



**THE ECONOMIC AND SOCIAL RESEARCH INSTITUTE**

**Working Paper No. 175**

**MACROECONOMIC DIFFERENTIALS AND ADJUSTMENT  
IN THE EURO AREA**

**Iulia Traistaru-Siedschlag**

Subsequently published in "[Macroeconomic Differentials and Adjustment in the Euro Area](#)", SUERF Studies 2008/3, Vienna: The European Money and Finance Forum.

Economic and Social Research Institute, Dublin  
4 Burlington Road, Dublin 4; Tel.:+353-1-667 1525; Fax: +353-1-668 6231  
E-mail: [iulia.traistaru@esri.ie](mailto:iulia.traistaru@esri.ie)

**October 2006**

4 BURLINGTON ROAD, DUBLIN 4, IRELAND

TEL (353-1) 667 1525 FAX (353-1) 668 6231

WEBSITE: [www.esri.ie](http://www.esri.ie)

## TABLE OF CONTENTS

<b>1.</b>	<b>Introduction</b>	<b>1</b>
<b>2.</b>	<b>Macroeconomic Differentials</b>	<b>2</b>
	2.1 Output growth differentials	3
	2.2 Inflation differentials	10
<b>3.</b>	<b>Macroeconomic Linkages and Transmission of Shocks</b>	<b>15</b>
	3.1 Trade linkages	15
	3.2 Financial linkages	16
	3.3 Business cycle synchronization	17
<b>4.</b>	<b>Macroeconomic Adjustment in the Euro Area: Selected Policy Issues</b>	<b>20</b>
	4.1 Price and output adjustment	20
	4.2 Fiscal adjustment	24
	4.3 Labour mobility	25
<b>5.</b>	<b>Summary and Policy Implications</b>	<b>27</b>
	<b>References</b>	<b>28</b>

# MACROECONOMIC DIFFERENTIALS AND ADJUSTMENT IN THE EURO AREA<sup>1</sup>

---

## 1. INTRODUCTION

There has recently been increased research and policy interest in the divergent macroeconomic performance in the European Economic and Monetary Union (EMU)<sup>2</sup>. Understanding the underlying factors of macroeconomic differentials, the source and transmission of shocks and the adjustment process in the euro area is important to appropriate economic policy in the EMU.

In a monetary union, the single monetary policy can only address common shocks. In the absence of nominal interest and exchange rates as policy instruments, to adjust to asymmetric shocks – country specific shocks or idiosyncratic effects of common shocks, member countries have to resort to remaining tools of economic policy. In theory, the adjustment to asymmetric shocks and return to equilibrium can take place through four channels<sup>3</sup>: a) market - driven price and output adjustment; b) policy induced fiscal adjustment; c) risk-sharing against country-specific shocks through fiscal transfers and financial integration; d) labour mobility.

Temporary inflation and output growth differentials are likely in a common currency area since prices and output adjustment is required to absorb shocks. In the euro area, output growth and inflation differentials are also related to the ongoing catch - up process in some of the member countries. Persistent inflation differentials can have negative effects on incomes and investment and result in divergent competitiveness and monetary conditions in the participating countries. Furthermore, inappropriate use of national fiscal policy and real exchange rate adjustment can lead to poor macroeconomic performance.

The objective of this paper is to analyse macroeconomic differentials and the adjustment in the euro area so far with the aim to draw lessons and policy implications for the better functioning of the EMU and euro area enlargement. The questions we address are the following: What do we know about macroeconomic differentials in the euro area? Are they temporary or persistent? What factors underline them? What is the likelihood of asymmetric shocks in the euro area and what are their main transmission channels? What policy issues related to the macroeconomic adjustment in the EMU are most important at this stage?

<sup>1</sup> This paper was prepared for the EUROFRAME-European Forecasting Network Autumn Report 2006. We thank Sandra Prose, Carolin Mainz, Jean Goggin and Claire Delaney for their excellent research assistance. We are grateful to Mary McCarthy, Jürgen Kroeger, Lars Jonung and DGECFIN staff for fruitful discussions and colleagues from the EUROFRAME-EFN network for useful comments and suggestions on earlier drafts.

<sup>2</sup> See for example, Ahearne and Pisani-Ferry (2006), Benalal et al (2006), Busetti et al (2006), European Commission (2006a), Honohan and Lane (2003), Mongelli and Vega (2006), Lane (2006).

<sup>3</sup> For an extensive discussion see Alesina et al (2001), De Grauwe (2003), Baldwin and Wyplosz (2004).

The remainder of this study is organised as follows. In Section 2 we analyse the size, evolution, persistence and underlying factors of output growth and inflation differentials. Section 3 discusses the likelihood of asymmetric shocks and their transmission across the euro area countries. In particular, we analyse trade linkages, including intra- and extra-euro area trade, financial integration and business cycle synchronization. In Section 4 we discuss a number of policy issues related to the macroeconomic adjustment in EMU which have gained increased interest recently. We start with the role and effects of real interest rate and competitiveness differentials as adjustment channels. We discuss next policy issues related to fiscal adjustment and the impact of fiscal shocks in the euro area countries. We discuss next labour mobility as an adjustment mechanism. Finally, Section 5 summarises the main findings and draws policy implications for the EMU and the euro area enlargement.

## 2. MACROECONOMIC DIFFERENTIALS

While it is still too early to formally assess the benefits and costs of the EMU<sup>4</sup>, the existing evidence on the euro area as a whole suggests that since the adoption of the single currency, while economic growth has stagnated, macroeconomic performance with respect to inflation and unemployment rates has improved in comparison with the previous seven years. Furthermore, inflation and unemployment differentials have declined while output growth differentials have remained stable (see Table 1).

**Table 1: Macroeconomic differentials in the euro area**

	Real GDP growth		GDP price deflator		Unemployment rate	
	1992-98	1999-05	1992-98	1999-05	1992-98	1999-05
<b>Euro area</b>	<b>1.8</b>	<b>1.9</b>	<b>2.6</b>	<b>1.8</b>	<b>10.1</b>	<b>8.5</b>
Belgium	0.0	0.1	-0.6	-0.1	-1.1	-0.7
Germany	-0.3	-0.6	-0.5	-1.1	-2.0	-0.1
Greece	0.0	2.4	7.3	1.8	-0.8	2.1
Spain	0.5	1.7	1.5	2.1	7.1	2.3
France	0.0	0.3	-1.2	-0.4	1.0	0.9
Ireland	5.4	4.6	1.0	2.1	2.3	-3.9
Italy	-0.5	-0.7	1.3	0.7	0.5	0.5
Luxembourg	1.8	2.9	-0.3	0.7	-7.4	-5.2
Netherlands	0.9	-0.2	-0.7	1.0	-4.4	-5.1
Austria	0.4	0.1	-0.9	-0.3	-6.1	-4.3
Portugal	0.6	-0.3	3.1	1.4	-3.9	-3.1
Finland	0.7	0.9	-0.3	-0.6	4.0	0.7
Standard Deviation <sup>a</sup>	1.6	1.6	2.4	1.1	4.2	2.8

<sup>a</sup> unweighted

Source: Own calculations based on the AMECO data base

<sup>4</sup> To properly assess the EMU impact on macroeconomic performance we would need to look at least at one full business cycle. Furthermore, it is difficult to separate the effect of EMU from global trade and financial integration.

<sup>5</sup> The data for 2005 used throughout in this paper are the European Commission's estimates of April 2006 (European Commission, 2006b)

Output growth dispersion has remained stable throughout the period 1992-2005<sup>6</sup> with average annual real GDP growth rates persistently above the euro area in Ireland, Spain, Luxembourg, Austria and Finland and persistently below the euro area in Germany and Italy. Over the same period, five countries experienced positive inflation differentials with respect to the euro area – Greece, Spain, Ireland, Italy, and Portugal while in Belgium, Germany, France, Austria, and Finland inflation rates were below the euro area average. Unemployment rates were above the euro area average in Spain, France, Italy and Finland and lower than the euro area in Belgium, Germany, Luxembourg, Austria and Portugal.

In this section we examine stylized facts and underlying factors of output growth and inflation differentials in the euro area countries and discuss the extent to which they may be linked to adjustment under the EMU.

## 2.1 OUTPUT GROWTH DIFFERENTIALS

The dispersion of real GDP growth across the euro area countries measured by the unweighted standard deviation<sup>7</sup> has been fluctuating around a level of 2.0 percent since the beginning of the EMU in 1990. The output growth dispersion has declined in the group of small countries<sup>8</sup>, while it has increased among the four largest euro area economies<sup>9</sup> (see Chart 1).

Output growth differentials have been persistent since 1994 as suggested by the correlation coefficients of real GDP growth differentials (Table 2). This evidence suggests that the single currency has not made output growth differentials more persistent than they were previously.

### The role of trend and cyclical components

The analysis of output growth differentials suggests that they were driven by differences in the trend GDP growth rates while cyclical components of the output growth rates have become more synchronised in the euro area.

Chart 2 shows the unweighted standard deviations of real GDP growth, trend GDP growth and output gap across the euro area countries over 1990-2005<sup>10</sup>. While the cyclical component of output growth has driven the dispersion of real GDP in Stage One of EMU, since 1995, the

<sup>6</sup> The data for 2005 used throughout in this paper are the European Commission's estimates of April 2006 (European Commission, 2006b)

<sup>7</sup> This measure of dispersion gives equal importance to the Euro area countries. This is convenient to our analysis of stylized facts. An alternative dispersion measure, the weighted standard deviation may be misleading because, given the high weights in terms of GDP of the four largest countries, it is similar to the unweighted standard deviation for these countries.

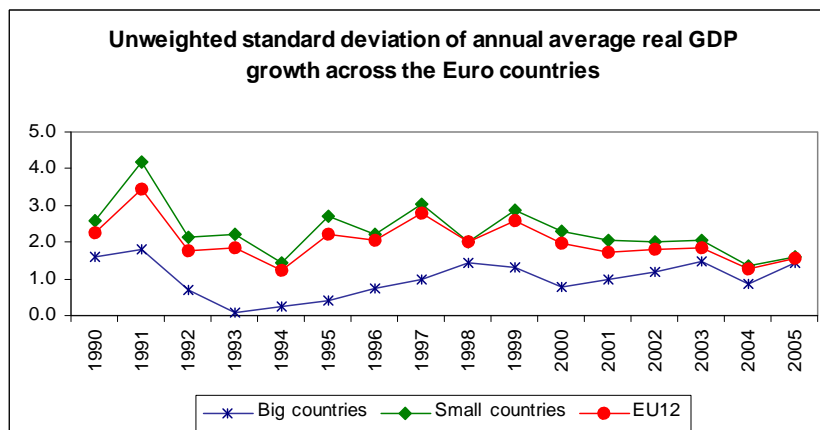
<sup>8</sup> Belgium, Greece, Ireland, Luxembourg, the Netherlands, Austria, Portugal, and Finland

<sup>9</sup> Germany, France, Italy and Spain

<sup>10</sup> The data on trend GDP and output gap are taken from the AMECO data base

dispersion of trend GDP growth has been higher than the dispersion of the cyclical component.

**Chart 1: The dispersion of real GDP growth across the euro area, big and small countries, 1990-2005**



Source: Own calculations based on the AMECO data base

**Table 2: Correlation coefficients of real GDP growth differentials: 1992-1998**

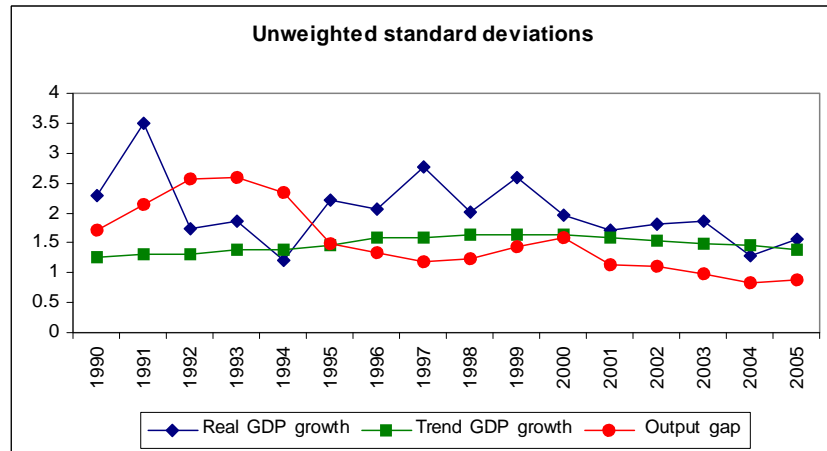
	1992	1993	1994	1995	1996	1997	1998
1992	1.00						
1993	0.41	1.00					
1994	0.08	0.70	1.00				
1995	0.21	0.27	0.61	1.00			
1996	0.08	0.34	0.64	0.92	1.00		
1997	0.02	0.57	0.80	0.84	0.88	1.00	
1998	0.10	0.66	0.64	0.67	0.81	0.89	1.00

**1999-2005**

	1999	2000	2001	2002	2003	2004	2005
1999	1.00						
2000	0.96	1.00					
2001	0.66	0.65	1.00				
2002	0.83	0.88	0.85	1.00			
2003	0.53	0.6	0.77	0.88	1.00		
2004	0.64	0.73	0.67	0.9	0.93	1	
2005	0.79	0.82	0.75	0.92	0.89	0.93	1

Source: Own calculations based on the AMECO data base

**Chart 2: The dispersion of real GDP growth, trend GDP growth and output gap across the euro area, 1990-2005**



Source: Own calculations based on the AMECO data base

Further, as shown in Charts 3 and 4, over the period 1990-2005, in the euro area countries, real GDP growth differentials were highly correlated with trend growth differentials. The correlation coefficients were 0.98 over the period 1990-1998 and 0.99 over the period 1999-2005. In particular, positive deviations from the euro area real GDP growth were associated with positive deviations from the euro area trend growth in Ireland, Luxembourg, Greece and Spain while in the cases of Germany and Italy, negative real GDP growth differentials were mirrored by negative trend growth differentials.

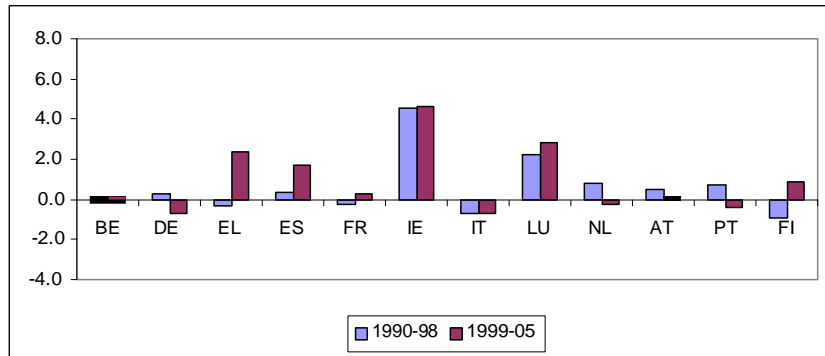
Since 1994 the trend GDP growth dispersion in the four largest countries (EU-4) has increased steadily while the dispersion in the case of the small countries (EU-8) has declined since 2000 (Chart 5). This evidence suggests that the increasing dispersion of real GDP growth in the four largest euro area countries reflects increasing differentials in their trend growth.

Trend growth has slowed down in Germany and Italy since the beginning of the 1990s while in Spain it has accelerated since 1993 (Chart 6). In the group of small economies, Ireland stands out for its performance. As shown in Chart 7, in Ireland, the trend output growth picked in 1997 stagnated in 1998 and has slowed down afterwards. Trend output growth has slowed down since 1997 in Portugal. In contrast, trend output growth has picked up in Greece since 1997.

That output growth differentials are in line with trend growth differentials suggests that they are sustainable over time and they can persist without the need for adjustment.

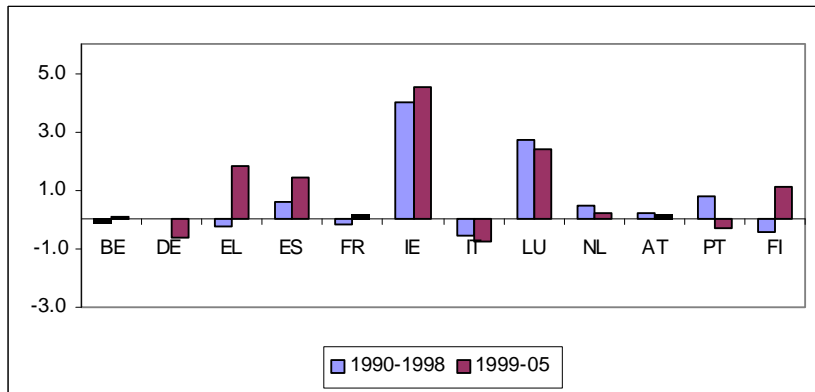
<sup>11</sup> The data on trend GDP and output gap are taken from the AMECO data base

**Chart 3: Real GDP growth, 1990-2005: deviation from the euro area average (percentage points)**



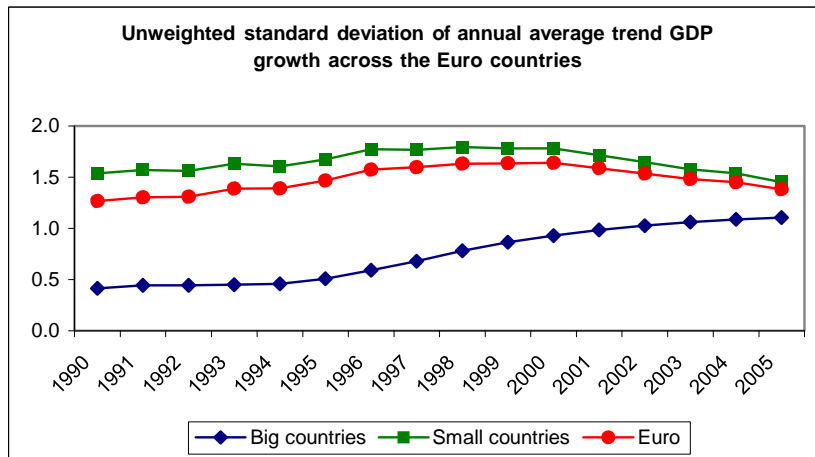
Source: Own calculations based on the AMECO data base

**Chart 4: Trend GDP growth, 1990-2005: deviation from the euro area average (percentage points)**



Source: Own calculations based on the AMECO data base

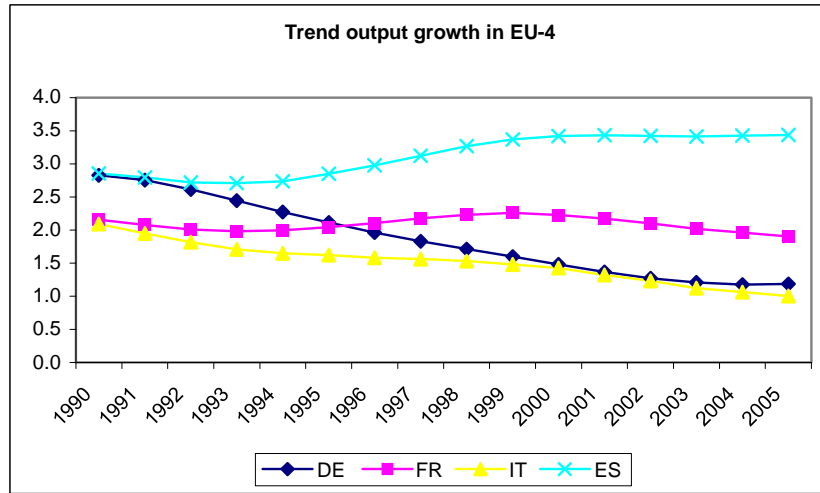
**Chart 5: The dispersion of trend GDP growth across the euro area, 1990-2005**



Source: Own calculations based on the AMECO data base

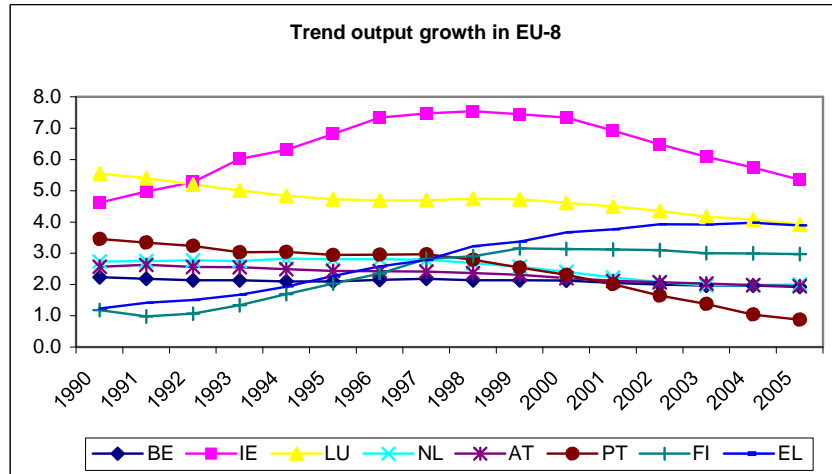


**Chart 6: Trend GDP growth in EU-4, 1990-2005**



Source: Own calculations based on the AMECO data base

**Chart 7: Trend GDP growth in EU-8, 1990-2005**



Source: Own calculations based on the AMECO data base

**Demographic change and output growth differentials**

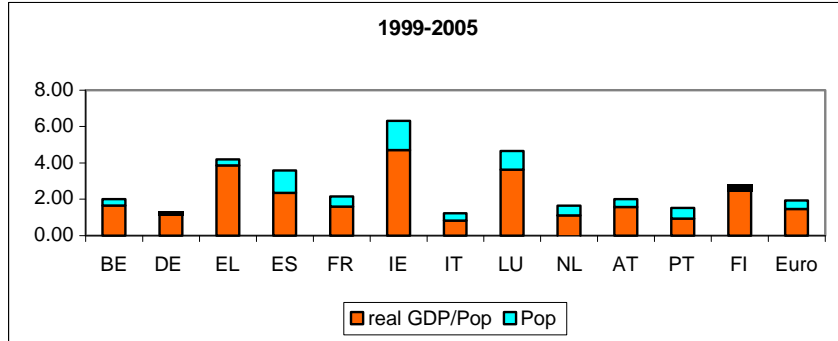
Demographic changes can affect real GDP growth through changes in growth rates of population and working age population. To the extent that demographic developments vary across the euro area countries they can account for output growth differentials.

To understand the role of demographic changes on output growth differentials we first decompose real GDP growth into the contributions of the real GDP per capita growth -  $\Delta \left( \frac{GDP}{POP} \right)$  and population growth  $\Delta POP$ .

$$\Delta GDP = \Delta \left( \frac{GDP}{POP} \right) + \Delta POP$$

As shown in Chart 8, over the period 1999-2005, real GDP per capita growth had the largest contribution to real GDP growth across euro area countries. Ireland, Spain and Luxembourg, stand out for their high population growth rates<sup>12</sup>.

Chart 8: Decomposition of real GDP growth



Source: Own calculations based on the AMECO data base

GDP per capita growth can be further decomposed<sup>13</sup> in the contributions of the growth rates of the ratio of working age population in total population

$$\Delta \left( \frac{15-64POP}{POP} \right), \text{ labour force ratio in total working age population}$$

$$\Delta \left( \frac{L}{15-64POP} \right), \text{ employment ratio in total labour force}$$

(activity rate)

$$\Delta \left( \frac{EMP}{L} \right) \text{ and labour productivity } \Delta \left( \frac{GDP}{EMP} \right) :$$

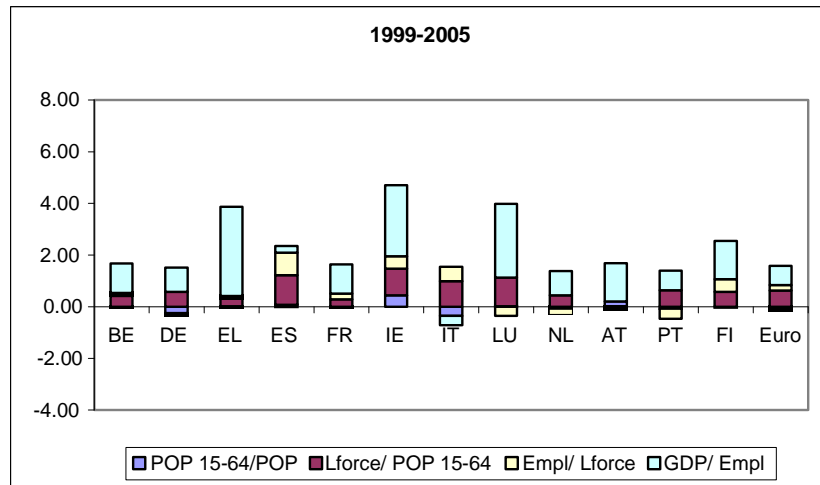
$$\Delta \left( \frac{GDP}{POP} \right) = \Delta \left( \frac{15-64POP}{POP} \right) + \Delta \left( \frac{L}{15-64POP} \right) + \Delta \left( \frac{EMP}{L} \right) + \Delta \left( \frac{GDP}{EMP} \right)$$

Labour productivity growth differentials have driven to a large extent real GDP per capita growth differentials in the euro area (Charts 9 and 10). In particular, over the period 1999-2005, labour productivity growth was above the euro area average in Greece, Ireland, Germany, Austria, Finland, the Netherlands, Belgium, and France while in Spain, Italy and Portugal it was below the euro area average.

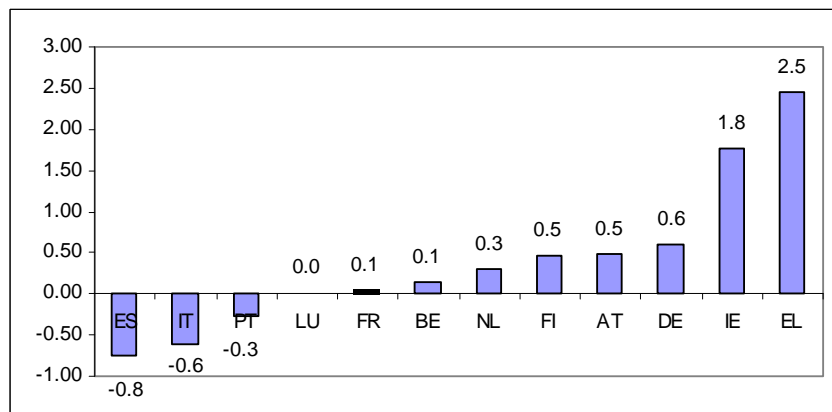
This evidence suggests that divergent output growth in the euro area countries reflects primarily differences in supply conditions such as differences in demographic trends, labour supply developments and long term productivity growth.

<sup>12</sup> Immigration has contributed to population growth in these countries

<sup>13</sup> Fitz Gerald (2006) uses this decomposition in the context of the convergence in Greece, Ireland, Portugal, and Spain

**Chart 9: The decomposition of real GDP per capita growth (percent)**

Source: Own calculations based on the AMECO data base

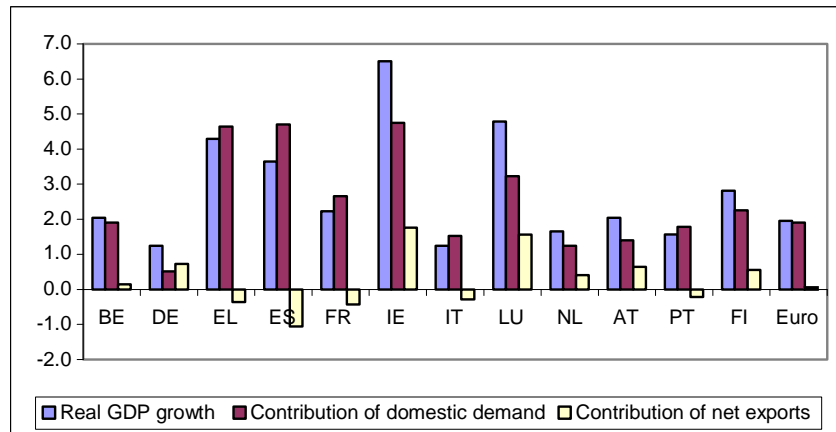
**Chart 10: Labour productivity growth, 1999-2005; deviation from the euro area average (percentage points)**

Source: Own calculations based on the AMECO data base

### The role of demand components

On average, real GDP growth in the euro area since the beginning of Stage Three of EMU has been driven by domestic demand with net exports contributing only marginally. The contribution of demand components to changes in real GDP has varied markedly across the euro area countries.

While in Ireland, Luxembourg, Netherlands and Finland, real GDP growth has been driven both by domestic demand and net exports, in Greece, Spain, France, Italy and Portugal, domestic demand has been the main growth driving force with negative contribution from net exports. Growth in Germany has been driven mainly by net exports while domestic demand has lagged behind (Chart 11).

**Chart 11: The Contribution of demand components to changes in real GDP, 1999-2005 (percent)**

Source: Own calculations based on the AMECO data base

### Summary

Output growth differentials across the euro area countries have been stable and fairly persistent since Stage One of the EMU. While the dispersion of real GDP growth in the small countries has declined, in the four largest euro area economies it has increased since 1993. The analysis of output growth differentials suggests that they were driven by differences in the trend growth while the cyclical components of the output growth rates have become more synchronized. Output growth higher than the euro area in Ireland, Greece, Spain and Luxembourg, reflect higher trend growth rates while lower output growth in Germany, Italy and Portugal reflect slowing down trend growth rates. Thus, divergent trend growth in the four largest euro area economies is likely to explain their increasing dispersion of real GDP growth.

This implies that output growth differentials are sustainable and there is no need for specific adjustment.

Real GDP growth for the euro area aggregate has been driven mainly by the growth of real GDP per capita. However, the contribution of population growth was relatively large in the cases of Ireland, Spain, and Luxembourg. Further, real GDP per capita differentials were driven by labour productivity growth differentials.

This evidence suggests that divergent output growth in the euro area countries reflects mainly differences in supply conditions such as differences in demographic and labour supply developments, and long term labour productivity growth.

## 2.2 INFLATION DIFFERENTIALS

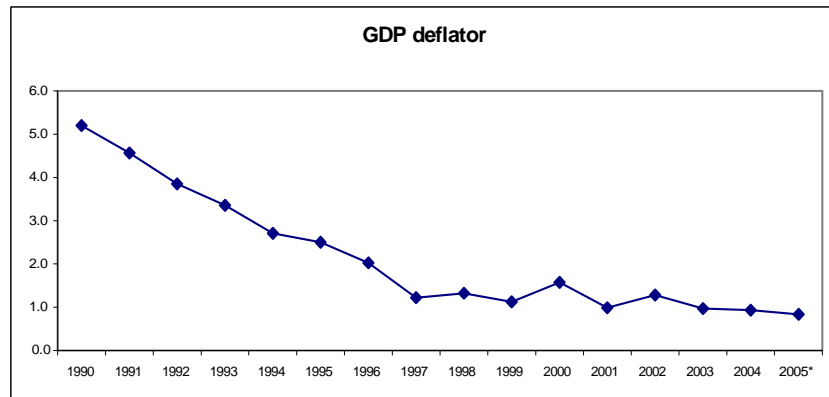
Changes in relative prices are necessary to absorb country specific shocks in a monetary union resulting in inflation differentials across the participating countries. In the euro area, inflation differentials are also related to country specific characteristics such as sectoral specialisation, trade openness and

trade composition, national economic policies, in particular fiscal and wage policies<sup>14</sup>.

To what extent do inflation differentials matter? The answer to this question requires understanding the persistence and underlying factors of diverging country inflation rates from the euro area average. Temporary inflation divergence related to transitory shocks and the convergence process may be necessary in a monetary union. Within the euro area, such inflation differentials may be driven by several factors including the price level convergence for tradable goods and services (due to increased market integration and cross border price transparency) and non-tradable goods and services (the Balassa-Samuelson effect, due to faster productivity growth in the tradable goods sector) (ECB, 2005). In contrast, persistent inflation differentials due to a slow adjustment and misaligned national policies should raise a warning flag.

Persistent deviations from the euro area average have a direct impact on fixed nominal incomes, real returns on savings and investment and wage setting (Honohan and Lane, 2003). An important direct consequence of persistent inflation differentials is persistent disparities in real interest rates which may be amplified by cyclical factors (Busetti et al, 2006). In addition to changes in the price level, inflation volatility raises price level uncertainty and has negative effects by raising risk premia, hedging costs and unanticipated redistribution of wealth and can thus hamper growth (Rother, 2004).

**Chart 12: Inflation dispersion, 1990-2005**



*Source:* Own calculations based on the AMECO database

Chart 12 shows that inflation differentials across euro area countries measured with the unweighted standard deviation of the GDP deflator have declined significantly over the period 1990-1997 and stabilized at a low level afterwards. This suggests that the EMU has had a beneficial effect on the macroeconomic stability in particular in countries which had high inflation rates.

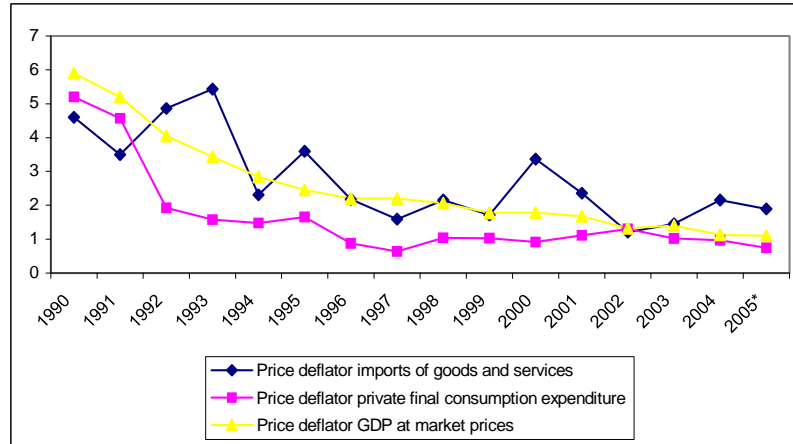
Looking at different inflation measures, Chart 13 shows that import price differentials were more pronounced than the GDP deflator and the private final consumption expenditure deflator. This points to the impact of

<sup>14</sup> For a detailed analysis see Honohan and Lane (2003), Altissimo et al (2005) and Lane (2006)

different trade patterns, in particular different intra- and extra-euro import patterns in the euro area countries.

Over the period 1999-2005 positive inflation deviations from the euro area average have persisted in Ireland, Greece, Spain, Portugal, while negative inflation differentials have persisted in Germany and Austria (Table 3).

**Chart 13: Inflation dispersion, 1990-2005**



Source: Own calculations based on the AMECO database

**Table 3: Inflation rate (HICP), 1999-2005: deviation from the euro area average**

	1999-05	1999	2000	2001	2002	2003	2004	2005
<b>Euro area</b>	<b>2.0</b>	<b>1.1</b>	<b>2.1</b>	<b>2.4</b>	<b>2.3</b>	<b>2.1</b>	<b>2.1</b>	<b>2.2</b>
<b>BE</b>	-0.1	0.0	0.6	0.0	-0.7	-0.6	-0.2	0.3
<b>DE</b>	-0.6	-0.5	-0.7	-0.5	-0.9	-1.1	-0.3	-0.3
<b>EL</b>	1.2	1	0.8	1.3	1.6	1.3	0.9	1.3
<b>ES</b>	1.1	1.1	1.4	0.4	1.3	1.0	1.0	1.2
<b>FR</b>	-0.3	-0.5	-0.3	-0.6	-0.4	0.1	0.2	-0.3
<b>IE</b>	1.5	1.4	3.2	1.6	2.4	1.9	0.2	0.0
<b>IT</b>	0.3	0.6	0.5	-0.1	0.3	0.7	0.2	0.0
<b>LU</b>	0.6	-0.1	1.7	0	-0.2	0.4	1.1	1.6
<b>NL</b>	0.6	0.9	0.2	2.7	1.6	0.1	-0.7	-0.7
<b>AT</b>	-0.3	-0.6	-0.1	-0.1	-0.6	-0.8	-0.1	-0.1
<b>PT</b>	1.0	1.1	0.7	2.0	1.4	1.2	0.4	-0.1
<b>FI</b>	-0.4	0.2	0.9	0.3	-0.3	-0.8	-2.0	-1.4
<b>St. Dev.</b>	0.7	0.7	1.0	1.1	1.1	1.0	0.8	0.9

Source: Own calculations based on the AMECO database

### Factors underlying inflation differentials in the euro area

Conventional theory of inflation divergence within currency union points to asymmetric demand shocks and productivity growth differentials in the traded sectors as explanatory factors. Inflation differentials in the euro area can be explained by a combination of factors that can be grouped in three categories (ECB, 2005): a) transitory factors related to the convergence

process; b) long-lasting permanent structural differences; c) policy induced factors.

Factors related to the convergence process include the convergence of nominal interest rates within the euro area; price level convergence for tradable goods due to market integration and cross-border price transparency; price level convergence for non tradable goods and services. Structural differences refer to differences in trade openness, the composition of international trade, trade links with non-euro area countries; wage and price setting rigidities. Policy induced factors include pro-cyclical effects of national fiscal policies; effects of national wage bargaining agreements; different transmission mechanisms of the common monetary policy.

Euro area inflation differentials can be decomposed using an inflation accounting methodology.<sup>15</sup> We analyse the following decompositions of inflation deviations from the euro area average: a) the final demand deflator differentials decomposed into contributions of domestic costs and import cost differentials; b) unit labour costs differentials decomposed into differentials due to compensation per employee and labour productivity.

The decomposition of the final demand deflator deviations from the euro area average is shown in Chart 14. Over the period 1999-2005, domestic costs were the main driving factor of inflation differentials in Germany, Greece, Spain, Ireland, Netherlands, and Portugal, while import costs predominated in Belgium, France, Italy, Austria and Finland.

The decomposition of unit labour costs differentials is shown in Chart 15. On average, the dynamics of the compensation per employee was more important than labour productivity growth. In particular, higher than average unit labour costs were driven by compensation per employee in Greece, Ireland, Luxembourg, Netherlands, Portugal. Compensation per employee and labour productivity were equally important in Finland.

In Italy higher than average compensation per employee growth was associated with lower than average productivity growth<sup>16</sup>. In Germany and Austria lower than average unit labour costs were due to lower than average compensation per employee growth despite better than average labour productivity growth.

## Summary

Inflation differentials across euro area countries have been declining since the Stage One of the EMU and stabilised at a low level. Positive inflation deviations from the euro area have persisted in Ireland, Greece, Spain, Portugal. In contrast, Germany, and Austria experienced persistent negative inflation deviations from the euro area average.

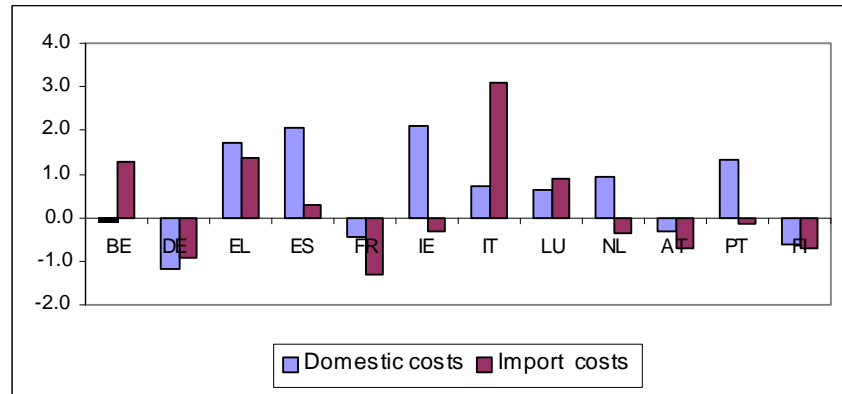
Our analysis of factors underlying these inflation differentials suggests that they were driven by country specific factors. Domestic costs were the main driving factor of inflation differentials in Germany, Greece, Spain, Ireland, the Netherlands, and Portugal, while import costs predominated in Belgium, France, Italy, Austria and Finland. With respect to unit labour costs differentials, on average, the dynamics of the compensation per employee was more important than labour productivity growth. Specifically, higher than average unit labour costs growth were driven by compensation

<sup>15</sup> See also ECB (2003)

<sup>16</sup> For a detailed analysis in the case of Italy, see Burattoni et al (2006)

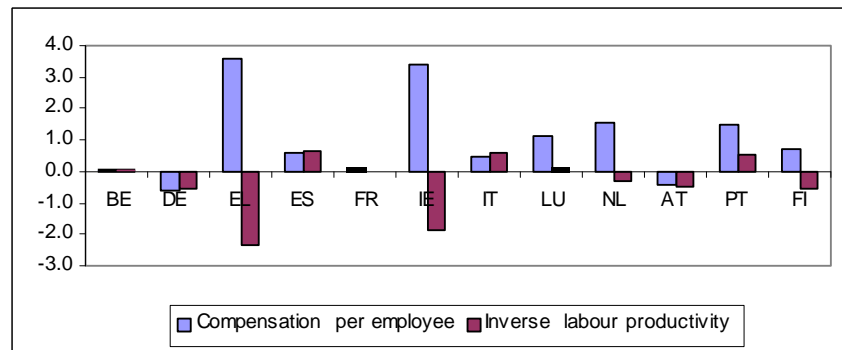
per employee growth in Greece, Ireland, Luxembourg, Netherlands and Portugal. In contrast, in Germany and Austria, lower than average unit labour costs growth were due to lower than average compensation per employee growth despite better than average labour productivity growth.

**Chart 14: Final demand deflator, 1999-2005, deviation from the euro area average: The contribution of domestic costs and import costs (percentage points)**



Source: Own calculations based on the AMECO database

**Chart 15: Unit labour costs, 1999-2005, deviation from the euro area average: The contribution of the compensation per employee and inverse labour productivity (percentage points)**



Source: Own calculations based on the AMECO database

To the extent that inflation differentials in the euro area are temporary and reflect a transitory and necessary adjustment of relative prices in response to asymmetric demand shocks and productivity differentials in the traded sector, they are part of the macroeconomic adjustment and they are expected. The common monetary policy has as an objective the price stability for the euro area aggregate and cannot address regional inflation differentials. However, persistent inflation deviations from the euro area average may have negative effects on monetary conditions and competitiveness.



---

### 3. MACROECONOMIC LINKAGES AND TRANSMISSION OF SHOCKS

In the EMU, the ECB pursues price stability for the euro area as a whole and consequently member countries have to use the remaining tools of economic policy to adjust to asymmetric shocks. Understanding the nature of external shocks and their transmission channels is essential to deciding on the appropriate policy instruments. To assess the likelihood and transmission of asymmetric external shocks to the euro area countries we analyse trade and financial linkages and business cycle synchronisation.

#### 3.1 TRADE LINKAGES

The analysis of trade integration patterns is important for assessing the transmission of shocks in the euro area for at least three reasons.

First, trade integration between similar and open economies reduces the cost of losing flexibility over the exchange rate. As shown by McKinnon (1963), in theory, this follows from the equalization of prices<sup>17</sup> of most traded goods when expressed in the same currency as a result of increased competition. In this case, exchange rate changes will have relatively small effects.

Second, the higher the degree of trade openness, the higher the benefits from adopting a common currency as a result of reduction of transaction costs. Third, increased trade integration fosters the transmission of common shocks across countries and the synchronisation of business cycles<sup>18</sup>.

In the context of exposure to and transmission of shocks to the euro area economies it is important to distinguish between intra- and extra-euro area trade patterns. Table 4 shows that over the period 1999-2005, for the euro area aggregate, intra-euro area trade openness was 27.8 percent of GDP, slightly lower than extra-euro area trade openness, 28.4 percent of GDP. Intra-euro area trade openness was the highest in Belgium, Luxembourg and the Netherlands and the lowest in Greece, Finland and Italy. Extra-euro area trade openness was the highest in Ireland, Belgium, the Netherlands and Finland and the lowest in Greece, Luxembourg and Portugal.

Significantly, compared with the period 1990-1998, extra-euro trade openness has increased by 6.7 percentage points, relatively more than the intra-euro area openness increase by 4.7 percentage points.

These stylized facts are in line with Micco et al. (2003) who find that, after controlling for other factors, euro area membership has had a higher effect on extra-euro area trade, ranging from 8 to 16 percent, while for bilateral intra-euro area trade the EMU effect has been smaller, ranging from 4 to 10 percent<sup>19</sup>.

Since the adoption of the single currency, with the exception of Belgium and Spain, extra-euro area trade in the member countries has increased to a larger extent in comparison with the intra-euro area trade. Extra-euro area trade is important in particular in the cases of Ireland, with an average extra-euro area trade 74 percent of GDP compared to 35.5

<sup>17</sup> The law of one price

<sup>18</sup> For recent empirical evidence see Canova and Marrinan (1998), Frankel and Rose (1998), Baxter and Kouparitsas (2003), Imbs (2004)

<sup>19</sup> Baldwin (2006) estimates that the euro has boosted the intra-euro area trade by 5-10 percent

percent intra-euro area trade, while in Finland the shares are 40.7 percent compared with 19.9 percent respectively.

**Table 4: Trade (exports and imports of goods) as percent of GDP, 1999-05**

	<b>Intra-euro area</b>	<b>Extra-euro area</b>
<b>Euro</b>	<b>27.8</b>	<b>28.4</b>
Belgium	97.6	61.3
Germany	23.6	32.1
Greece	14.1	16.3
Spain	24.3	18.5
France	21.9	20.9
Ireland	35.5	74.0
Italy	19.3	21.3
Luxembourg	70.6	16.6
Netherlands	52.9	46.1
Austria	41.0	29.7
Portugal	34.1	16.6
Finland	19.9	40.7

*Source:* Own calculations based on the OECD International Trade data base

## Summary

Since the adoption of the single currency both intra- and extra-euro area trade have increased. Increased trade among the euro countries fosters the transmission of country specific shocks and contributes to the co-movement of their economic activity. The extent of extra-euro area trade has implications for the exposure to shocks originating outside the euro area and volatility of the euro nominal effective exchange rate.

## 3.2 FINANCIAL LINKAGES

Financial integration can act as an adjustment mechanism to country – specific shocks by smoothening consumption over time through cross-border portfolio diversification (Kalemli-Ozcan et al, 2001). Furthermore, financial integration plays an important role in the transmission of the common monetary policy. Consumption growth rates in the euro area are less correlated than GDP growth rates suggesting that the level of risk sharing in the Euro area is low (Adjaoute and Danthine, 2003 and 2004). However, recent evidence suggests that the adoption of the euro has fostered financial integration among the euro area member countries (Baele et al, 2004; Lane, 2006).

Using various price-based and news-based measures, Baele et al., (2004) find that the degree of integration differs across various Euro area markets. Money and government bond markets are highly integrated, corporate bond and banking markets are quite well integrated while equity markets are the least integrated.

Furthermore, while the euro has fostered financial markets integration, a contemporaneous increase in global financial linkages outside the euro area may have contributed as well (Lane and Wälti, 2006).

Berben et al (2006) analyse the relationship between wealth gains and losses on actual and planned savings in the Netherlands and find that households' responsiveness to equity shocks is asymmetric with a stronger

reaction to capital losses in comparison to capital gains. This asymmetric reaction is likely to influence the marginal propensity to consume out of wealth.

Al-Eyd et al (2006) analyse the impact of a series of equity price shocks at the individual country and global levels using the NiGEM model. They first simulate the impact on GDP of an exogenous 10 per cent increase in equity prices sustained over two years in each of the euro area countries. Second, a simultaneous equity price rise in all economies is simulated. Equity price shocks are transmitted through asset prices (direct channel) and trade effects (indirect channel).

The results of the single country equity price shocks suggest that while the short run wealth effects on consumption are weak in all euro area economies, long run wealth effects appear stronger, indicating a delayed impact of the shock in all of the euro area countries with the exception of the Netherlands and Ireland where the impact on GDP is largest in the second year. The actual pattern of adjustment in each country is conditioned by the country specific dynamics of consumption, asset accumulation and supply.

A simultaneous global rise in equity prices of 10 per cent, sustained for two years is further simulated. In response to a global shock, multipliers tend to rise with trade and financial openness. A higher trade exposure outside the euro area is associated with a higher multiplier, since equity price impacts in countries such as the US and the UK tend to be higher than they are in the larger euro area economies. For example, this effect shows up in Ireland which has high levels of trade with the UK and the US.

### Summary

Recent research suggests that the euro has fostered financial integration in the euro area. However, the level of risk sharing through financial integration in the euro area is still low as wealth effects on consumption are weak in the member countries in particular in the short run. Global equity price shocks have a stronger effect in the euro area with most of spillovers originating in the US. A higher trade exposure to outside area, in particular to the UK and US is associated with a higher multiplier.

There is also evidence indicating that households react stronger to capital losses in comparison to capital gains. This asymmetry is likely to influence the marginal propensity to consume out of wealth.

### 3.3 BUSINESS CYCLE SYNCHRONIZATION

Business cycle synchronisation is taken as an indication of a low probability of asymmetric shocks and a low cost of losing independence over monetary and exchange rate policies (Frankel and Rose, 1998; Alesina et al., 2002; Artis et al., 2003).

Business cycle synchronization across countries over a given period can be measured by cross-country correlations of actual real GDP growth rates or output gaps. Benalal et al (2006) analyse the business cycle synchronisation across the euro area countries since early 1970s until 2004 using both annual and quarterly data. They find that the co-movement of economic activity between the euro area countries has increased, in particular since the early 1990s. The results are not sensitive to the data

frequency and they hold for both big and small countries. The group of the largest countries (Germany, France, Italy and Spain) are more correlated in comparison with the group of the small countries. Belgium and France had the highest business cycle correlations with the rest of the euro area countries, while Greece, Ireland and Finland were the least correlated. Furthermore, with the exception of Luxembourg, in all countries, the average business cycle correlations with the rest of the euro area have increased. In this respect, the performance of Ireland stands out for the sizable increase in its business cycle correlation with the other countries since the adoption of the single currency. In order to distinguish the effects of European economic integration and EMU in particular on business cycle synchronisation from the impact of global trends such as the increasing world trade between industrialised countries, the authors look at the degree of the co-movement of economic activity for 12 non-euro OECD countries.<sup>22</sup> They find that this has not changed significantly since the 1980s and suggest that the increased business cycle synchronisation across the euro area countries may be a result of increased EU integration and the single currency. However, several caveats to this analysis should be kept in mind. For instance, no formal tests of statistical significance have been carried out.

Furthermore, the group of 12 OECD countries used as a benchmark may not be fully representative for global developments.

Boewer and Guillemineau (2006) take a step further in the analysis of business cycle synchronisation across euro area countries and uncover their key determinants. Using data over the period 1980-2004 they find that bilateral business cycle correlations have increased significantly. This increased business cycle synchronisation appears strong in particular following the adoption of the single currency. The extreme-bounds analysis is applied to test the robustness of a large range of determinants including trade integration, structural and policy variables. The results indicate that bilateral trade has been a major driving factor of business cycle synchronisation in the euro area through out the whole period and in particular before the adoption of the single currency. In particular, intra-industry trade between euro area countries has increased in Stage Three of EMU. Furthermore, differences in industrial and financial sector structures have been significant determinants of business cycle correlation during the completion of the Single Market.

Trade specialisation and short-term interest rate differentials are found robust determinants of business cycle correlation throughout the whole analysed period. Other factors including bilateral bank flows, economic sectoral specialisation, nominal exchange rate volatility and labour market flexibility come out as not robust. The authors point out that monetary integration has fostered intra-industry trade between euro area countries and argue that this finding supports the endogeneity of optimum currency areas suggested by Frankel and Rose (1998).

Massman and Mitchell (2004) analyse the relationship between the business cycles of the 12 euro area countries, by using 40 years of monthly industrial production data. They focus on eight parametric and nonparametric univariate measures of the “classical” and “growth” cycles. The investigation whether euro area business cycles have converged is based on a descriptive analysis of the distribution of bivariate correlation coefficients between the 12 countries’ business cycles. The authors propose a statistical test for convergence based on the estimation of a dynamic

heterogeneous panel data model. Their results indicate that the properties of the business cycles depend on how the business cycle is measured, in line with the findings of Canova (1998). However, the examination of convergence between euro area business cycles indicates that there are substantive similarities across alternative measures of the business cycle. The euro area has been characterised by periods of convergence, associated with a rising mean correlation, a falling variance and with limited intra-distributional movement, and periods of divergence in the last 40 years. This fact is supported by the clearly negative relationship between the mean correlation coefficient and the variance of the correlation coefficients.

Furthermore, Massman and Mitchell (2004) offer a tentative, and preliminary, interpretation of these facts that is consistent with Artis and Zhang's (1997) view that business cycles synchronisation is positively related to monetary integration, specifically the degree of exchange-rate rigidity. Moreover, despite the volatility over the last 20 years, statistical tests indicate that the long-run trend over the last 20 years is one of rising correlations between euro area business cycles although there is at best weak evidence for divergence when attention is confined to just the last 10 years. However, it is too early to tell whether these recent tendencies will continue, and both the descriptive analysis and the statistical tests for convergence suggest that the emergence of a common euro area business cycle has been far from smooth and stable.

Economic integration is likely to have a stronger effect at regional level than at national level. This stronger effect can be expected because regions trade relatively more than countries and specialisation at regional level is higher than at national level (Krugman, 1993, Fatás, 1997). Thus, fluctuations of economic activity at regional level are expected to be more important than at national level which raises the question about the extent of synchronisation of regional business cycles. Barrios and de Lucio (2003) argue that the dynamics of regional business cycles may condition the adjustment of national economies to economic integration.

Tondl and Traistaru-Siedschlag (2006) provide empirical evidence about patterns and key determinants of growth cycle determinants across euro area regions. Using a panel data of 208 EU-15 regions over the period 1989-2002 they estimate a system of four simultaneous equations to analyse the impact of regional trade integration, specialisation and exchange rate volatility on correlations of regional growth cycles with the euro area. Their results suggest that deeper trade integration with the euro area had a strong direct positive effect on the synchronisation of regional growth cycles with the euro area. Industrial specialisation and exchange rate volatility were sources of cyclical divergence. Industrial specialisation had however an indirect positive effect on growth cycles synchronisation via its positive effect on trade integration, while exchange rate volatility had an indirect additional negative effect on growth cycle correlations by reducing trade integration. Industrial specialisation had an indirect negative effect on growth cycle correlations by increasing the exchange rate volatility. The direct impact of trade integration on growth cycle correlations was stronger in the pre-EMU sub-period, while in the EMU sub-period, the negative direct effects of industrial specialisation and exchange rate volatility were stronger than in the pre-EMU sub-period. A distinct result is the positive and significant relationship between exchange rate volatility and growth cycle correlations in the pre-EMU sub-period, suggesting that over this period, country-specific exchange rate fluctuations acted as shock absorbers.

The above results suggest a number of relevant policy implications for the EMU and euro area enlargement. First and foremost, promoting trade integration with the euro area is likely to foster regional growth cycle convergence and thus to lower the probability of regions' exposure to asymmetric shocks. Real income convergence with the euro area average is expected to increase trade integration and at the same time affect the pattern of industrial specialisation towards more similarity which in turn will increase the regional growth cycles convergence with the euro area.

### Summary

Empirical evidence suggests that EMU has fostered intra-euro area trade integration in particular intra-industry trade which in turn has contributed to business cycle synchronisation. However, because of differences in patterns of trade, financial linkages and industrial specialisation there remains the possibility of asymmetric shocks - country specific shocks or idiosyncratic effects of common shocks across the euro area countries.

---

## 4. Macroeconomic Adjustment in the Euro Area: Selected Policy Issues

4. In this section we discuss policy issues related to the macroeconomic adjustment in the Euro area which have attracted attention recently in both academic and policy making communities. We start with the adjustment triggered by inflation and output differentials. Second, we ask how efficient is fiscal adjustment in a monetary union and analyse the impact of fiscal shocks on the euro area countries. Third, we discuss labour mobility as an adjustment mechanism in a monetary union.

### 4.1 PRICE AND OUTPUT ADJUSTMENT

A smooth and fast correction of imbalances in a monetary union depends to a large extent on the efficiency and speed of wage and price adjustment. Flexible wages and prices can trigger macroeconomic adjustment through two channels: the real interest rate channel and the competitiveness channel. The real interest channel affects domestic demand: inflation higher (lower) than euro area inflation results in lower (higher) real interest rates which may foster (depress) domestic demand. The competitiveness channel affects the external demand through competitiveness gains (losses) in countries with inflation lower (higher) than the euro area.

In reality, well-documented rigidities in labour and product markets<sup>20</sup> influence negatively the growth performance in the euro area. Furthermore, the interaction between the real exchange rate adjustment and the real interest rate developments in the euro area might lead to poor macroeconomic performance (overheating or overcooling).<sup>21</sup>

<sup>20</sup> See for example Nicoletti and Scarpetta (2005)

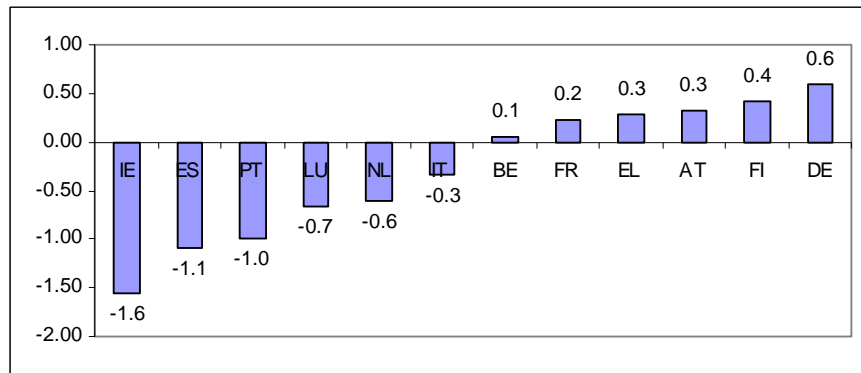
<sup>21</sup> See Deroose et al (2004) for a model-based analysis of adjustment to competitiveness and demand shocks in the Euro area.

### The real interest rate channel

Real short term interest rates over 1999-2005 ranged from – 0.5 percent in Ireland to 1.7 percent in Germany. Deviations of real short term interest rates from the euro area average have been negative in six countries including Ireland, Spain, Portugal, Luxembourg, the Netherlands, and Italy, while they were positive in Belgium, Greece, France, Austria, Finland and Germany (Chart 18).

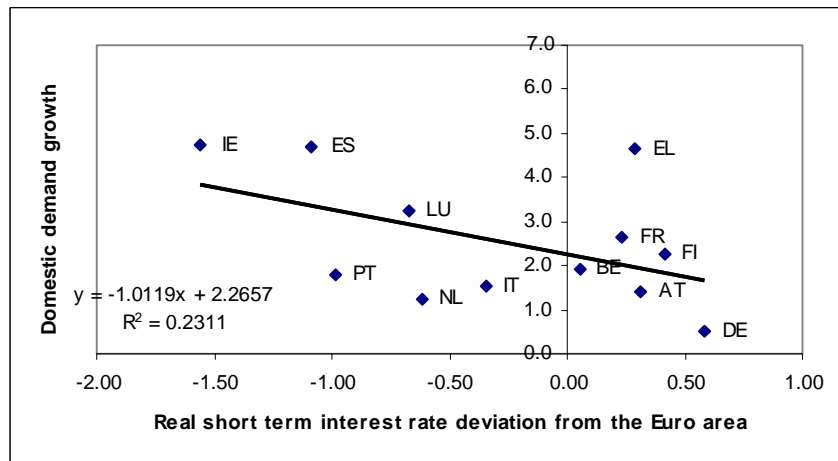
Chart 19 shows a negative but weak correlation between short-term real interest rate differentials and domestic demand growth. While this evidence is indicative only, it suggests that real short term interest rate below the euro average in particular in Ireland, Spain, and Luxembourg might have contributed to domestic demand growth in these countries, while in Germany, Austria, France, Finland and Belgium, real short term interest rates might have depressed domestic demand.

**Chart 18: Real short term interest rate, 1999-2005: deviation from the euro area average (percentage points)**



Source: Own calculations based on the AMECO database

**Chart 19: Real short term interest rate differentials and domestic demand, 1999-2005**



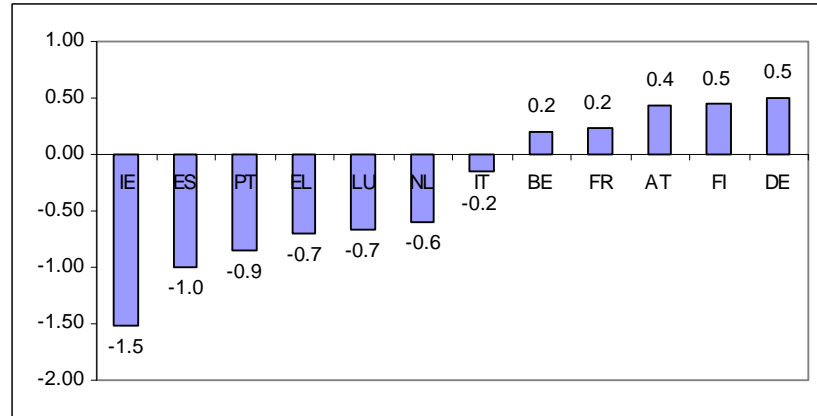
Source: Own calculations based on the AMECO database

Average annual dispersion of real long term interest rates over 1999-2005 has been 0.9 percent, lower than 1.2 percent for real short term interest

rates. The highest dispersion of real long term interest rates was experienced in 2002 and has declined afterwards. Average annual real long term interest rates over 1999-2005 ranged from 1.0 percent in Ireland to 3.0 percent in Germany.

They have been below the euro area average in seven countries: Ireland, Spain, Portugal, Greece, Luxembourg, Netherlands, and Italy and slightly above the euro area average in Belgium, France, Austria, Germany, and Finland (Chart 20).

**Chart 20: Real long term interest rate, 1999-2005: deviation from the euro area average (percentage points)**



Source: Own calculations based on the AMECO database

### The competitiveness channel

Inflation higher than the euro area average results in the real exchange rate appreciation and thus competitiveness loss leading to a reduction of external demand. Inflation lower than the euro area average leads to real exchange rate depreciation and competitiveness gains resulting in an increase in the external demand.

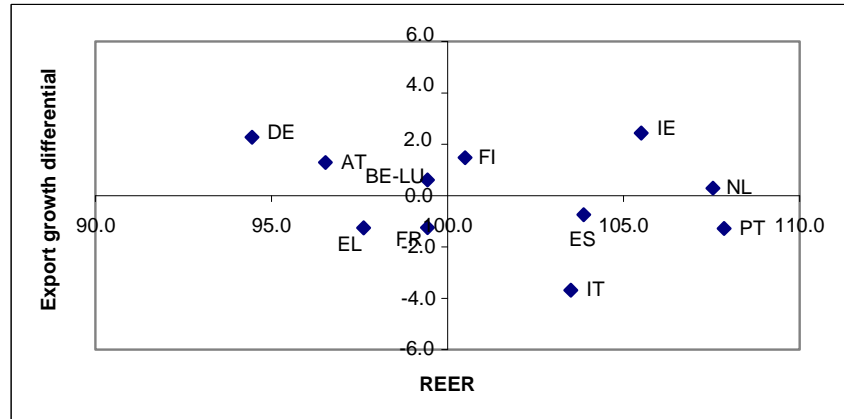
Over the period 1999-2005, in particular, Germany, Austria, France, Belgium-Luxembourg and Greece have experienced a real exchange rate depreciation while Ireland, Finland, Spain, the Netherlands, Portugal and Italy have appreciated in real terms. Competitiveness gains have led to export growth in particular in Germany, Austria and Belgium-Luxembourg while competitiveness loss have affected negatively export growth in Italy, Portugal and Spain. Significantly, in Ireland, Finland, and the Netherlands export growth has remained above the euro area average despite their real exchange rate appreciation (Chart 21).

These divergent developments in export growth performance may be explained by the product composition of exports. Due to their specialisation in low-tech products, which are sensitive to price competitiveness, Italy, Portugal and Spain have been affected by export competition from low cost countries, in particular China<sup>22</sup>.

<sup>22</sup> see Burattoni et al (2006) for evidence from Italy illustrating this point



**Chart 21: Real effective exchange rates (REER)\* versus EU-12 and export growth differentials, 2000-2005**



\* calculated on the basis of unit labour cost in total economy (ULCE)

Source: Own calculations based on the AMECO database

### Summary

In a monetary union price and output differentials trigger adjustment through two channels: the real interest rate channel and the competitiveness channel. In the euro area countries, real interest rates and real exchange rates developments have had uneven effects on domestic and external demand. In particular, in countries with positive output growth differentials, such as Ireland and Spain, low real interest rates might have added to domestic demand pressure while higher than the euro area real interest rates might have further depressed domestic demand in countries with output growth below the euro area average, in particular Germany and Austria. However, this evidence is weak and should be taken as indicative.

Real exchange rate adjustment has led to changes in external demand and export performance in the euro area countries. Competitiveness gains have led to export growth in particular in Germany, Austria and Belgium-Luxembourg while competitiveness losses have affected negatively export growth in Italy, Portugal and Spain. Significantly, in Ireland, Finland, and the Netherlands export growth has remained above the euro area average despite their real exchange rate appreciation. The case of Italy, illustrates that differences in the product composition of exports may explain these divergent developments in export growth performance<sup>23</sup>.

<sup>23</sup> see Burattoni et al (2006)

## 4.2 FISCAL ADJUSTMENT

Given the lack of nominal interest and exchange rates as policy tools in a monetary union, fiscal policy may be a key policy instrument in adjusting to macroeconomic shocks in the euro area (Calmfors, 2003, Wren-Lewis, 2000, 2002). However, in the case of small open economies the effectiveness of discretionary fiscal policy is limited due to import leakage (Hoeller et al, 2004; Al-Eyd et al, 2006).

To assess the role of national fiscal policies within a monetary union, Colciago et al (2006) use a two-country New Keynesian DGE model with non-Ricardian consumers and a home bias in the composition of national consumption bundles. They find that fiscal policy can be successful for macroeconomic stabilisation in a monetary union, in particular when combining elements of both government expenditure and taxation in the automatic stabilisers. However, in some cases, conflicting views among national policy makers may emerge. Furthermore, their results suggest that there may be redistributive effects in terms of consumer welfare.

Recent research on fiscal adjustment (Perotti et al, 1998; von Hagen and Strauch, 2001; von Hagen, Strauch and Hughes Hallet, 2002) shows that the quality of fiscal adjustment is related to the relative contribution of different budgetary items to the adjustment effort. A fiscal consolidation is considered successful if the reduction in the budget deficit lasts for a number of years. Successful consolidations are fiscal adjustments based on expenditure cuts rather than increased revenues.

Briotti (2004) finds that the composition of budget consolidation policies implemented by EU countries between 1991 and 2002 have had an effect on the durability of fiscal consolidation. Countries which relied more than others on revenue-based adjustment suffered the largest consolidation setbacks since 2000.

The extent of the consolidation is also relevant, as countries which implemented more limited and delayed consolidation have suffered from significant budget worsening in more recent years. In relation to the cycle, fiscal policies show a clear bias in the period under examination. The analysis shows that fiscal policies were more pro-cyclical in high deficit countries than in low-deficit countries and in large countries than in small countries. In the first case, the risk of exceeding the fiscal reference values in bad times might have prompted pro-cyclical consolidation in countries with serious fiscal imbalances. In the second case, the worse budget positions recorded by larger countries might again explain why consolidation resumed in bad times. The analysis reveals that the pro-cyclical policies were those dominated by revenue-based adjustments. This may have accentuated the distortionary effects of tax increases.

Al-Eyd et al (2006) use the NiGEM model and examine the impact of an expansionary fiscal policy in the euro area countries. The results are compared to a simulation where all euro area economies raise government spending at the same time. Specifically, the model simulates the effects of a two - year raise of government consumption expenditure by 1 percent of GDP. Short-term interest rates are held fixed over the two year period so that this fiscal expansion is not immediately offset by a monetary tightening.

They find that in the case of the single country shocks, the interest rate response is small, particularly for the smaller euro area countries, as the small rise in inflation exhibited by these countries has little impact on the ECB target for the euro area as a whole. The exchange rate strengthens in

the first quarter of the simulation in anticipation of the interest rate rise. Export prices rise relative to import prices, and there is deterioration in net trade, which partially offsets the increase in output. In the long run, GDP, unemployment and inflation return to their baseline values.

An area-wide fiscal expansion has stronger effects on the euro area economies in comparison to responses to unilateral fiscal expansions. Further, the simulation results suggests that the benefits from an euro area wide fiscal expansion are greater in the more open economies due to a stronger export demand from the other expanding euro area countries. In addition, a higher share of intra-euro area trade is associated with a less impact of exchange rate shifts on competitiveness.

### Summary

The effectiveness of fiscal policy as a stabilisation tool remains still to be proved. Model-based simulations suggest that discretionary fiscal policy is more effective in large countries while, due to import leakages, it is limited in small open economies. More open economies, with a high share of intra-euro area trade are likely to benefit more from an euro area wide fiscal expansion.

## 4.3 LABOUR MOBILITY

The Optimum Currency Area (OCA) theory<sup>24</sup> points to labour mobility as an adjustment mechanism in the absence of an independent monetary policy. The need to rely upon labour mobility as an adjustment mechanism also depends on the degree of wage flexibility. A negative labour demand shock in a country should translate into a decrease of its relative price level, provided that relative prices are flexible. Although increasing, wage flexibility in the members of EMU is generally low, particularly in terms of downward wage rigidity.

Labour mobility across EMU countries is still low, compared with a benchmark like the US reflecting barriers to movement such as language and cultural differences and different social security systems.<sup>25</sup>

Empirical studies point out that wage and unemployment differentials are indeed important determinants of migration flows. For example, Eichengreen (1993) investigated fifteen regions from UK, USA, and Italy. He found that immigration is positively related to high wages and negatively to high unemployment rates.

Barro and Sala-i-Martin (1995) regressed the net migration rate on per capita income, weather conditions and population density for five European countries, US and Japan. They found a much smaller effect of income on migration for Europe when compared with the US and Japan.

Puhani (1999) estimates the elasticity of migration with respect to changes in unemployment and income on the basis of a regional panel data for Germany, France and Italy. Labour mobility is higher in Germany but even here it would take at least four years until more than half of a shock to unemployment is accommodated by migration. This leads him to conclude

<sup>24</sup> see Mundell (1961)

<sup>25</sup> see Obstfeld and Peri (1998) and Piracha and Vickerman (2002)

that labour mobility is extremely unlikely to act as a sufficient adjustment mechanism to asymmetric shocks in the euro area.

Similar research was done previously by Decressin and Fatas (1995) that investigated a panel data set for 51 US states and 51 EU regions over the period 1975-1990. They found that a region specific employment shock is absorbed in the short run in a different manner. In the EU a negligible proportion of the labour demand shock is absorbed by migration throughout one year after the shock occurred, while for the US after one year the proportion is 52 per cent.

It has also been argued that the EU's current combination of highly mobile capital and relatively low labour mobility might have increased the costs of adjusting to asymmetric shocks without nominal exchange rate changes. If a country suffers a negative shift in output demand, the capital can flow out of the country relatively fast, accentuating the negative effect on unemployment. Krugman and Obstfeld (2003) see this as an example of the theory of the second best, which implies that complete liberalization of the capital market might impact negatively on the efficiency of the EU if the labour market functions poorly.

### **Summary**

Low labour mobility makes it unlikely to act as an efficient adjustment mechanism to country specific shocks in the euro area. Furthermore, this low labour mobility combined with highly mobile capital imply higher adjustment costs in the euro area.

---

## 5. Summary and Policy Implications

Overall, the adoption of the single currency can be assessed as successful. However, the resilience of the euro area countries to major asymmetric shocks has not yet been fully tested.

Output growth differentials across the euro area countries have been stable since the beginning of the Stage One of the EMU. They are mainly due to underlying trend growth differentials while the cyclical components of growth rates have become more synchronised. In particular, differences in real GDP growth reflect primarily differences in supply conditions such as demographic and labour supply developments, and long term labour productivity trends.

Inflation differentials have declined and stabilised at a low level. They reflect changes in relative prices and are explained mainly by country specific wage developments.

Divergent inflation rates have resulted in divergent real interest rates. In particular, real interest rates lower than the euro area average may have added to demand pressures and contributed to housing market booms.

EMU has fostered intra-euro area trade integration in particular intra-industry trade which in turn has contributed to business cycle synchronisation. However, because of differences in patterns of trade, financial linkages and industrial specialisation there remains the possibility of asymmetric shocks - country specific shocks or idiosyncratic effects of common shocks across the euro area countries.

Financial integration can act as an adjustment mechanism to country-specific shocks by smoothening consumption over time through cross-border portfolio diversification. Furthermore financial integration plays an important role in the transmission of the common monetary policy.

Recent research suggests that the euro has fostered financial integration in the euro area. However, the level of risk sharing through financial integration in the euro area is still low as wealth effects on consumption are weak in the member countries in particular in the short run. Global equity price shocks have a stronger effect in the euro area with most of spillovers originating in the US. There is also evidence indicating that households react stronger to capital losses in comparison to capital gains. This asymmetry is likely to influence the marginal propensity to consume out of wealth.

The effectiveness of fiscal policy as a stabilisation tool remains still to be proved. Model-based simulations suggest that discretionary fiscal policy is more effective in large countries while, due to import leakages, it is limited in small open economies. More open economies, with a high share of intra-euro area trade are likely to benefit more from an euro area wide fiscal expansion.

## REFERENCES

- Adjaoute, K. and J. P. Danthine (2003). European financial integration and equity returns: A theory-based assessment, in: V. Gaspar, P. Hartmann and O. Sleijpen (eds.), *The Transformation of the European Financial System*, 185-245.
- Adjaoute, K. and J. P. Danthine (2004). "Equity returns and integration: Is Europe changing?", *Oxford Review of Economic Policy*, 20(4), 555-570.
- Ahearne, A. and J. Pisani-Ferry (2006). "The Euro: Only for the agile", The Bruegel Policy Brief Series, 2006/01.
- Al-Eyd, A., R. Barrell, D. Holland (2006). "The role of financial markets' openness in the transmission of shocks in Europe", National Institute of Economic and Social Research, Discussion Paper No. 271
- Alesina, A., O. Blanchard, J. Gali, F. Giavazzi, and H. Uhlig (2001). "Defining a macroeconomic framework for the euro area", CEPR Monitoring the European Central Bank No. 3
- Alesina, A., R. Barro, and S. Tenreyro (2002) "*Optimal Currency Area*", NBER Working Paper No. 9702.
- Altissimo, F., P. Benigno, and D. Rodriguez Palenzuela (2005). "Long-run determinants of inflation differentials in a monetary union", NBER Working Paper No. 11473
- Artis, M. and W. Zhang (1997). "The international business cycle and the ERM: Is there a "European" cycle?", *International Journal of Finance and Economics*, 2:1-6.
- Artis, M., A. B. Galvao, and M. Marcellino (2003). "The transmission mechanism in a changing world", *CEPR Discussion Paper* No. 4014. CEPR, London.
- Baele, L., A. Ferrando, P. Hoerdahl, E. Krylova and C. Monnet (2004). "Measuring financial integration in the Euro area", ECB Occasional Paper No. 12.
- Baldwin, R. and C. Wyplosz, (2004). *The Economics of European Integration*, McGraw-Hill
- Baldwin, R. (2006). "The euro's trade effects", ECB Working Paper No. 594
- Barrell, R. and S. Gottschalk (2004). "The volatility of the output gap in the G7", NIESR, *National Institute Economic Review*, April
- Barrios, S. and J. de Lucio (2003). "Economic integration and regional business cycles: Evidence from the Iberian regions", *Oxford Bulletin of Economics and Statistics*, 65, 497-515.
- Barro, R. and X. Sala-i-Martin (1995), *Economic Growth*. New York: McGraw-Hill.
- Baxter, M. and M. Kouparitsas (2003). "Trade structure, industrial structure, and international business cycles", *American Economic Review*, May, 51-56.
- Benalal, N., J. L. Diaz del Hoyo, B. Pierluigi, and N. Vidalis (2006). "Output growth differentials across the Euro area countries – Some stylised facts", ECB Occasional Paper Series, No. 45.
- Berben, R., K. Bernoth, and M. Mastrogiacomo (2006). "Households' response to wealth changes. Do gains and losses make a difference?", CPB Discussion Paper No. 63
- Boewer, U. and C. Guillemineau (2006). "Determinants of business cycle synchronisation across Euro area countries", ECB Working Paper Series, No. 587.
- Briotti, M. G. (2004). "Fiscal adjustment between 1991 and 2002: Stylized facts and policy implications", ECB Occasional Paper No. 9, February

- Busetti, F., L. Forni, A. Harvey and F. Venditti (2006). "Inflation convergence and divergence within the European Monetary Union", ECB Working Paper Series, No. 574.
- Burattini, M., M. Ferrari, and S. Tomasini (2006). "The Italian economy since the start of the European Monetary Union", Prometeia, paper prepared for the EUROFRAME-European Forecasting Network Autumn Report 2006, www.eurofarme.org
- Calmfors, L. and A. Johansson (2005). "Nominal wage flexibility, wage indexation and monetary union", *The Economic Journal* 116: 283-308
- Calmfors, L. (2003). Fiscal policy to stabilise the domestic economy in the EMU: What can we learn from monetary policy?, CESifo Economic Studies, Vol.49, No.3, 319-353.
- Cameron, G., J. Muellbauer and A. Murphy, 2006, "Was there a British House Price Bubble? Evidence from a Regional Panel", London CEPR 5619
- Canova, F. (1998). "Detrending and business cycle facts", *Journal of Monetary Economics*, 41:3, 475-512
- Canova, F. and J. Marrinan (1998). "Sources and propagation of international output cycles: Common shocks or transmission?," *Journal of International Economics*, vol. 46(1), 133-166, October.
- Chauvin, V. and S. Le Bayon (2005). "Logement: Sommets atteints?", *Lettre de l'OFCE*, No. 257
- Colciago, A., A. Muscatelli, T. Ropele and P. Tirelli (2006). "The role of fiscal policy in a monetary union: Are national automatic stabilizers effective?", CESifo Working Paper Series, No. 1682.
- Decressin, J. and A. Fatas (1995), "Regional Labour Market Dynamics in Europe", *European Economic Review* 39
- De Grauwe, P. (2003). *Economics of Monetary Union*, Oxford: Oxford University Press
- Deroose, S., S. Langedijk and W. Roeger (2004). "Reviewing adjustment dynamics in EMU: From overheating to overcooling", European Economy", *Economic Papers*, No. 198, European Commission.
- Duffy, D. (2002). "A descriptive analysis of the Irish housing market", Dublin: ESRI *Quarterly Economic Commentary*, July.
- Duffy, D., Fitz Gerald, J. and I. Kearney (2005). "Rising house prices in an open labour market", *Economic and Social Review*, Vol 36 No 3, Winter
- Eichengreen, B. (1993), "Labour Markets and European Monetary Unification" in P. Mason and M. Taylor (eds.) *Policy Issues in the Operation of Currency Unions*. Cambridge: Cambridge University Press.
- European Central Bank (2003). "Inflation differentials in the Euro area: Potential causes and policy implications", ECB Report, September 2003.
- European Central Bank (2005). "Monetary policy and inflation differentials in a heterogeneous currency area", ECB Monthly Bulletin, May 2005, 61-77.
- European Central Bank (2006) "Assessing house price developments in the euro area", article in the ECB Monthly Bulletin, February 2006
- European Commission (2005) "Country Study: Spain in EMU: a virtuous long-lasting cycle?", Brussels, European Commission, Directorate General for Economic and Financial Affairs, Working Paper No. 14
- European Commission (2006a). *Annual Statement on the Euro area*, COM (2006) 392 final.
- European Commission (2006b). "Economic forecasts Spring 2006", *European Economy*, No. 2, Statistical Annex, Luxembourg: Office for Official Publications of the EC

- European Forecasting Network (2006). "Economic forecasts of the Euro area: Forecasts and policy analysis", Dublin: The ESRI, Spring.
- Fatás, A. (1997). "EMU: Countries or regions? Lessons from the EMS experience", *European Economic Review*, vol. 41, 743-751.
- Fischer, S., R. Sahay, and C. A. Vegh (2002). "Modern hyper- and high inflations", *The Journal of Economic Literature*, Vol. 40, No. 3, 837-880.
- Fitz Gerald, J. (2006) "Lessons from 20 Years of Cohesion", in S. Mundshenk, M. Stierle, U. Stierle-von Schuetz, and I. Traistaru (eds.) *Competitiveness and Growth in Europe*, Cheltenham: Edward Elgar, 66-100
- Frankel, J. A. and A. Rose (1998), "The endogeneity of the optimum currency area criteria", *The Economic Journal*, No. 108, 1009-1025.
- Himmelberg, C., C. Mayer and T. Sinai (2005). "Assessing high house prices: Bubbles, fundamentals, and misperceptions", *Journal of Economic Perspectives*, Vol. 19, No.4.
- Hoeller, P., C. Giorno and C. de la Maisonnette (2004) "One money, one cycle? Making monetary union a smoother ride", OECD Economic Department Working Paper No. 401
- Honohan, P. and P. Lane (2003), "Divergent inflation rates in EMU", in: R. Baldwin, G. Bertola and P. Seabright (eds.), *EMU: Assessing the Impact of the Euro*, Blackwell Publishing, 67-95.
- Imbs, J. (2004) "Trade, finance, specialisation and synchronisation", *Review of Economics and Statistics*, 86(3), August.
- Kalemli-Ozcan, S., B. Sorensen and O. Yosha (2001). "Economic integration, industrial specialization and the asymmetry of macroeconomic fluctuations", *Journal of International Economics*, Vol. 55, No. 1, 107-137.
- Lane, P. R. (2006). "The real effects of EMU", IIS Discussion Paper, No. 115.
- Krugman, P. (1993). "Lessons of Massachusetts for the euro area", in T. Giavazzi, and F. Torres, (eds.), *Adjustment and Growth in the Economic and Monetary Union in Europe*, New York: Cambridge University Press, 241-261.
- Krugman, P.R. and M. Obstfeld (2003), *International Economics: Theory and Policy*. London: Addison-Wesley.
- Lane, P. R. and S. Wälti (2006). "The euro and financial integration", IIS Discussion Paper, No. 139.
- Lemoine, M. (2006). "A model of the stochastic convergence between euro area business cycles", OFCE
- Massmann, M. and J. Mitchell (2004). "Reconsidering the evidence: Are Euro area business cycles converging?", *Journal of Business Cycle Measurement and Analysis*, Vol. 1(3), 275-307
- McKinnon, R. (1963). "Optimum currency areas", *American Economic Review*, 53: 717-725.
- Micco, A., E. Stein, and G. Ordonez (2003). "The currency union effect on trade: early evidence from EMU", in: R. Baldwin, G. Bertola and P. Seabright (eds.), *EMU: Assessing the Impact of the Euro*, Blackwell Publishing, 23-51
- Mongelli, F. P. and J. L. Vega (2006). "What effect is EMU having on the Euro area and its member countries? An overview", ECB Working Paper Series, No. 599.
- Mundell, R. (1961), A Theory of Optimal Currency Areas, *American Economic Review*, 51.
- Murphy, A. (2006). "Modelling Irish house prices: A review and some new results", Nuffield College Oxford mimeo.



- Nicoletti, G and S. Scarpetta (2005). "Regulation and economic performance: Product market reforms and productivity in the OECD", *OECD Economics Department Working Papers*, No. 460
- OECD (2005). *Economic Outlook*, Paris: OECD.
- Obstfeld, M. and G. Peri (1998). "Asymmetric shocks. Regional non-adjustment and fiscal policy", *Economic Policy*, No. 26
- Piracha, M. and R. Vickerman (2002). "Immigration, labour mobility and EU enlargement", Department of Economics, University of Kent.
- Perotti, R. (2002). "Estimating the effects of fiscal policy in OECD countries", ECB Working Paper Series, No. 168.
- Puhani, P.A. (1999), "Labour Mobility – An Adjustment Mechanism in Euroland? Empirical Evidence for Western Germany, France and Italy." IZA Bonn Discussion Paper No. 34.
- Rae, D. and P. van den Noord (2006). "Ireland's housing boom: What has driven it and have prices overshot? Paris: OECD Economics Department Working Paper No. 492.
- Rother, P. C. (2004). "Fiscal policy and inflation volatility", ECB Working Paper Series, No. 317.
- Rünstler, G. (2004). "Modelling phase shifts among stochastic cycles", *Econometrics Journal* 7(1), 232-248
- Tondl, G. and I. Traistaru-Siedschlag (2006). Regional growth cycle synchronisation with the Euro area, ESRI Working Paper Series, No. 173.
- von Hagen, J. and R. Strauch (2001). "Fiscal consolidations: Quality, economic conditions, and success", *Public Choice*, 109, 327-346
- von Hagen, J., A. H. Hallet, and R. Strauch (2002). "Budgetary consolidations in Europe", *Journal of Japanese and International Economics*, 16, 512-535
- Wren-Lewis, S. (2000). "The limits to discretionary fiscal stabilisation policy", *Oxford Review of Economic Policy*, Vol.16, No.4, 92-105.
- Wren-Lewis, S. (2002). "Fiscal policy, inflation and stabilisation in EMU", Working Paper, University of Exeter