2 The weighted standard deviation measure takes account of the size of countries in terms of GDP, while the unweighted measure gives equal importance to all countries.

Table 1 Real GDP growth across euro area countries

(percentage changes)

| | 1970-1979 | 1980-1989 | 1990-1998 | 1990-1998 | | 1999-2006 | Latest data | | |
				1990-1994	1995-1998		2004	2005	2006
Euro area	3.6	2.3	2.1	1.9	2.3	2.0	1.7	1.5	2.8
Belgium	3.6	2.2	1.9	1.8	2.2	2.1	2.7	1.5	3.0
Germany	3.2	1.9	2.4	3.0	1.7	1.4	0.8	1.1	2.9
Ireland[1]	4.7	3.1	6.8	4.3	10.0	6.6	4.3	5.5	6.2
Greece	5.5	0.8	1.7	0.8	2.9	4.2	4.7	3.7	3.4
Spain	3.9	2.7	2.5	1.7	3.4	3.7	3.2	3.5	3.9
France	3.8	2.5	1.7	1.3	2.2	2.1	2.0	1.2	2.0
Italy	4.0	2.6	1.4	1.1	1.7	1.3	0.9	0.1	1.9
Luxembourg[1]	2.7	4.6	4.4	4.8	3.8	4.7	3.6	4.0	6.2
Netherlands	3.3	2.0	2.9	2.3	3.7	2.2	2.0	1.5	2.9
Austria	4.2	2.0	2.6	2.7	2.5	2.1	2.3	2.6	3.4
Portugal	5.1	3.4	2.8	1.7	4.2	1.5	1.2	0.4	1.3
Finland	4.1	3.5	1.3	-1.4	4.7	3.3	3.3	3.0	5.5
Unweighted SD[2]	*2.3*	*1.6*	*2.2*	*2.1*	*2.4*	*1.8*	*1.3*	*1.6*	*1.6*
Weighted SD[2]	*1.4*	*0.9*	*1.2*	*1.2*	*1.2*	*1.1*	*0.9*	*1.2*	*0.9*

Sources: European Commission and Eurostat data.
Notes: Data for Germany refer to West Germany up to 1991.
Period averages are computed from European Commission data. Annual averages of the "latest data" are obtained from Eurostat's quarterly national accounts, where preliminary data for the fourth quarter of 2006 are available for most countries.
1) For Ireland and Luxembourg, the 2006 figure is the average of the first three quarters with respect to the same period in 2005.
2) SD = standard deviation.

significantly different from that observed across regions or states within the United States (see Chart 1).[3]

Looking at developments in individual countries, growth rates in Ireland, Greece, Spain, Luxembourg and Finland have persistently been significantly above the euro area average since the mid-1990s, which partly reflects a catching-up process for Greece, Spain and, initially, also for Ireland (see Table 1).[4] By contrast, the performance of Germany and Italy has been persistently lower, in growth terms, than the euro area average since around the mid-1990s. Only more recently, in 2006, has Germany's growth performance matched the euro area average.

In line with this evidence of persistent differentials in real GDP growth across the euro area countries since the beginning of the 1990s, the dispersion of real GDP growth rates across the euro area countries has largely reflected lasting trend growth differences and, to a lesser extent, cyclical differences. This finding is illustrated in Chart 2, which shows the contributions from the cyclical and trend components to overall real GDP growth dispersion.[5] It should be kept in mind that any distinction between trend and cycle is model-dependent and particularly uncertain for the most recent period. However, some results appear to be confirmed by most studies. The breakdown of the variance of real GDP growth since the beginning of the 1990s points to a large decrease in the contribution to dispersion

3 For a comprehensive review of the evidence on output growth differentials, see N. Benalal, J. L. Diaz del Hoyo, B. Pierluigi and N. Vidalis, "Output growth differentials across the euro area countries: some stylised facts", ECB Occasional Paper No 45, 2006.
4 Slovenia has also shown a catching-up process since 1993, outperforming the average of the rest of the euro area countries in terms of output growth. Notwithstanding its relatively strong growth performance, the unweighted measures of dispersion are virtually unaffected by the inclusion of Slovenia in the euro area. For an overall review of the impact of the entry of Slovenia into the euro area, see the article entitled "The enlarged EU and euro area economies" in the January 2007 issue of the Monthly Bulletin.
5 In order to obtain the breakdown of real GDP growth dispersion, the variance rather than the standard deviation needs to be used as the measure of dispersion.

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Chart 2 Contributions to variance of overall real GDP growth across euro area countries [1]

(in unweighted terms)
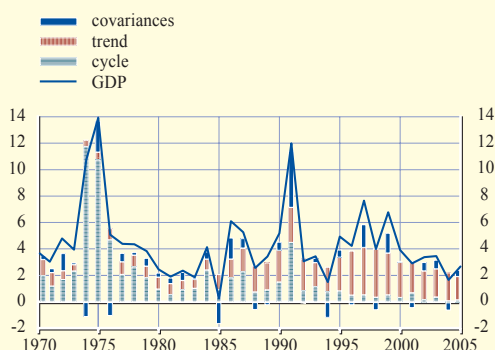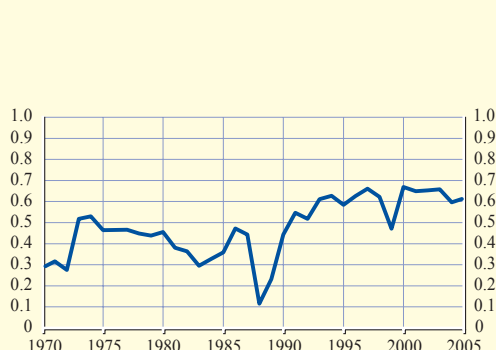
- covariances
- trend
- cycle
- GDP

Source: ECB computations based on European Commission data.
Note: Data for Germany refer to West Germany up to 1991.
1) The trend-cycle decomposition has been obtained by using the Baxter King band pass filter over the period 1960-2008. For the period 2006-08, European Commission forecasts of real GDP have been used.

Chart 3 Average of eight-year rolling correlations of output gap across euro area countries [1), 2)]

(in unweighted terms)

Source: ECB computations based on European Commission data.
Note: Data for Germany refer to West Germany up to 1991.
1) The trend-cycle decomposition has been obtained by using the Baxter King band pass filter over the period 1960-2008. For the period 2006-08, European Commission forecasts of real GDP have been used.
2) Eight-year rolling correlations of pairs of euro area countries were first computed and the unweighted average of these correlations calculated subsequently.

from the cyclical component and, simultaneously, to a large increase in the contribution from trend growth differences. In other words, most of the dispersion can be explained by differences in trend output growth.

In line with the above finding, the degree of synchronisation of business cycles across the euro area countries seems to have increased since the beginning of the 1990s. Chart 3 suggests that the degree of synchronisation is currently at historically high levels. This result holds for various measures of synchronisation. [6]

2 FACTORS EXPLAINING OUTPUT GROWTH DIFFERENTIALS ACROSS THE EURO AREA COUNTRIES

This section reviews some possible explanations for output growth differentials in the euro area. First, it analyses the sources of trend GDP growth differentials, relying mainly upon the growth accounting literature, and relates supply-side differences across countries to

structural and institutional features. Second, it reviews the relevance of shocks and adjustment mechanisms in a currency area. It is important to bear in mind that there is as yet no single and comprehensive framework available, so that conclusions are thus of a more qualitative nature.
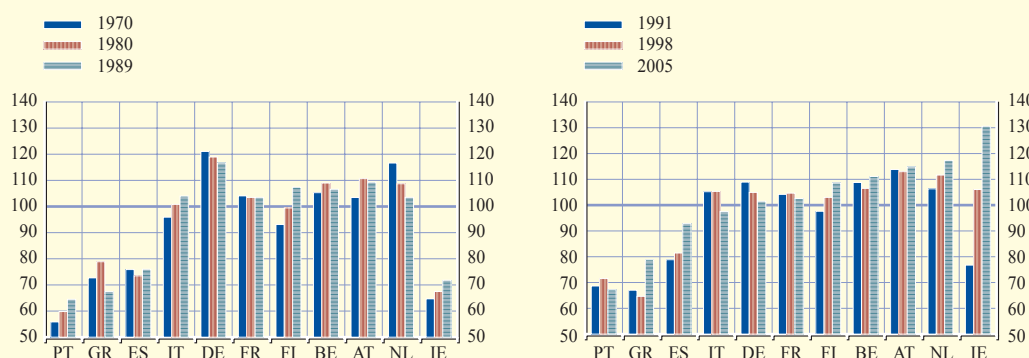
2.1 SOURCES OF TREND GROWTH DIFFERENTIALS

A review of the stylised facts on growth differentials across the euro area countries suggests a key role for differences in trend growth. This section therefore takes a close look at the structural factors that are behind trend growth differentials, by assessing the relevance of initial conditions, i.e. the potential effects of catching-up, and the supply-side factors behind trend output growth differences.

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6   See also D. Giannone and L. Reichlin, "Trends and cycles in the euro area: how much heterogeneity and should we worry about it?", ECB Working Paper No 595, 2006.

(euro area = 100 in each year considered)

- 1970
- 1980
- 1989

- 1991
- 1998
- 2005

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Source: ECB computations based on European Commission data.
Note: Data for Germany refer to West Germany up to 1991.
1) In both charts the countries have been ranked in ascending order for the year 2005. Luxembourg is excluded as per capita GDP computations are distorted by the high number of cross-border workers. Such a computation for Luxembourg would show a per capita GDP in purchasing power standard of close to 230 relative to the euro area average in 2005.

THE RELEVANCE OF INITIAL CONDITIONS

Output growth differentials may partly reflect catching-up processes in lower-income countries. Chart 4 shows the relative level of per capita GDP measured for the euro area countries in purchasing power standard for different years.

The left-hand panel of Chart 4 indicates that among the low-income group of countries of the 1970s – Ireland, Greece, Spain and Portugal – some limited catching-up occurred in Ireland and Portugal during the 1970s and 1980s. However, these four countries were still well below the euro area average in 1989. Ireland, Greece and Spain subsequently made considerable progress, and Ireland has even been able to reach and then substantially overtake the euro area average in recent years (see the right-hand panel of Chart 4). By contrast, per capita GDP in Portugal relative to the euro area average has declined slightly since 2000.

THE ROLE OF SUPPLY-SIDE FACTORS

Looking at the supply side, in the context of a standard growth accounting framework, real output growth can be broken down into changes in hourly labour productivity (real GDP/total hours worked), changes in labour utilisation (total hours worked/population) and changes in the population (see Box 1). Hourly labour productivity growth can be broken down into total factor productivity (TFP) developments – which are usually attributed both to innovation and to technological and organisational improvements – and changes in capital deepening. It is important to stress that the cross-country comparability of such a breakdown suffers from several measurement shortcomings. Moreover, the growth accounting exercise does not reveal causality relationships but only provides an accounting breakdown of growth differentials. Indeed, the components are not necessarily independent of one another (for example, in standard growth theory, the rate of capital deepening depends on the rate of TFP growth).

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Box I

GROWTH ACCOUNTING

This box explains the breakdown of output growth in a standard growth accounting framework and elaborates on some measurement issues.

In formal terms, real GDP growth can be broken down as follows:

$$(1) \quad \Delta(\text{Real GDP}) = \Delta\left(\frac{\text{Real GDP}}{\text{Total hours worked}}\right) + \Delta\left(\frac{\text{Total hours worked}}{\text{Population}}\right) + \Delta\left(\text{Population}\right)$$

where the first term on the right-hand side represents changes in hourly labour productivity and the second term represents changes in labour utilisation. In turn, according to the standard growth accounting literature, hourly labour productivity growth can be broken down as follows:

$$(2) \quad \Delta\left(\frac{\text{Real GDP}}{\text{Total hours worked}}\right) = \Delta(\text{TFP}) + (1-\alpha)\Delta\left(\frac{\text{Capital stock}}{\text{Total hours worked}}\right)$$

where the first term on the right-hand side indicates changes in total factor productivity and the second term represents changes in capital deepening, defined as the ratio of the capital stock to total employment (in hours worked), multiplied by the capital income share $(1-\alpha)$[1].

Despite major harmonisation efforts by international organisations, measurement problems still limit the comparability of growth accounting across countries and over time.

First, caution is required when interpreting differences in hours worked across countries, since data on hours worked are not harmonised and may therefore not be comparable across countries.

Second, the measurement of TFP growth is surrounded by considerable uncertainty, given the difficulties in properly measuring improvements in capital and labour inputs. Measured TFP growth, which is calculated as a residual, does not include only disembodied technological changes, but also some embodied technological changes. Disembodied technological change results from new knowledge, blueprints and network effects, including better management and organisational changes, leading to a genuine improvement in the productivity of all factors of production. Embodied technological change represents improvements in the quality of new vintages of capital. Furthermore, some non-technological factors, such as improvements in the skill composition of the workforce and measurement errors, among others, are likely to be picked up by the residual measuring TFP growth.[2]

1 Equation (2) is derived from a standard Cobb-Douglas production function, where α refers to the labour income share. Furthermore, changes in labour utilisation can be broken down into changes in the age structure of the population, in the labour market performance and in the use of the employed workforce. For the sake of simplicity, this further breakdown is not shown.
2 Using the concept of capital services (as used in the databases of the Groningen Growth and Development Centre (GGDC) and the OECD) instead of net capital stocks (as used in Table 3, which is based on the European Commission database) for the calculation of TFP may resolve some of the measurement issues mentioned above (in particular, the distinction between embodied and disembodied technological changes). However, the GGDC database has not been used owing to the lack of updated series, while the OECD database does not cover the whole time horizon needed for this analysis.

Table 2 Growth accounting – breakdown of real GDP growth – equation (1)

(percentage changes)

	Real GDP = (1)+(2)+(3)					Hourly labour productivity (1)					Labour utilisation (2)					Population (3)				
	1970-1979	1980-1989	1990-1994	1995-1998	1999-2005	1970-1979	1980-1989	1990-1994	1995-1998	1999-2005	1970-1979	1980-1989	1990-1994	1995-1998	1999-2005	1970-1979	1980-1989	1990-1994	1995-1998	1999-2005
Euro area	3.7	2.3	1.9	2.3	1.9	4.3	2.5	2.1	1.5	1.2	-1.2	-0.4	-0.7	0.5	0.2	0.6	0.3	0.5	0.3	0.5
Belgium	3.6	2.2	1.8	2.2	2.1	4.3	2.5	2.6	0.9	1.4	-0.9	-0.4	-1.2	1.1	0.3	0.2	0.1	0.4	0.2	0.4
Germany	3.2	1.9	3.0	1.7	1.2	4.1	2.0	2.4	2.1	1.5	-1.1	-0.2	-0.4	-0.6	-0.4	0.2	0.1	1.0	0.2	0.1
Ireland	4.7	3.1	4.3	10.0	6.8	4.8	4.0	3.5	6.0	3.8	-1.5	-1.2	0.4	2.8	1.3	1.4	0.4	0.3	1.0	1.6
Greece	5.5	0.8	0.8	2.9	4.3	5.6	0.3	0.0	1.9	3.7	-0.9	0.0	0.2	0.0	0.3	0.9	0.5	0.7	1.0	0.3
Spain	3.9	2.7	1.7	3.4	3.7	4.6	3.4	1.8	0.2	0.5	-1.8	-1.0	-0.2	2.9	1.9	1.1	0.4	0.2	0.2	1.2
France	3.8	2.5	1.3	2.2	2.1	4.5	3.2	1.9	1.3	2.1	-1.3	-1.1	-1.0	0.6	-0.6	0.6	0.5	0.5	0.4	0.6
Italy	4.0	2.6	1.1	1.7	1.2	4.5	2.1	1.9	1.2	0.4	-1.0	0.3	-0.8	0.5	0.4	0.5	0.1	0.1	0.0	0.4
Luxembourg	2.7	4.6	4.8	3.8	4.6	2.5	3.8	2.3	0.9	1.7	-0.4	0.4	1.1	1.5	1.8	0.7	0.4	1.4	1.4	1.0
Netherlands	3.3	2.0	2.3	3.7	2.1	4.1	2.1	1.6	1.3	1.5	-1.5	-0.6	0.0	1.8	0.0	0.9	0.6	0.7	0.5	0.5
Austria	4.2	2.0	2.7	2.5	2.0	4.5	2.3	2.8	3.6	1.6	-0.4	-0.4	-0.9	-1.1	0.0	0.1	0.1	0.8	0.1	0.5
Portugal	5.1	3.4	1.7	4.2	1.6	5.4	3.7	2.9	3.6	1.0	-1.2	-0.7	-1.2	0.3	-0.1	1.0	0.4	0.0	0.3	0.6
Finland	4.1	3.5	-1.4	4.7	3.1	4.5	3.0	3.1	2.8	2.1	-0.7	0.1	-4.9	1.6	0.6	0.3	0.4	0.5	0.3	0.3
SD [1]	2.3	1.6	2.1	2.4	1.9	2.3	2.1	1.7	2.1	1.5	1.3	1.7	2.0	1.8	1.3	0.6	0.3	0.4	0.4	0.5

Source: ECB computations based on European Commission and GGDC data.
Notes: Data for Germany refer to West Germany up to 1991. See Box 1 for an explanation of this accounting excercise and some methodological considerations.
1) SD = unweighted standard deviation.

Tables 2 and 3 report the breakdowns shown in equations (1) and (2), respectively, of Box 1 for the euro area countries over the period 1970-2005.

Table 2 suggests that the above-mentioned factors behind real GDP growth performance played different roles across countries. In particular, focusing on demographic developments,[7] growth in Ireland, Spain and Luxembourg has been boosted by favourable demographic factors since the mid-1990s, partly reflecting immigration flows. However, demographic factors have made only a marginal contribution to growth in Germany and Italy.

With regard to labour productivity developments, it is worth noting that some euro area countries saw a significant downward trend, mainly associated with a slowdown in TFP growth (see Table 3).

Finally, the fall in labour utilisation observed in most countries in the 1980s and the first half of the 1990s was reversed from the mid-1990s onwards in some countries. This reversal is most likely to be the result of successful structural reforms as well as of wage moderation in the late 1980s and the 1990s.

Structural rigidities appear to play an important role in explaining labour productivity and labour utilisation developments in the euro area countries. For instance, it has been shown that regulations limiting competition in the goods, services, labour and capital markets have negative repercussions on technological advancement, and thus on productivity growth. There is also increasing empirical evidence to suggest that high tax wedges are an important determinant of cross-country differences in employment performance. By affecting the degree of labour market flexibility, product market competition and the tax/benefit system, structural policies influence supply and demand for labour and capital, the efficient adoption of technical innovations, and investment in research and development (R&D). There is also

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7 In the context of the growth accounting framework, demographic changes affect output growth, first, via the population growth rate and, second, via developments in the working-age population rate, measured as the share of the working-age population in the total population, which captures changes in the age structure of the population.

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Table 3 Growth accounting – breakdown of labour productivity – equation (2)

(percentage changes)

	Hourly labour productivity = (1)+(2)					TFP (1)					Capital deepening (2)				
	1970-1979	1980-1989	1990-1994	1995-1998	1999-2005	1970-1979	1980-1989	1990-1994	1995-1998	1999-2005	1970-1979	1980-1989	1990-1994	1995-1998	1999-2005
Euro area	4.3	2.5	2.1	1.5	1.2	2.9	1.6	1.2	1.1	0.7	1.5	0.8	0.9	0.5	0.5
Belgium	4.3	2.5	2.6	0.9	1.4	2.7	1.7	1.3	0.6	1.0	1.6	0.7	1.3	0.3	0.5
Germany	4.1	2.0	2.4	2.1	1.5	2.8	1.4	1.8	1.4	1.0	1.3	0.6	0.6	0.8	0.5
Ireland	4.8	4.0	3.5	6.0	3.8	2.8	2.4	2.8	6.0	2.7	2.0	1.6	0.7	0.0	1.2
Greece	5.6	0.3	0.0	1.9	3.7	3.1	-0.6	-0.6	1.4	2.5	2.5	0.8	0.6	0.5	1.2
Spain	4.6	3.4	1.8	0.2	0.5	2.7	2.2	0.4	0.2	0.0	1.9	1.2	1.4	0.0	0.5
France	4.5	3.2	1.9	1.3	2.1	2.7	2.0	0.7	0.9	1.2	1.7	1.1	1.2	0.4	0.9
Italy	4.5	2.1	1.9	1.2	0.4	3.0	1.3	0.7	0.7	-0.1	1.5	0.9	1.2	0.6	0.5
Luxembourg	2.5	3.8	2.3	0.9	1.7	1.8	3.2	1.5	0.5	0.6	0.7	0.6	0.8	0.5	1.2
Netherlands	4.1	2.1	1.6	1.3	1.5	2.7	1.4	1.3	1.4	1.1	1.4	0.7	0.3	-0.1	0.4
Austria	4.5	2.3	2.8	3.6	1.6	3.3	1.6	1.9	2.4	1.0	1.1	0.8	0.8	1.2	0.6
Portugal	5.4	3.7	2.9	3.6	1.0	4.0	2.2	1.0	2.4	-0.1	1.4	1.5	1.9	1.2	1.1
Finland	4.5	3.0	3.1	2.8	2.1	3.0	2.1	1.2	3.4	1.9	1.6	0.9	1.9	-0.7	0.3
SD [1]	2.3	2.1	1.7	2.1	1.5	2.1	1.8	1.5	1.9	1.3	0.6	0.6	0.8	0.7	0.6

Source: ECB computations based on European Commission and GGDC data.
Notes: Data for Germany refer to West Germany up to 1991. See Box 1 for an explanation of this accounting exercise and some methodological considerations.
1) SD = unweighted standard deviation.

growing evidence that different degrees of efficiency in the financial system can explain differences in TFP growth across countries.[8]

2.2 THE RELEVANCE OF SHOCKS AND ADJUSTMENT MECHANISMS

The presence of persistent output growth differences may, to some extent, reflect the long-lasting output impact of economic shocks. This in turn would imply a relatively low shock absorption capacity of the economy concerned, i.e. a slow functioning of the relevant adjustment mechanisms. This section therefore reviews, first, the kind and role of shocks affecting the euro area economies and, second, the working of various adjustment mechanisms within EMU.

THE RELEVANCE OF SHOCKS
Two broad categories of shocks may translate into different output effects: common and country-specific shocks.

Common shocks might create different effects on output growth across countries, either if

there are differences in the way these shocks are transmitted, or if countries are exposed to these common factors to a different degree. Common shocks typically refer to external shocks that are related, for example, to oil prices, extra-euro area foreign demand and euro exchange rate developments. These shocks may also generate different output growth reactions, depending on how different the structural features of the economies are, such as the trade structure and the degree of energy dependency, openness and flexibility. However, there is little evidence that any of the major common shocks over recent years have by themselves been a relevant factor behind persistent real GDP growth differentials.

8   For an overall review of the link between efficient financial intermediation and output growth, see R. Levine, "Finance and growth: theory, evidence, and mechanisms", in P. Aghion and S. Durlauf, (eds.), *The Handbook of Economic Growth,* Elsevier, Amsterdam, North Holland, 2005. More specifically, there is evidence showing that efficient finance fosters productivity by swiftly reallocating resources to sectors with positive global investment prospects, see A. Ciccone and E. Papaioannou, "Adjustment to target capital, finance, and growth", CEPR Discussion Paper No 5969, 2006.

Another type of common shock refers to monetary policy shocks. As far as the euro area is concerned, empirical work has shown that, overall, there is a considerable degree of homogeneity in the general pattern of output growth responses to a temporary change in short-term interest rates.[9]

Country-specific (or asymmetric) shocks, such as fiscal measures and structural reforms, naturally give rise to differentials in output growth. Overall, the available empirical literature shows that country-specific shocks have played a greater role in generating growth differentials in recent years than common shocks, and that the effects of those shocks are highly persistent.[10] There are many types of country-specific shock. Notably the one-off convergence of nominal interest rates in the run-up to EMU is likely to have contributed to growth differentials, as some countries saw a notable reduction in short and long-term interest rates. However, this effect has been empirically found to be of a temporary nature, mostly restricted to the first years of EMU.[11]

Other country-specific developments, such as the impact of the German reunification, may also have played a role. The lacklustre growth performance of the German economy since the mid-1990s can be attributed, to some degree, to the impact of the German reunification. The resulting fiscal burden, largely associated with financing social security expenditure and infrastructure investment in eastern Germany, the increasing tax wedge and the long-lasting adjustment process in the construction sector affected the dynamism of the economy for a long period of time. Regarding country-specific fiscal measures, there is some evidence that pro-cyclical effects of discretionary fiscal policies of euro area countries contributed to widening cyclical output growth differences before EMU.

ADJUSTMENT MECHANISMS IN EMU

The slow functioning of adjustment mechanisms to shocks can explain persistent output growth differentials. In a monetary union such as the euro area, with a single currency and a single monetary policy, the main adjustment mechanisms that can play a role – in the absence of a high degree of labour mobility across countries – are the competitiveness channel and, of a somewhat different nature, the "risk-sharing channel".

The competitiveness channel is typically seen as the most important equilibrating mechanism. If, for example, a country in a monetary union experiences a shock that drives its output above its potential, this will lead to domestic inflationary pressures, in particular a rise in wages and other domestic costs. As a result, a deterioration in external competitiveness will gradually accumulate, reducing foreign demand for the country's exports over time. The resulting decline in demand for the country's output will tend to restore output to its potential level and to dampen previous inflationary pressures. The working of this adjustment mechanism through the competitiveness channel would be enhanced in an environment of highly integrated labour, goods and services markets in the euro area. However, available evidence shows that in the euro area this key equilibrating mechanism appears, as a result of structural rigidities and a lack of full implementation of the Single Market, to require a relatively long period to work through.[12]

It is sometimes claimed that a destabilising real interest rate channel can emerge in response to higher inflation in a given country, which might

9 For a comprehensive review of the Eurosystem Monetary Transmission Network results, see I. Angeloni, A. Kashyap and B. Mojon, *Monetary policy transmission in the euro area,* Cambridge University Press, 2003. It should also be highlighted that differences in the monetary transmission mechanism depend on structural features of the economies. See R. P. Berben, A. Locarno, J. Morgan and J. Valles, "Cross-country differences in monetary policy transmission", ECB Working Paper No 400, 2004.
10 Recent analyses of this issue are provided in D. Giannone and L. Reichlin (cf. footnote 6), and in A. Buisán and F. Restoy, "Cross-country macroeconomic heterogeneity in EMU", Banco de España Occasional Paper No 0504, 2005.
11 See G. Fagan and V. Gaspar, "Adjusting to the euro", ECB Working Paper No 716, 2007.
12 For a comprehensive study of adjustment mechanisms in EMU, see the European Commission, "The EU economy 2006 review – Adjustment dynamics in the euro area: experiences and challenges", *European Economy 6,* 2006, and F. P. Mongelli and J. L. Vega, "What effects is EMU having on the euro area and its member countries? An overview", ECB Working Paper No 599, 2006.

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itself be related to relatively strong output growth. Such a country would face lower real rates, fostering further domestic demand and output growth. However, what matters for investment and consumption decisions are ex ante real interest rates that take into account inflation expectations rather than realised inflation rates. Indeed, inflation expectations across the euro area countries do not diverge greatly. Moreover, although the real interest rate channel may have had a short-term impact at the country level on some occasions in the past, it is typically – as empirical evidence shows – more than offset by the competitiveness channel over the medium and long run.[13]

A high degree of wage flexibility is essential for the competitiveness channel to work through because it would help national labour markets to adjust to economic shocks and would facilitate the efficient allocation of labour and other resources.[14] A high degree of price flexibility is similarly important. This has been analysed in depth in the context of the Eurosystem Inflation Persistence Network (IPN),[15] a research network comprising all euro area NCBs and the ECB. While cross-country heterogeneity in price flexibility does not appear to be the main factor behind growth differentials, it should be noted that prices change only infrequently, and considerably less often in the euro area countries than in the United States, for example. Product market regulations limiting competition may be a factor behind this finding.

Another market mechanism, albeit of a somewhat different nature, which can counteract the differential impact of asymmetric shocks on output growth among members of a currency union is the "risk-sharing channel": integrated financial markets allow borrowers and lenders to better share risks that arise from country-specific or asymmetric shocks. If, for example, a country is hit by a positive/negative demand shock, the implied output gains/losses would be shared by other countries if an environment of highly integrated cross-border financial activities through portfolio diversification exists. As explained in greater detail in Box 2, the available evidence points to an increase in risk-sharing across the euro area countries, but risk-sharing overall is lower than within a long-standing monetary union such as the United States.

13 See the article entitled "Monetary policy and inflation differentials in a heterogeneous currency area" in the May 2005 issue of the Monthly Bulletin. See also the box entitled "Measuring real interest rates in the euro area countries" in the September 2004 issue of the Monthly Bulletin. For a more recent overview, see European Commission, "The EU economy 2006 review" (cf. footnote 12).

14 The International Wage Flexibility Project, an international research network of academics and policy-makers, including the ECB, found, on the basis of microeconomic data for a number of euro area countries, a significant degree of nominal and real wage rigidity in many euro area countries, as well as significant heterogeneity in the magnitude of these types of rigidity across the countries. See W. Dickens, L. Goette, E. Groshen, S. Holden, J. Messina, M. Schweitzer, J. Turunen and M. Ward, "How wages change: micro-evidence from the International Wage Flexibility Project", ECB Working Paper No 697, 2006.

15 See F. Altissimo, M. Ehrmann and F. Smets, "Inflation persistence and price-setting behaviour in the euro area: a summary of the IPN evidence", ECB Occasional Paper No 46, 2006.

Box 2

RISK-SHARING IN THE EURO AREA

Well-integrated financial markets and readily available portfolio diversification opportunities provide an important mechanism to counteract the differential impact of asymmetric shocks among members of a currency union, reducing the dependence of firms' and households' saving and spending decisions on national economic and financial developments. In essence, this mechanism implies that consumption does not need to follow movements in output because consumers can borrow abroad. Given the key role that this risk-sharing channel can play in the face of asymmetric shocks, it is natural to consider whether risk-sharing opportunities in the euro area are broadly similar to those available in other currency areas, and whether risk-sharing has increased since the introduction of the euro.

Asdrubali et al. applied to the United States a framework measuring the amount of risk-sharing actually achieved. They found that, over the period 1963-1990, 75% of idiosyncratic fluctuations in gross state output were smoothed and thus did not affect state consumption.[1] Moreover, the bulk of this significant hedging of output shocks across US states was the result of efficient and integrated financial markets, including cross-border portfolio diversification, rather than centralised fiscal policy.

Early applications of the same methodology to several EU economies concluded that over the period 1966-1990 the amount of risk-sharing across European countries was basically nil. More recent evidence, however, points to a substantial increase in risk-sharing across euro area countries, reflecting the increasing integration of financial markets. As regards the availability of credit, the euro area has already gone a long way towards closing the gap with the United States. Money markets are fully integrated. The market in euro-denominated bonds has developed very fast, and a small increase in the diversification of equity portfolios also seems to have occurred in Europe since the run-up to Monetary Union.[2]

Recent work at the ECB confirms that the impact of country-specific output fluctuations on national consumption has decreased since the start of Monetary Union. Giannone and Reichlin carried out a panel analysis in which the deviations of consumption growth of each country from the euro area average are regressed on the deviations of the real GDP growth of each country from the euro area average, on a year-by-year basis, over the period 1970-2004.[3] The elasticity of consumption growth deviations from the euro area average to deviations of real GDP growth falls from around 0.8 over the period 1970-89 to around 0.65 over the period 1990-2003, which can be interpreted as an increase in the amount of idiosyncratic output risk that has smoothed since the early 1990s. The increase in risk-sharing occurred in a period when the integration of capital and goods markets accelerated significantly in Europe.

Overall, although the smoothing of output fluctuations seen within the United States is greater than that found among euro area countries, recent evidence shows that the degree of risk-sharing across euro area countries has increased since the 1990s.

1 P. Asdrubali, B. Sorensen and O. Yosha, "Channels of interstate risk sharing: United States 1963-1990", *Quarterly Journal of Economics,* Vol. 111, 1996.
2 See S. Kalemli-Ozcan, B. Sorensen and O. Yosha, "Asymmetric shocks and risk sharing in a monetary union: Updated evidence and policy implications for Europe", CEPR Discussion Paper No 4463, 2004.
3 See footnote 6 in the main text.

3 POLICY IMPLICATIONS OF OUTPUT GROWTH DIFFERENTIALS ACROSS THE EURO AREA COUNTRIES

Some differentials in output growth in the euro area, as in any currency union, are natural and to some extent desirable. This is the case, for example, when such differences reflect catching-up effects of lower-income countries or differences in demographic trends. Furthermore, there may be temporary differences in output growth across countries, for instance, as a result of country-specific shocks or common shocks which require different country adjustments. Policy-makers should therefore be concerned only about those differences in output growth that reflect inappropriate national economic policies, structural rigidities or a malfunctioning adjustment mechanism in individual countries. This may lead to increasing internal imbalances and diverging developments in competitiveness across countries. While it is often difficult in practice to precisely identify those undesirable

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aspects of divergence, there is sufficient evidence of structural deficiencies in individual countries which need to be addressed by appropriate policies.

The single monetary policy of the ECB is geared towards the primary objective of price stability in the euro area as a whole. The very existence of a single monetary policy and, thereby, of a uniform policy interest rate across the euro area countries does not allow monetary policy to be used to influence output growth (or inflation) differentials across euro area countries.[16] The best contribution the ECB's single monetary policy can make to the smooth functioning of EMU is to maintain price stability in the euro area as a whole.

Addressing "unsatisfactory" output growth performance in some individual countries must be tackled by properly designed national policies in the fiscal and structural domains. In the context of EMU with a single monetary policy, the later the necessary national policy measures are taken, the larger the potential costs can be in case of adverse shocks. Policies have to focus, in particular, on increasing the adjustment capacity of economies to shocks and, in the slower growth countries, on fostering productivity and labour utilisation while maintaining stable macroeconomic conditions.

3.1 FISCAL POLICIES

Fiscal policies in the euro area countries can best support the smooth functioning of EMU by being sustainable and medium term-oriented. The use of "activist" fiscal policies as a stabilisation tool entails significant risks: in particular, an ill-timed fiscal policy adjustment aimed at stabilising demand can be a significant source of variability in the economy and might, depending on the relative initial position of the countries, cause output growth differentials between countries. Experience shows that discretionary fiscal policies – particularly in view of the long implementation and impact lags involved – are imprecise tools for fine-tuning aggregate demand, often resulting in

pro-cyclical effects. By contrast, automatic stabilisers can play a useful role, and the necessary room for the operation of automatic stabilisers should be created during economic upswings.

Fiscal policies can also help to mitigate undesirable output growth performance if public spending and tax systems are made more efficient and growth-friendly. Such an improvement in the quality of public finances could also facilitate the adjustment of the euro area economies in the event of adverse shocks.

3.2 STRUCTURAL POLICIES

It is in the area of structural measures and enhanced cross-border integration that national policies can make the most significant contribution, first, to facilitating the working of adjustment mechanisms and, second, to improving long-term growth and employment prospects and addressing persistent growth underperformance in some countries.

The working of adjustment mechanisms in EMU, seen as a crucial element for the better absorption of shocks, can be improved by removing institutional barriers to flexible price and wage-setting mechanisms, in particular by easing product market regulation and employment protection legislation. The completion of the Single Market, in particular in the services sector and the financial markets, can stimulate price flexibility by fostering competition. In addition, existing barriers to labour mobility within the euro area must be removed. Greater cross-border competition and the integration of markets across countries can also enhance the adjustment mechanisms in the individual countries in the event of asymmetric shocks or differentials in cyclical developments across countries. In this respect, measures aimed at protecting domestic industries or

16 The aim of keeping inflation for the euro area as a whole below but close to 2% also addresses the implications of those equilibrium inflation differentials within the euro area which are related to real catching-up processes. See ECB, "Background studies for the ECB's evaluation of its monetary policy strategy", 18 November 2003.

employees against international competition are detrimental.

As regards wage-setting, nominal and real wages should adjust to help to absorb shocks. In a monetary union, much of the adjustment to economic fluctuations has to take place in national labour markets. Wage-setting must, therefore, reflect the differing situations of firms and labour market conditions, rather than being defined homogeneously across regions or sectors irrespective of the local conditions. In particular, sufficient wage differentiation would improve employment opportunities for less skilled workers and in regions with high unemployment. It is consequently of particular importance for all countries to achieve a high degree of wage flexibility to improve the ability of their labour markets to adjust to such shocks. Wage indexation mechanisms to past price increases as well as minimum wage regulations should be avoided, as they tend to undermine the speed of wage adjustment and job creation, in particular in regions hit by adverse shocks.

Long-term growth prospects can be improved by national measures targeted at raising labour productivity growth and employment growth. Growth in productivity should be supported by policies that aim to promote innovation and technological change. Regulations limiting competition in goods, services, labour and capital markets have negative repercussions on innovation and technological advancements. Structural policies can increase employment by enhancing labour supply incentives. High average and marginal tax rates and unemployment benefits may have a negative impact on the incentives to engage in paid employment or on the choice of the number of hours to work. Early retirement policies may also have a significant negative effect on the labour supply and, hence, on the levels of participation and the employment rate (see Box 3 for a review of the empirical literature on the link between structural policies and productivity/employment growth).

Box 3

STRUCTURAL POLICIES, PRODUCTIVITY AND EMPLOYMENT

Structural factors appear to play an important role in explaining labour productivity and employment developments in the euro area countries. Certain recent reforms in some euro area countries, aimed at stimulating employment growth, notably for low-skilled workers, by integrating workers with below-average productivity into the productive process, raised output but lowered productivity growth, dampening the positive effect of employment growth on real GDP growth. However, this should only be a temporary phenomenon. In the longer run, increasing the flexibility of the labour market and the diffusion of innovation and technological progress seems to be crucial to achieving relatively high levels of both productivity and employment.

Structural policies and productivity

Starting with productivity, differences in technological progress and in the diffusion of innovation, as associated with differences in TFP growth, seem to have been a major factor behind the disparities in the trend in hourly labour productivity performance across euro area countries.[1] A key policy issue is how to raise labour and TFP growth. Policies targeted at

1 See A. Annenkov and C. Madaschi, "Labour productivity in the Nordic EU countries: a comparative overview and explanatory factors 1980-2004", ECB Occasional Paper No 39, 2005.

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increasing innovation and technological diffusion can be grouped into three broad categories[2]: (i) policies aimed at easing regulations, (ii) policies aimed at improving human capital and (iii) policies aimed at promoting venture capital and the speedy and efficient adoption of technical innovations and investment in R&D.

With regard to the first category, regulations restricting competition in goods, services, labour and capital markets by, for instance, limiting entrepreneurial activities, imposing entry restrictions or regulations affecting labour market adaptability, such as recruitment and dismissal rules, have negative repercussions on innovation and technological advancement. There is consistent empirical evidence to show that significant TFP gains and increasing investment in information and communications technology can be obtained by deregulating product markets.[3] Moreover, it seems that the positive effect of deregulating product markets on diffusing innovation and technological changes, and therefore on labour productivity levels and real GDP growth rates, is amplified in periods of rapid technological change, giving rise to significant disparities in trend labour productivity levels and growth rates across euro area countries in which the degree of product market regulation differs. The extension and deepening of the Single Market is also a priority since the existing regulatory environment in the euro area is still overly complex, in particular in comparison with the United States, and is consequently an obstacle to innovation and labour productivity gains.

Second, with regard to policies aimed at improving human capital, measures favouring improvements in skills and lifelong learning contribute to further innovation, facilitate the use of advanced technologies and allow technological change to translate into more jobs. Third, policies promoting investment in R&D and venture capital are also important drivers of innovation and technological change. While private venture capital markets can allow the market mechanism to play a greater role in financing innovation, as an alternative or complement to traditional financial R&D support, thereby improving efficiency in the allocation of finance, higher outlays for R&D should, all other things being equal, yield higher results in terms of innovation, and thus of productivity and output.

Structural policies and employment

The structural factors that may affect employment trends can be grouped into two broad categories: (i) policies aimed at increasing incentives to supply work and to create jobs, e.g. by reducing taxes on labour, and (ii) policies aimed at increasing the flexibility of markets and the ability to adjust to shocks by easing, for instance, regulation on labour and product markets.

As regards the first category, high average and marginal tax rates, as well as generous unemployment benefits, may have a negative impact on the incentives to engage in paid employment and/or, following a decision to work, on the number of hours people choose to work. Moreover, there is growing empirical evidence that high tax wedges[4] are a significant determinant of cross-country differences in employment and labour utilisation.[5] Recent

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2 See S. Scarpetta, P. Hemmings, T. Tressel and J. Woo, "The role of policy and institutions for productivity and firm dynamics: evidence from micro and industry data", OECD Working Paper No 329, 2002.
3 See G. Nicoletti and S. Scarpetta, "Regulation and economic performance: product market reforms and productivity in the OECD", OECD Working Paper No 460, 2005.
4 The tax wedge captures the amount of social security contributions, payroll taxes, personal income tax and consumer taxes that create a wedge between the real labour costs for employers and the real take-home pay of employees.
5 See E. Prescott, "Why do Americans work so much more than Europeans?", Federal Reserve Bank of Minneapolis, 2004, and M. Spolander and J. Tarkka, "Taxation and employment – international comparisons", *Bank of Finland Bulletin,* Vol. 79, 2005.

empirical work finds that high unemployment benefits and high tax wedges are associated with generally lower employment rates, especially for women. This work also shows that public pension systems and other social transfer programmes which provide significant early retirement incentives may have a major negative impact on the employment rate of older workers.[6]

With regard to flexibility and regulation, the central question has been whether excessively strict employment protection and product market regulation negatively affect the performance of the labour market. Studies suggest that groups that have problems in entering the labour market, such as young workers, women and the long-term unemployed, are mostly negatively affected by excessively strict employment protection legislation.[7] As regards product regulation, there is consistent empirical evidence to show that significant employment gains can be obtained by deregulating product markets.[8]

6 A. Bassanini and R. Duval, "Employment patterns in OECD countries: reassessing the role of policies and institutions", OECD Social, Employment and Migration Working Paper No 35, 2006.
7 See also A. Bassanini and R. Duval (cf. footnote 6 of this box).
8 See G. Nicoletti and S. Scarpetta, "Product market reforms and employment in OECD countries", OECD Working Paper No 472, 2005.

4 CONCLUSION

The evidence discussed has generally stressed the important role of structural factors in the output growth differentials seen across euro area countries. These differentials are largely caused by differing trend growth patterns and, to a lesser extent, by cyclical factors. Moreover, the various rigidities within euro area countries may have hampered the capacity of the economies of the euro area to adjust to shocks. In this respect, persistent output growth differences also appear to be related to the relatively long-lasting effects of economic shocks, which, in turn, are largely due to the slow functioning of adjustment mechanisms in the individual countries, mainly reflecting structural rigidities and the lack of integrated markets.

The best contribution the ECB's single monetary policy can make to the smooth functioning of EMU is to maintain price stability in the euro area as a whole. Undesirable output growth performance in some individual countries must be tackled by properly designed national policies in the fiscal and structural domains. In the context of EMU, the later the necessary national policy measures are taken, the larger the potential costs can be in the event of adverse shocks. Fiscal policies in the euro area can best support the smooth functioning of EMU by being sustainable and oriented to the medium term. Structural policies must focus, in particular, on increasing the adjustment capacity of economies to shocks and on fostering productivity and employment trends while maintaining stable macroeconomic conditions. Open, integrated and flexible economies create the best conditions for exploiting the substantial benefits of the single currency, which is in the interests of each euro area country and its citizens.