

**CROSS-COUNTRY MACROECONOMIC
HETEROGENEITY IN EMU**

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Abstract

The objective of this paper is to explore the size and normative implications of macroeconomic discrepancies between EMU countries. Available data and empirical work show that EMU countries display noticeable heterogeneity in terms of economic development, exposure to shocks and adjustment mechanisms. But this does not seem to prevent a relatively high degree of similarity in their cyclical patterns. And the remaining discrepancies do not seem much influenced by monetary and exchange rate policies. Indeed, EMU makes a limited difference in terms of the cross-country effects of common shocks. It may nevertheless have an influence on the ability of countries to absorb idiosyncratic shocks. The problem is therefore not a deficit of homogeneity so much as a possible deficit of flexibility for each economy to adjust smoothly to country-specific developments.

1 Introduction

In the last few years, the dynamism of economic activity in the euro area economy has been relatively scant: average GDP growth between 2001 and 2004 was only 1.3%, half the related figure in the United States. This has contributed to increasing the income per-capita gap between both areas. However, not all euro zone economies have grown at the same modest rates. Indeed, countries like Greece, Spain and, especially, Ireland have significantly outperformed the EMU average while others, such as Germany, Italy and Portugal have clearly lagged behind. The combination of low average growth and noticeable cross-country discrepancies in the performance of the euro area economies have prompted an ongoing debate on the possible adverse effect of the single monetary and exchange rate policies on economic activity in the euro area.

By and large this debate is a follow-up of the discussion in the nineties on the suitability of the EU as a currency area. Starting with the report *One Market, One Money* [see Emerson et al. (1992)], an extensive literature has assessed the pros and cons of the EMU project. Essentially, two issues have merited most attention: first, gains from trade creation as a consequence of the elimination of foreign exchange risk and associated transaction costs [see e.g. Rose (2000), and Rose and Wincoop (2001)]; and second, losses due to a lack of domestic stabilisation tools [see e.g. Eichengreen (1992), and Bayoumi and Eichengreen (1997)].

The short history of EMU has already allowed direct evidence to be had on trade integration generated by the single currency. In particular, Micco et al. (2003) and Baldwin (2005) confirm that trade effects of the currency are large. The availability of only a few years' data not yet spanning a complete business cycle prevents a thorough assessment of the implications of the single monetary and exchange rate policy on the macroeconomic stability of the Member States. We do, however, have some data and empirical literature that allow some light to be shed on whether national macroeconomic developments are diverging excessively for a workable and welfare-improving monetary union. The analysis of this issue entails not only measuring the degree of heterogeneity in the performance of EMU Member States, but also an attempt to understand its determinants and, in particular, the extent to which such heterogeneity has been reduced or exacerbated by the current monetary union regime.

The objective of the paper is precisely to review the available analytical and statistical evidence on this issue. Although we will focus mainly on cyclical discrepancies across countries, we will start by reviewing in section 2 some basic structural features. Section 3 will be devoted to evaluating the degree of similarity of national business cycle fluctuations. Section 4 explores differences in the degree of exposure to different types of shocks and in the propagation mechanisms. Section 5 focuses on the influence of the monetary union regime on the observed discrepancies. Section 6 draws some conclusions.

2 Structural features

In order to highlight some basic structural characteristics of the euro area national economies, it is useful to recall first some relatively well-known patterns of growth accounting in the euro area as whole, in comparison with the United States as depicted in Table 2.1. Namely:

i) There is a significant welfare gap (in terms of GDP per-capita) between the United States and the eurozone which has increased slightly in the last decade or so.

ii) The gap is due both to lower productivity and lower use of labour input. The relative importance of these two factors depends on whether labour is measured in hours or employees. When employment figures are used as is done for simplicity in Table 2.1, the productivity differential effect predominates.

iii) Although the labour utilisation gap has been partially corrected in the last few years, the productivity gap has actually increased, due to both the mechanical effect of higher employment creation but also to a technological deficit affecting TFP.

Observing now the cross-country evidence (presented in Chart 2.1 and 2.2), the dispersion of GDP per-capita in EMU countries is not small due essentially to the relative underperformance of three countries –Greece, Spain and Portugal– despite the real convergence process experienced by the first two economies. Luxembourg¹ and, more recently, Ireland are the countries that most significantly outperform the euro area average. This ranking of countries in terms of income per-capita is largely explained by relative productivity levels. By contrast, although employment rates and, to a less extent, demographic developments also diverge, labour utilisation, seem less heterogeneous than productivity across countries.

In any case the above evidence shows that GDP per-capita is lower than in the United States in all countries, except Luxembourg; that with no exception, EMU countries are less productive than the United States; and that labour utilisation is similar or smaller than in the United States in nearly all the EMU Member States. Therefore, although there are relevant structural differences across countries, the usual general qualitative statements on the main basic structural characteristic of the euro-area economy can safely be applied to most EMU Member States.

1. Due to statistical difficulties, employment and GDP in Luxembourg is not properly corrected from non resident workers. It overstates the Luxembourg per-capita income and employment rate.

3 Cyclical divergences

An important aspect in assessing the degree of homogeneity among Member State economies is the comparative analysis of the business cycle. This concept refers to the regular, sequential pattern of broad movements of a stationary nature in economic variables around their long-term trend. In principle, synchronism in the cycles of the euro area countries can be considered a positive factor in monetary union because it facilitates the co-ordination of economic policies and, in particular, the conduct of a common monetary policy.

This section thus examines the degree of homogeneity of the Member States' cyclical behaviour, comparing it with the current dispersion in other monetary unions and analysing whether the synchrony has changed in recent years and the reasons behind the cycle proximity. To do this the first statistic to look at is probably the dispersion of growth rates across countries. Chart 3.1 presents the standard deviation for both the 12 euro area countries and the largest four, as well as similar statistics for other monetary unions. The chart shows that the degree of dispersion is now below that at the beginning of the 90s. Interestingly, the standard deviation of GDP growth rates of EMU countries does not lie significantly above that of US states, and is only moderately higher than the dispersion between German *länder*. Therefore, we can hardly take the dispersion of EMU countries, in terms of GDP growth, to be necessarily excessive for a workable Monetary Union.

Moreover, dispersion of GDP growth rates could, to some extent, be due to different potential growth.² Therefore, in order to assess cyclical divergences it is probably more precise to use instead output gaps. To do so, we first present some updated results from Cabrero, Chuliá and Millaruelo (2002), where a frequency band filter is used to estimate the cyclical component.³ Chart 3.2 presents the weighted and unweighted standard deviation of this cyclical component for the 12 euro area countries and the 4 largest ones. In this case, it is clear that the dispersion of output gaps is indeed much lower now than it was in the early nineties. The greatest progress in reducing divergence was made before the process of setting up the euro area began; it took place from 1993, after the impact of Germany's reunification had been absorbed and the ERM crisis in late 1992 and the first few months of 1993 had been resolved. According to both measures, cyclical divergences have not changed much after 1999. This fact may be seen as a failure of EMU to increase cyclical synchrony between Member States. At the same time, it does suggest that the lack of domestic stabilisation tools has not had an adverse influence on the degree of macroeconomic disparities across countries.

Looking more closely at business cycle fluctuations in each Member State –as in Chart 3.3– it is striking that the correlation between the domestic and the aggregate output gap is very high for almost all of them. Indeed, the contemporaneous correlations between the output gap of the euro area and that of each member country are typically around 90%.

2. According to EC calculations, in the last years, trend growth dispersion explains up to 80% of total euro area growth dispersion [see European Commission (2005)].

3. To calculate the cyclical component, first the trend-cycle component is estimated using TRAMOSEATS applications. Subsequently, the cycle is extracted using the TRACE application. The main references followed are: Gómez and Maravall (1996), Kaiser and Maravall (1999), and Gómez (1999 and 2001).

The chart also shows that Finland⁴ is a special case which has a low correlation with the euro area and lags the other euro area countries. This may be because in the past it had strong trade ties with the USSR and was affected by the Soviet economic collapse at the end of the 1980s. Nowadays, Finland's industrial structure also happens to be somewhat singular, given its specialisation in the high-technology sector.

The above evidence seems to suggest that there could already be a common European cycle. This is in line with the findings of Artis et al. (1997) and Mansour (2003). More recently, Camacho, Pérez-Quirós and Sáiz (2004) fail to find evidence supporting that view. These authors develop several indicators of distance between business cycles of different economies. These distances are defined as 1 minus the correlation across countries of the cyclical component of the Industrial Production Index derived with three different statistical procedures. A number of bilateral distances were constructed and projected in a two-dimensional space as Chart 3.4 plots. The chart shows that, in general, there are some relevant discrepancies in bilateral distances between EMU countries themselves and with third countries. Based on that, they can reject the hypothesis of a single euro-economy attractor.

However, as seen in Chart 3.4, bilateral distances corresponding to euro area countries tend to cluster in a specific region of the space, thereby suggesting that the cycles of EMU countries have in fact much more in common with one another than with other countries. Among the European countries, Greece and Portugal exhibit fewer similarities with other European cycles. In addition, the cycle in Finland seems closer to the cycles of Canada and United States than to those of the euro area countries.

Moreover, of special interest is the evidence found on the variables explaining the estimated distances. The results are presented in Table 3.1 and are robust to different methodologies used to obtain the distances. Distances can be explained by a number of structural features such as the relative weight of the different sectors, labour productivity and fiscal policies. Interestingly, monetary and exchange rate policies are found to be non-significant, which suggests that domestic monetary policies do not help mitigate discrepancies nor contribute to increasing distances. More importantly, bilateral trade has a robust and significant negative impact on distances.

Therefore, there are probably some non-negligible cyclical discrepancies across EMU countries that may make it difficult to be able to accept statistically the hypothesis of a single euro area business cycle. But the evidence shows that heterogeneity is not large by any reasonable standard and, in particular, it is in line with those of regions within other monetary unions. It is also interesting that discrepancies do not seem to be much influenced by monetary and exchange rate policies and that, by contrast, there is clear scope for further convergence of cyclical developments in the future if trade links strengthen as expected.

4. The data on Ireland are insufficient and excluded in this exercise. The sample period for analysis of the quarterly items in the National Accounts runs from 1988 Q1 to 2004 Q4.

4 What causes cycle divergences?

When dealing with possible sources of cyclical discrepancies we have to distinguish between those associated with the different exposure of Member States to different types of shocks and those derived from the mechanisms through which common or idiosyncratic shocks affect the relevant macroeconomic variables in each country.

4.1 Exposure to shocks

Following previous literature on economic integration and optimal currency areas [see e.g. Masson and Taylor (1993)] we consider exposure to four types of shocks: foreign demand from outside the euro area, oil imports, sector-specific developments and asset prices.

Focusing first on relevant external shocks, the overall sensitivity of the area and its members to a trade shock depends on the relative importance of non-euro area trade in relation to domestic economic activity. Chart 4.1 shows the significance of external trade in the different countries, in terms of GDP. As the chart reveals, there is a significant dispersion of the weight in GDP of trade with third countries which implies a relatively high degree of cross-country heterogeneity in the degree of exposure to external trade shocks. Among the euro area countries, in Belgium, Finland, Ireland and Netherlands non-euro area trade accounts for a much larger share of GDP than in the rest of the euro area. By contrast, countries such as Portugal, Spain and France show a significantly lower exposure than the average. It is also worth pointing out that there seem to be discrepancies in relation to the structure of external trade with third countries, both in terms of its geographical distribution and its product composition [Cabrero, Chuliá and Millaruelo (2004)].

As regards exposure to oil prices, Chart 4.2 plots net oil imports as a percentage of GDP. This ratio is relatively similar across countries, with some small countries, such as Portugal and Greece, outperforming the average share of net oil imports in terms of GDP.

In order to assess the exposure in different countries to sector-specific shocks, it is appropriate to look at the homogeneity and diversification of the productive structure. Charts 4.3 and 4.4 show first the composition of each Member State's gross value added and second, the composition of industrial production according to the technology intensity of each industry. Chart 4.3 suggests that the exposure of EMU countries to sector-specific shocks is not very different. Services represent a very similar share of output –around 65-70% in most countries– and below that in the United States, where it stands above 75%. Manufacturing also represents a share close to 20% in most Member States, with a somewhat higher value in Finland. The share of agriculture holds constant at between 1% and 4%, and that of construction between 4% and 8%, in both cases above the related US shares. In terms of the technology intensity of industrial production⁵ there are some discrepancies, although most countries seem to attach a larger weight to medium-technology industries and the share of high-technology industries is smaller than in the United States in the majority of countries with the usual exception of Ireland and Finland (Chart 4.4). Therefore, as often mentioned, sectoral specialisation in the eurozone does not differ much and most countries seem to have a relatively diversified production structure which does not seem very heterogeneous across national economies.

5. Gordo, Gil and Pérez (2003) analyse in depth the specialisation and geographical distribution of industrial activity in the EU-15 countries.

Finally, focusing on the potential macroeconomic relevance of asset price variations, Chart 4.5 plots the weight of marketable instruments in households' and non-financial corporations' balance sheets. It can be seen that all countries have a degree of intermediation of financial flows that is relatively high if compared with the United States, which shows a slow declining trend. Non-marketable financial assets represent more than 30% of total household financial assets in most countries, with the only clear exception being Netherlands, in which this share is in any event above that in the United States. As far as firms' financing is concerned, bank loans account for somewhere between 30% and 40% of total liabilities in most countries, with Austria somewhat above and France below these figures. The ratio is in any case higher than in the United States. As regards real assets, Table 4.1 shows that the exposure to house prices is probably larger than that to financial asset prices in all countries and heterogeneity seems more pronounced. As can be seen here, although the ratio of residential investment to GDP lies not far from the EMU average (5.9%) in most countries, the ratio of owner-occupied dwellings does vary significantly across countries. We will see later whether this translates into different housing wealth effects across countries.

Therefore, from the purely descriptive evidence presented here, there would not seem to be any large systematic discrepancies in exposures to financial asset prices, sector-specific developments and oil shocks. More relevant may be the heterogeneity of foreign demand shocks on different countries.

4.2 Transmission mechanism

The second source of cyclical discrepancies in Member States is the possible heterogeneity of the transmission mechanisms of different shocks, i.e. the differences in the path of adjustment to exogenous developments. Probably, the most important propagation channel is the Monetary Transmission Mechanism (MTM). But we will also review some specific evidence on the functioning of labour and product markets as this explains much of the adjustment path of the economy after any type of shock.

Looking first at the transmission of monetary impulses, in an exercise recently performed by the Working Group on Econometric Modelling (ECB)⁶ it was found that the cross-country correlation of output and price responses to a common interest rate shock was relatively high in all euro area countries with the exception of Finland and Austria (see Chart 4.6). In this exercise it was found, however, that the relative importance of specific transmission channels such as the substitution effect, the cost of capital channel and the exchange-rate channel differ among the euro members⁷ (see Chart 4.7). The authors of these studies were also able to find some relationship between those discrepancies and certain structural and policy features. For example, labour market protection seemed to be positively correlated with the magnitude of the substitution channel and, naturally, openness with that of the exchange-rate channel.

But, not surprisingly, financial structures are those that matter most when explaining the discrepancies in interest rate effects on output and inflation. The results of the Eurosystem Monetary Transmission Network collected in Angeloni, Kashyap, Mojon and Terlizzese (2002) show that the importance of quantitative financial channels –such as credit, lending and balance-sheet effects– may be high in some countries (such as Italy, France, Germany and Belgium) while seemingly irrelevant in others (such as Finland, Spain and Luxembourg). This, by definition, would make the effect of interest rates on economic activity differ according to the financial situation of firms and banks, in a way which may not be quite homogenous across countries.

6. See Van Els, Locarno, Morgan and Villettelle (2001), and Berben, Locarno, Morgan and Vallés (2004).

7. The differences in the spillover channel are less important and the cash flow/income and wealth channels are only estimated for a few countries.

Finally, with respect to wealth effects, we have recent evidence from the OECD depicted in Table 4.2 which shows that the Marginal Propensity to Consume out of wealth is significantly lower in the euro area than in the United States, Japan, United Kingdom, Canada and Australia. The degree of heterogeneity within the euro zone is rather limited –even in the case of housing wealth– with the exception of Netherlands, where these effects seem very pronounced given the high exposure of agents in this country to financial asset prices and the widespread use of Mortgage Equity Withdrawal, whose importance is relatively minor in other Member Countries.

Therefore, while there seem to be no large systematic differences in Monetary Transmission Mechanisms, there are some discrepancies, mostly affecting the relative importance of the various transmission channels as a consequence of domestic institutional idiosyncrasies and differences in financial structures and labour markets.

Another category of country characteristics that could contribute to macroeconomic discrepancies in connection with common or idiosyncratic shocks is related to the functioning of product and labour markets. Chart 4.8 summarises the relative position of countries in terms of product market regulation according to a qualitative indicator constructed by the OECD.⁸ It can be seen that the degree of flexibility in the euro zone stands at around the OECD average in 2003, being clearly less flexible than Anglo-Saxon countries and more flexible than other non-EMU countries, with a moderate degree of heterogeneity within the euro zone. Probably more relevant, however, is the evidence on the degree of price flexibility. In a recent ambitious research initiative within the Eurosystem, a number of country studies were produced exploring price patterns using highly disaggregated data. As shown in Table 4.3, it was found that the frequency of price changes in the eurozone normally fluctuated within a range of 13-23% per month, clearly below the frequency prevailing in the United States, the sectorial pattern being quite similar in all countries. Services proved the most rigid sector while energy was constantly the most flexible one. In addition, the share of downward adjustments was around 40% of the total price changes in most countries. This finding suggests models and policy positions that rely on the existence of relevant downward price rigidities may be worth reviewing.

The degree of heterogeneity of labour markets is, however, probably larger. Chart 4.9 plots a standard indicator of labour market functioning such as the cyclically adjusted employment rate calculated by Brandt, Burniaux and Duval (2005). Almost all EMU countries show figures below the OECD average, although the range is quite wide, extending from 55% in Italy to 75% in Netherlands. Moreover, the heterogeneity of the degree of wage rigidities also seems relatively large. The results of the “International Wage Flexibility Project”⁹ show that countries vary widely in terms of their degree of nominal and real wage rigidity and no clear EMU patterns seem to emerge from the results (see chart 4.10).

Therefore, the domestic adjustment mechanisms in euro zone countries seem to have a number of similarities such as the patterns of interest rate and wealth effects and the functioning of product markets; in particular, the degree of price rigidity. But there are also some discrepancies which are especially evident in the relative weight of different monetary transmission channels, due to financial structures and other idiosyncratic features. And the functioning of labour markets seems particularly heterogeneous.

8. See Brandt, Burniaux and Duval (2005).

9. See Dickens et al. (2005), presented at ECB Watchers Conference in Frankfurt, June 3, 2005.

5 Do these discrepancies matter for monetary policy?

This is obviously a very difficult question the answer to which requires a research effort that has still to be completed. This section presents two simple exercises to obtain, at least, some preliminary intuitions on this issue. In an initial exercise we have used a full macro-econometric model –the NIGEM– to see whether, given a common shock, purely domestic-oriented monetary policies following similar rules would have helped reduce the dispersion of output and inflation. In other words, is the single monetary policy becoming destabilising after a common shock, thereby exacerbating discrepancies? For that purpose we consider three common shocks (a 10% increase in oil prices, a 5% increase in external demand and an increase in government consumption equal to 1% of GDP). For each shock we compute the effects on GDP and the consumption deflator for each country under domestic rules (every country has its own monetary regime) and single monetary policy rules (EMU exists and monetary policy responds to the area as a whole). Note that in NIGEM exchange rates are determined endogenously through interest-rate parity conditions. Table 5.1 presents the dispersion measure of the percentage deviation from baseline level after three years for the five largest EMU countries, under the two monetary policy regimes considered: EMU (single monetary rule) and NO EMU (domestic rules).

We see that, under both regimes, the dispersion generated by the common shocks is always moderate although slightly larger in the case of oil shocks. The heterogeneity in the response to the oil shock seems basically due to the different functioning of the labour markets across countries –as oil dependence does not differ much in general. In any case, these results are roughly in line with recent findings by Giannone and Reichlin (2005), which attach little importance to common shocks as an explanatory factor of persistent growth differentials across EMU countries.

Moreover, the simulations show that the absence of domestic monetary and foreign exchange tools does have an ambiguous effect on dispersion. Domestic rules do contribute to moderating the dispersion of GDP under an oil shock and an external demand shock. But under an aggregate demand shock the standard deviation of GDP is higher with domestic monetary policies than when the single monetary and exchange-rate policy is assumed. Interestingly, in all three cases the dispersion of inflation rates is lower under the single monetary policy than under the domestic monetary rules. The reason is of course the behaviour of the bilateral exchange rates which, over business cycle frequencies, may sometimes not contribute much to output or, especially, price stabilisation. Arguably, this is quite a mechanical exercise as it is always possible to design domestic policy rules that could do a better job in stabilising the economy than the simple Taylor rule assumed in the NIGEM simulation. But still, this exercise does help to illustrate –in line with other results in the academic literature– that it cannot be taken for granted that EMU reduces the scope for macroeconomic stability when countries face common shocks, even if member countries are not, as seen, absolutely heterogeneous.

The results above do not, however, exclude the possibility of EMU countries facing difficulties to stabilise the economy in the presence of country-specific shocks. In a second exercise we again use NIGEM to compare the effects on GDP and prices of an increase of public consumption in a large country (Germany) and in a medium-sized one (Spain) under the two regimes considered: EMU (monetary policy responds to the area as a whole) and NO

EMU (every country has its own monetary regime), as in the first exercise. As we can see in Table 5.2, differences across regimes in interest rates and GDP after an idiosyncratic shock are moderate in Germany and relatively large in the case of Spain.¹⁰ The effects of EMU on inflation after domestic shocks are, however, relatively minor as exchange rate movements tend to compensate the demand effect on prices.¹¹ In any case, results suggest that EMU may potentially harm output stability in countries facing idiosyncratic shocks. This effect would logically be larger the bigger the country.

10. Due to the greater weight of Germany in the euro area, it might seem striking that a 1% of GDP increase in government consumption in Germany has the same effect on euro area GDP as the same increase in Spain. The reason behind it is mainly related to the way inflation expectations for each country are constructed in NIGEM. In Spain, inflation expectations are higher than in Germany because a constant is systematically added to it. This means that in Spain, after the positive demand shock, the user cost of capital is lower and real wages are higher than in Germany, boosting at the end of the third year investment and consumption, respectively, and, eventually, GDP.

11. Results may be sensitive to the choice of the exchange rate rule in the NIGEM simulations. A forward rule would actually imply in Germany lower GDP discrepancies across regimes and higher inflation in EMU in the first years of the simulations. Convergence was, however, not achieved when a forward rule was applied to Spain.

6 Concluding remarks

Using available statistical information, recent literature and some model simulations, this paper has documented five basic stylised facts related to cross-country economic discrepancies within EMU. First, EMU countries show some noticeable discrepancies in terms of economic development, exposure to shocks and adjustment mechanisms. Second, despite the different national economic structures, the degree of similarity of the cyclical pattern of countries' output is quite high. Third, the monetary and exchange rate regime seem so far to have exerted only a limited influence on the remaining growth dispersion across countries. Fourth, the existing cyclical differences seem more influenced by idiosyncratic shocks than to the heterogeneity of the propagation mechanisms of common shocks. Fifth, although EMU makes only a relatively small difference in terms of the cross-country effects of common shocks, it may have an influence on the ability of countries to absorb idiosyncratic shocks. Therefore, what matters is not cross-country heterogeneity of economic structures as much as flexibility in national economies to minimise the destabilising effects of country-specific shocks. But, importantly, this poses a domestic policy challenge which would be there even under national monetary sovereignty. The single currency simply makes economic reform more urgent.

By way of conclusion, the economic and political reasons that helped push forward the EMU project seem to remain valid. In particular, the euro is gaining space as an international currency, trade and financial integration is progressing, macroeconomic stability is today a reality throughout the Union, including countries that never really enjoyed such stability in the past; and, after a successful changeover, European citizens are already benefiting from the advantages of being able to use the same banknotes and coins in 12 different countries. If the benefits are already tangible, this paper has argued that the potential risks that were identified when the single-currency project was launched in the early nineties –mainly to the narrowing of the set of domestic stabilisation tools– have not become as severe as many feared at that time.

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Table 2.1

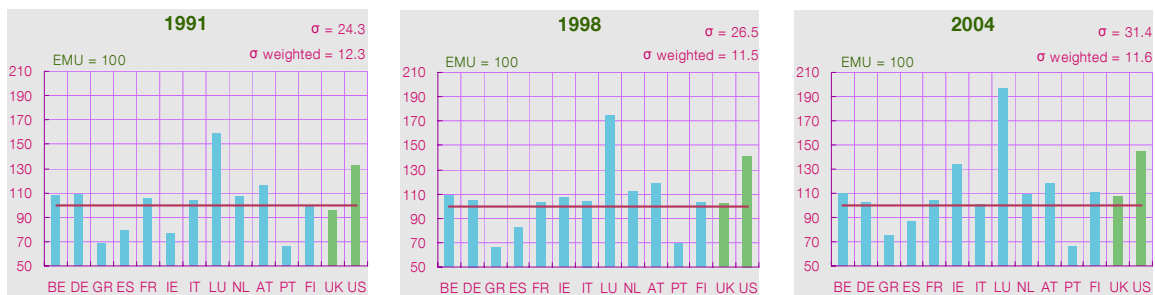
INTERNATIONAL DIFFERENCES IN LEVELS OF PER CAPITA GDP

	RELATIVE LEVELS		
	1991	1998	2004
EMU - US	UNITED STATES = 100		
PER CAPITA GDP (a)	72.8	70.8	69.1
PRODUCTIVITY	83.9	82.9	76.1
EMPLOYMENT / POP.(15 - 64)	84.9	83.9	90.6
POP.(15 - 64) / TOTAL POP.	102.1	101.8	100.2

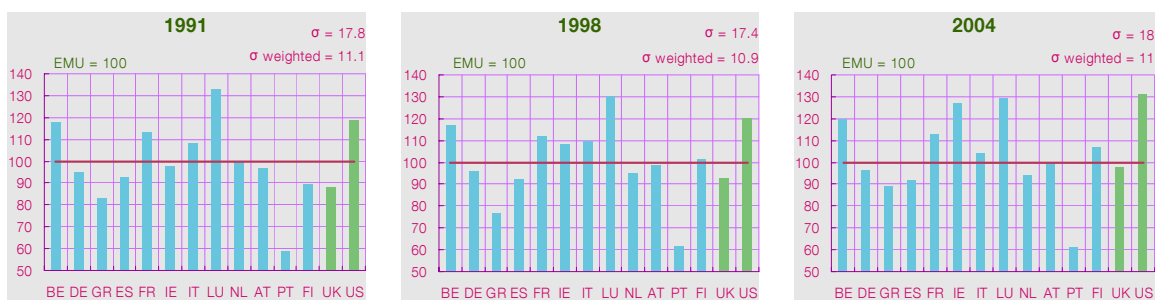
SOURCE: Ameco.

(a) Based on constant prices series expressed in terms of 1995 purchasing power standard (PPS).

PER CAPITA GDP

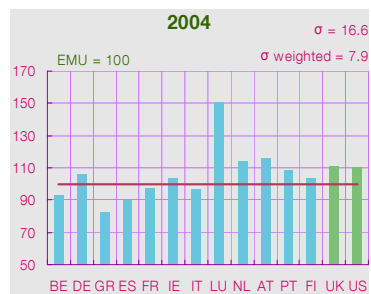
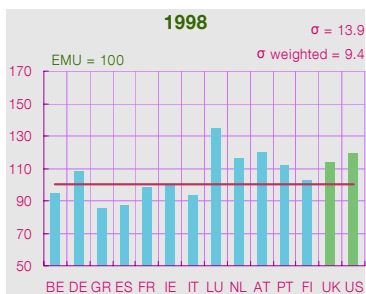
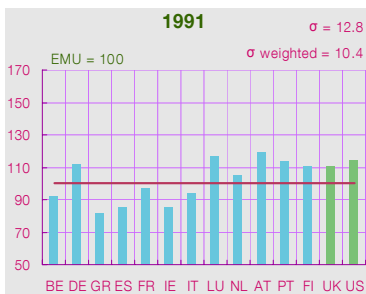


PRODUCTIVITY

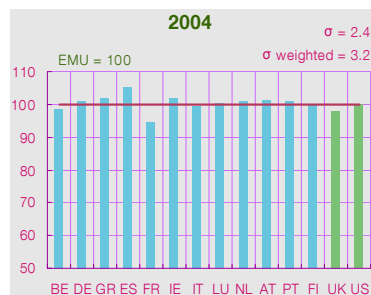
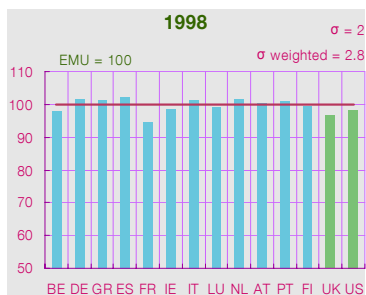
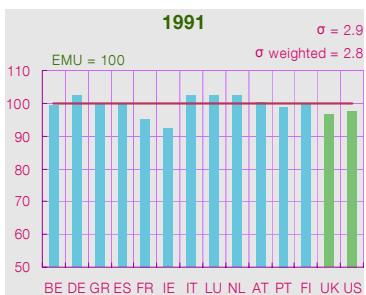


Source: Ameco.

EMPLOYMENT / POP. (15 - 64)



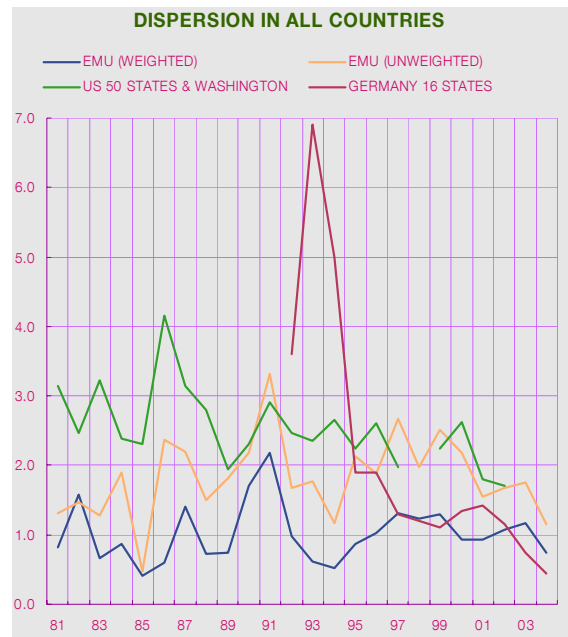
POP. (15 - 64) / TOTAL POP.



Source: Ameco.

GDP GROWTH RATES: DISPERSION (a)

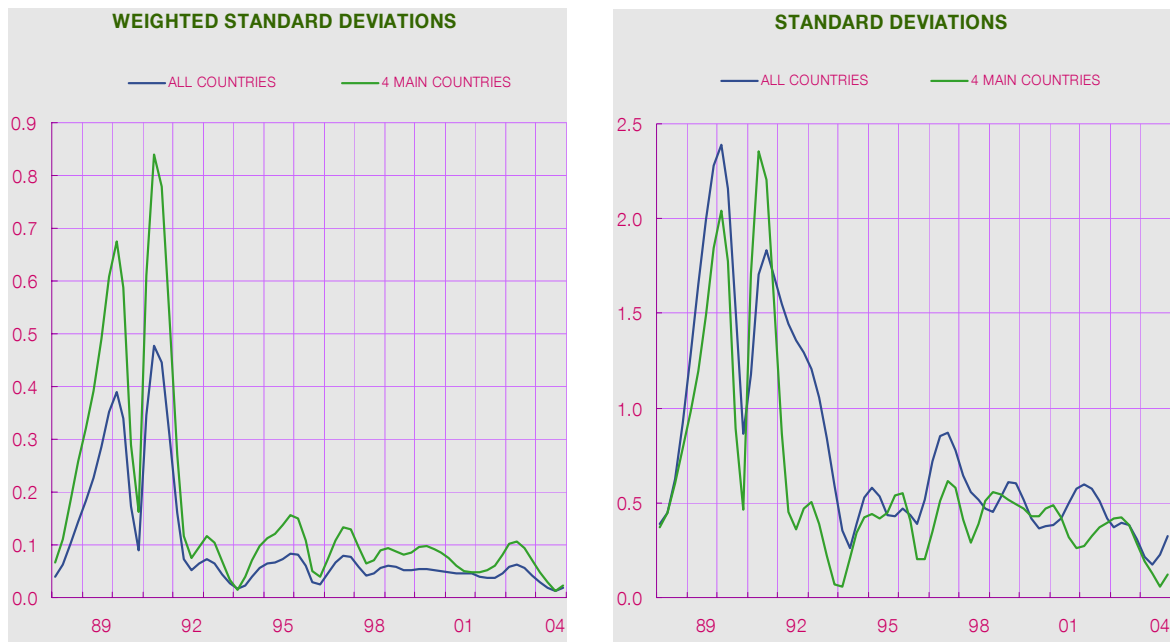
Chart 3.1



SOURCES: ECB and Banco de España.
(a) Standard deviations.

OUTPUT GAP DISPERSION

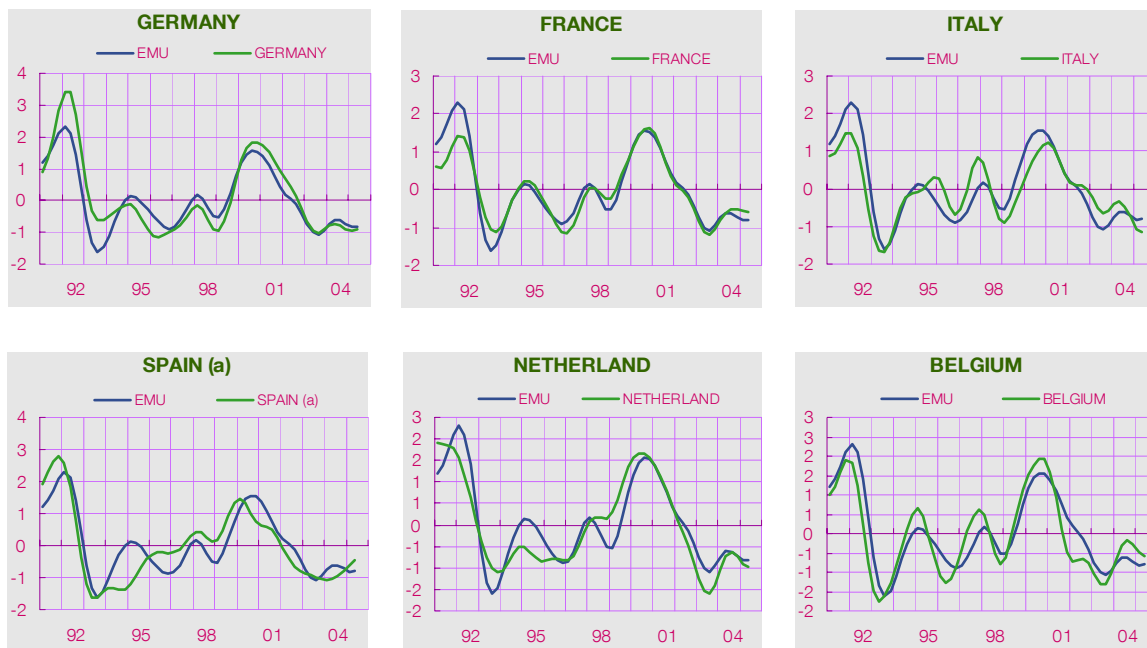
Chart 3.2



SOURCES: Banco de España.

BUSINESS CYCLE FLUCTUATION

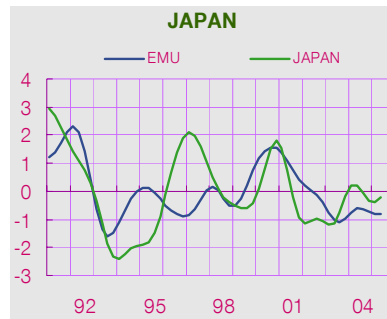
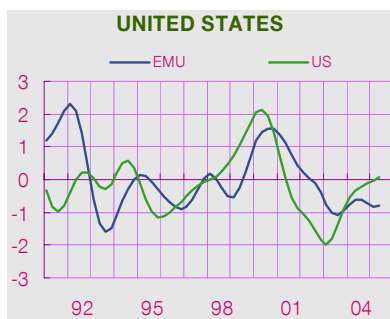
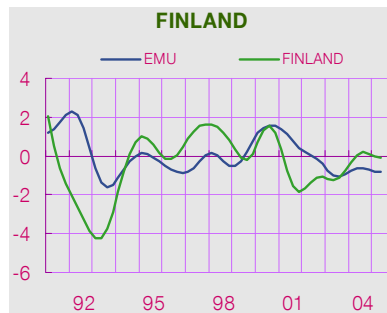
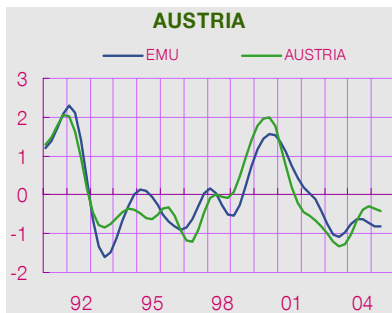
Chart 3.3



SOURCE: Banco de España.
 (a) National accounts 1995.

BUSINESS CYCLE FLUCTUATION

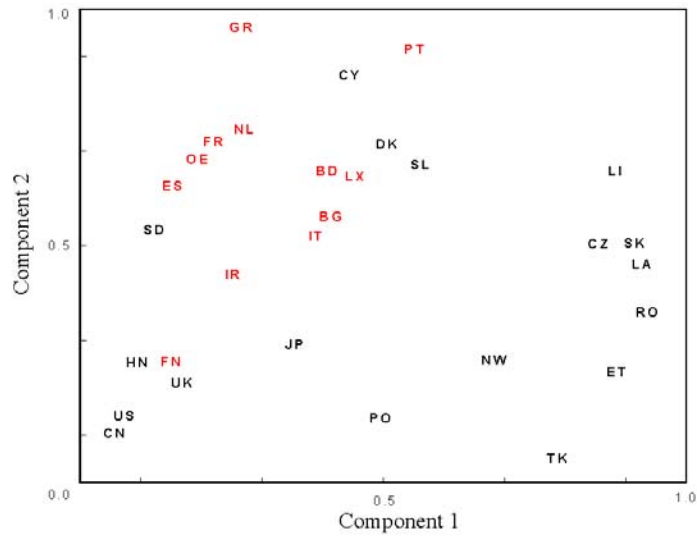
Chart 3.3 (cont.)



SOURCE: Banco de España.

MULTIDIMENSIONAL SCALING MAP FROM AVERAGED BUSINESS CYCLE DISTANCES

Chart 3.4



Note: The figure plots in a two dimensional scale the distances across the economies.

SOURCE: Camacho M., G. Pérez-Quiros and L. Sáiz (2004).

BUSINESS CYCLE DISTANCES AND MACROECONOMIC VARIABLES

Table 3.1

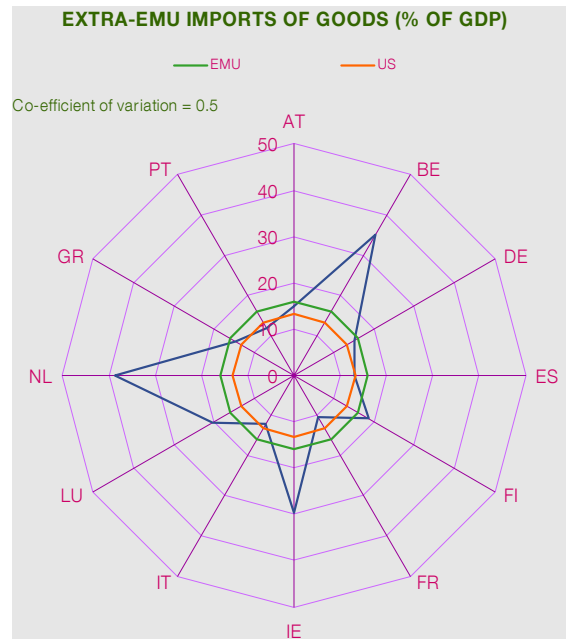
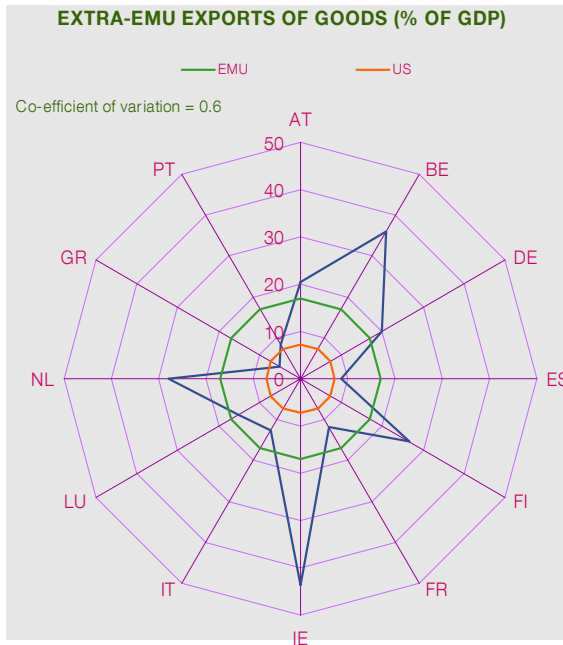
	Combined approach		VAR-based approach		Spectral-based approach		Dummy-based approach	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Constant	0.58 (0.02)	0.58 (0.03)	0.56 (0.03)	0.56 (0.04)	0.50 (0.03)	0.52 (0.04)	0.71 (0.03)	0.70 (0.04)
% Industry	0.84 (0.18)	0.83 (0.19)	1.21 (0.21)	1.22 (0.22)	0.70 (0.22)	0.66 (0.22)	0.54 (0.23)	0.54 (0.24)
%Agriculture	1.55 (0.26)	1.54 (0.26)	1.70 (0.30)	1.70 (0.30)	2.04 (0.31)	2.05 (0.31)	0.78 (0.33)	0.78 (0.33)
Saving ratio	0.36 (0.17)	0.36 (0.17)	0.37 (0.19)	0.37 (0.19)	0.42 (0.20)	0.39 (0.20)	0.35 (0.21)	0.35 (0.21)
Labor productivity	0.08 (0.04)	0.08 (0.04)	0.05 (0.05)	0.05 (0.05)	0.001 (0.04)	-0.006 (0.05)	0.18 (0.06)	0.18 (0.06)
Public Balance	0.56 (0.23)	0.55 (0.24)	0.62 (0.28)	0.63 (0.28)	0.95 (0.28)	0.90 (0.29)	-0.02 (0.30)	-0.01 (0.30)
Trade	-0.86 (0.14)	-0.64 (0.27)	-0.48 (0.16)	-0.46 (0.30)	-0.69 (0.16)	-0.93 (0.31)	-0.46 (0.17)	-0.41 (0.33)
R-squared	30%		28%		28%		16%	

Notes. Entries refer to the estimated coefficients from OLS and instrumental variables regression of business cycle distances on different economic aggregates using the sample 90.01-03.01. Standard errors are in parentheses. See the Section 5 and the Appendix for a detailed description of data sources, missing data, and countries used in the different approaches.

SOURCE: Camacho M., G. Pérez-Quiros and L. Sáiz (2004).

EXTRA-EMU TRADE FLOWS (2004)

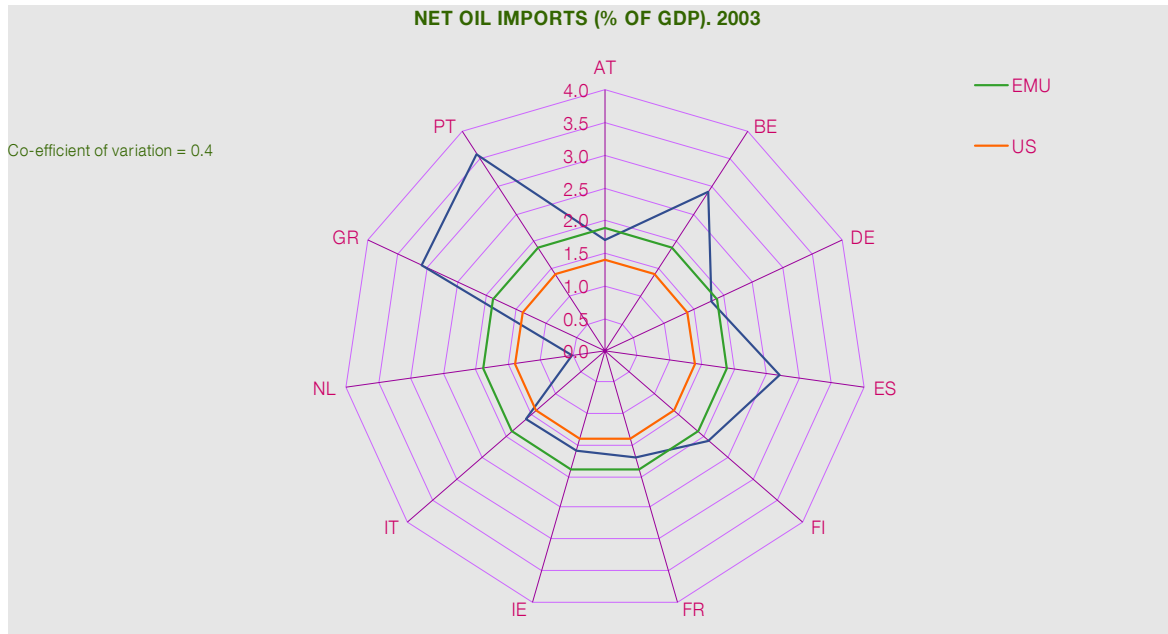
Chart 4.1



SOURCES: Eurostat and US Census Bureau.

EXPOSURE TO OIL PRICES

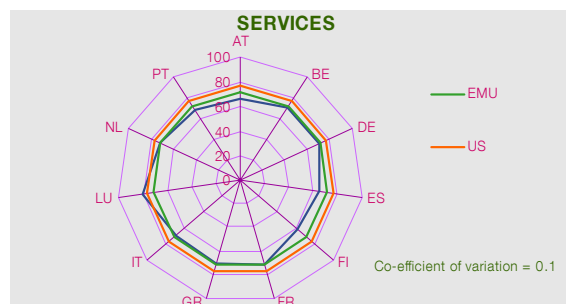
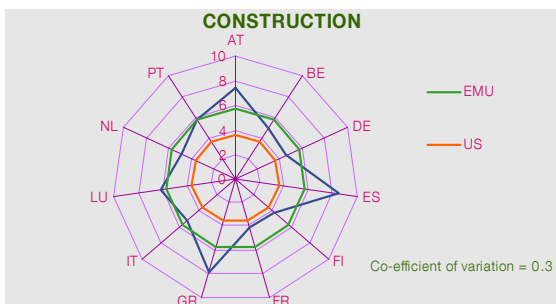
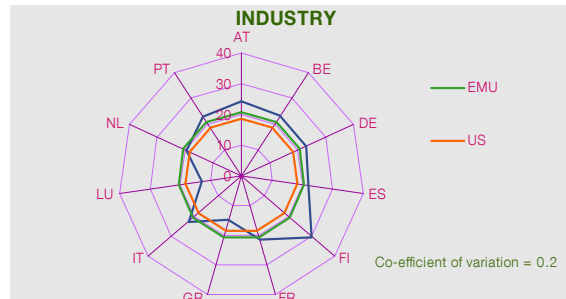
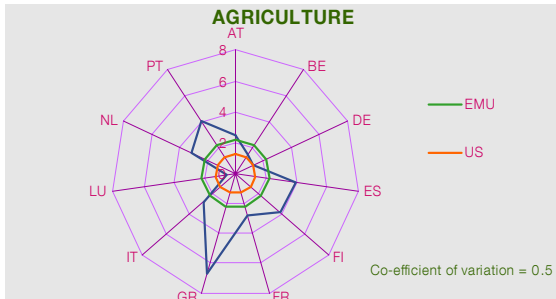
Chart 4.2



SOURCE: European Comision.

VALUE ADDED COMPOSITION (2003)

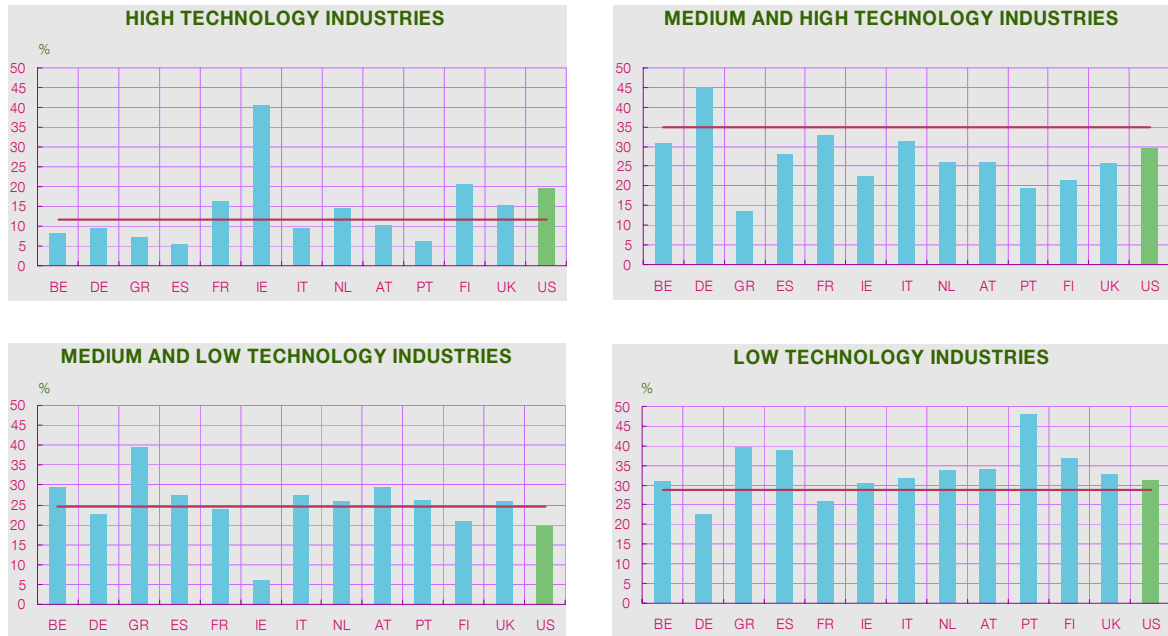
Chart 4.3



SOURCES: Eurostat and OECD.

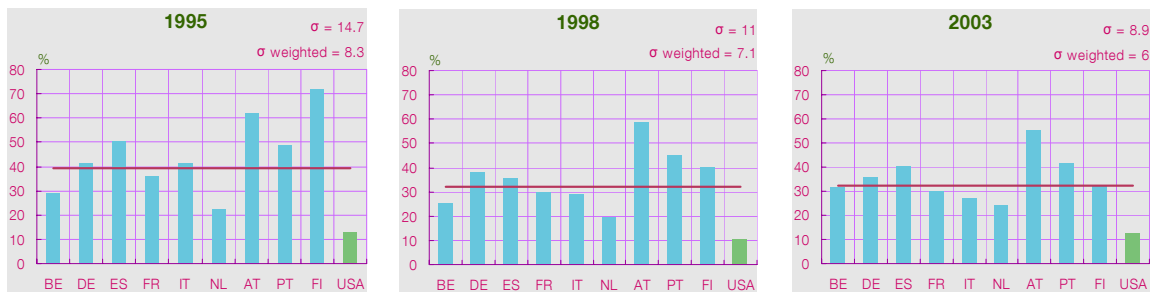
INDUSTRIAL PRODUCTION COMPOSITION (2001)

Chart 4.4

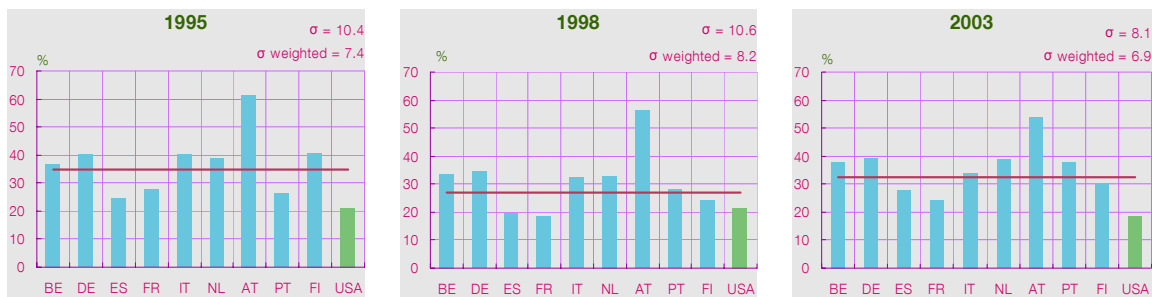


SOURCES: SBSplus of Eurostat and Banco de España.

HOUSEHOLDS. CURRENCY AND DEPOSITS AS % OF TOTAL FINANCIAL ASSETS



NON-FINANCIAL CORPORATIONS. LOANS AS % OF TOTAL FINANCIAL LIABILITIES



SOURCES: Eurostat and Federal Reserve.

OVERVIEW OF EU HOUSING SECTOR (%)

Table 4.1

	Ratio of residential investment to GDP	Share of owner occupied dwellings
	2004	2002
Belgium	4.1	69.8
Germany	6.6	42.6
Greece	5.4	74.0
Spain	7.3	84.3
France	5.1	56.1
Ireland	7.3	77.4
Italy	5.8	72.8
Luxembourg	2.9	71.8
Netherlands	5.9	54.2
Austria	4.6	57.3
Portugal	6.2	75.7
Finland	5.1	58.0
Euro area	5.9	60.0
US	4.5	68.3

SOURCES: Eurostat ant US Census Bureau.

COMMON MONETARY POLICY SIMULATION

Chart 4.6

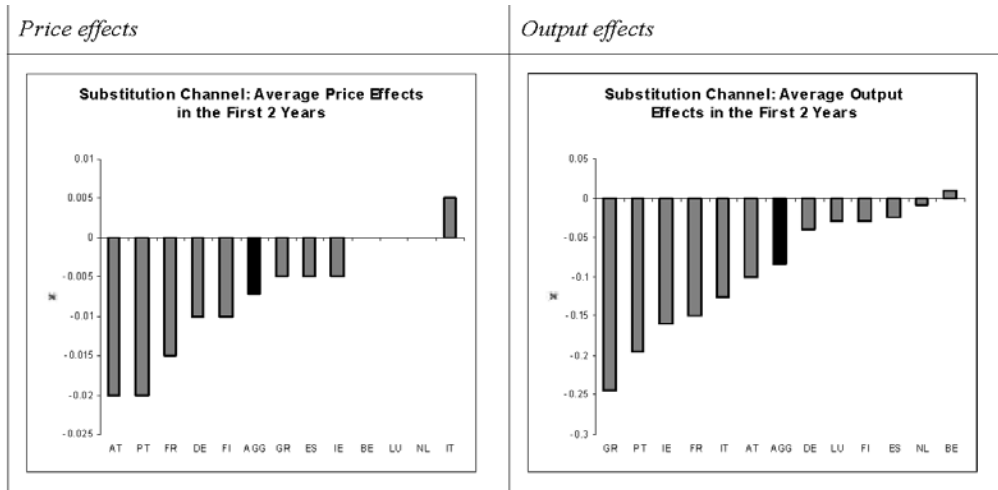
OUTPUT AND PRICE RESPONSES: CORRELATION BETWEEN COUNTRIES AND THE EURO AREA



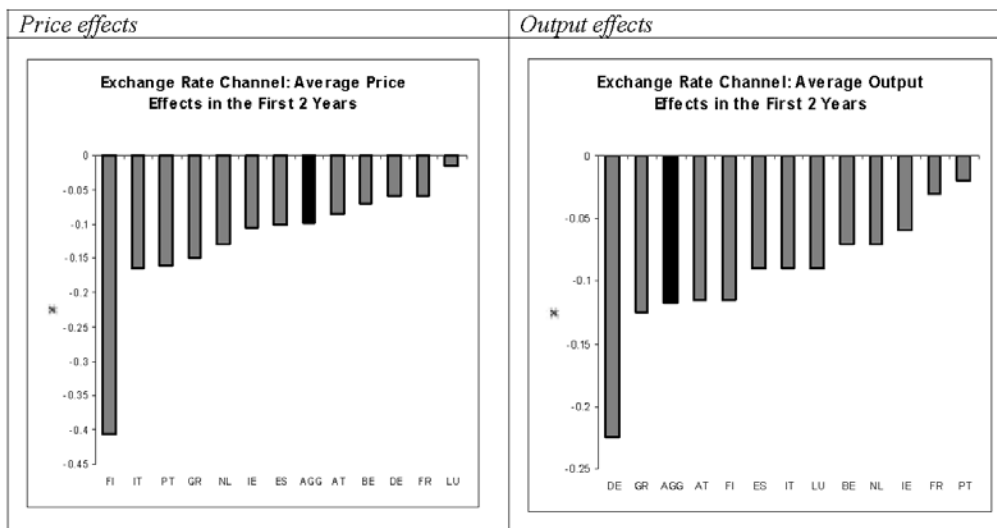
SOURCE: Berben R.-P., A. Locarno, J. Morgan and J. Valles (2004).

MAGNITUDE OF THE SUBSTITUTION CHANNEL

Chart 4.7



MAGNITUDE OF THE EXCHANGE RATE CHANNEL



SOURCE: Berben R.-P., A. Locarno, J. Morgan and J. Valles (2004).

SHORT-TERM AND LONG-TERM IMPACT OF FINANCIAL AND HOUSING WEALTH ON CONSUMPTION

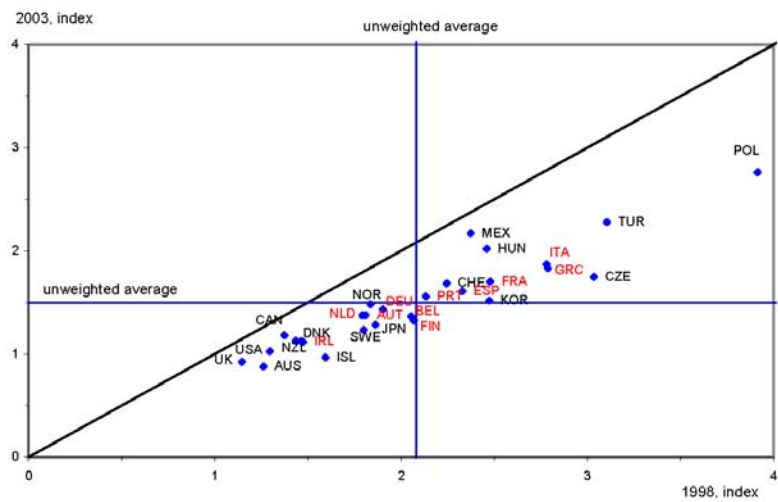
Table 4.2

ESTIMATED SHORT-TERM AND LONG-TERM MARGINAL PROPENSITIES TO CONSUME OUT OF FINANCIAL AND HOUSING WEALTH				
	Short-term		Long-term	
	Housing	Financial	Housing	Financial
Germany	...	0.01	...	0.02
France	0.02
Italy	...	0.01	0.01	0.01
Spain	0.01	...	0.02	0.02
Netherlands	0.02	...	0.08	0.06
United States	...	0.02	0.05	0.03
Japan	0.01	...	0.01	0.07
United Kingdom	0.08	0.03	0.07	0.04
Canada	0.03	0.03	0.06	0.04
Australia	0.02	...	0.07	0.03

SOURCE: OECD.

CHANGES IN PRODUCT MARKET REGULATION, 1998 - 2003

Chart 4.8



SOURCE: Brandt N., J.M. Burniaux and R. Duval (2005).

FREQUENCY OF PRICE CHANGES (a)

Table 4.3

	Unprocessed food	Processed food	Energy	Non-energy industrial goods	Services	Total
Austria	37,5	15,5	72,3	8,4	7,1	15,4
Belgium	31,5	19,1	81,6	5,9	3,0	17,6
Germany	25,2	8,9	91,4	5,4	4,3	13,5
Spain	50,9	17,7	0,0	6,1	4,6	13,3
Finland	52,7	12,8	89,3	18,1	11,6	20,3
France	24,7	20,3	76,9	18,0	7,4	20,9
Italy	19,3	9,4	61,6	5,8	4,6	10,0
Luxembourg	54,6	10,5	73,9	14,5	4,8	23,0
The Netherlands	30,8	17,3	72,6	14,2	7,9	13,2
Portugal	55,3	24,5	15,9	14,3	13,6	21,1
Euro	28,3	13,7	78,0	9,2	5,6	15,1

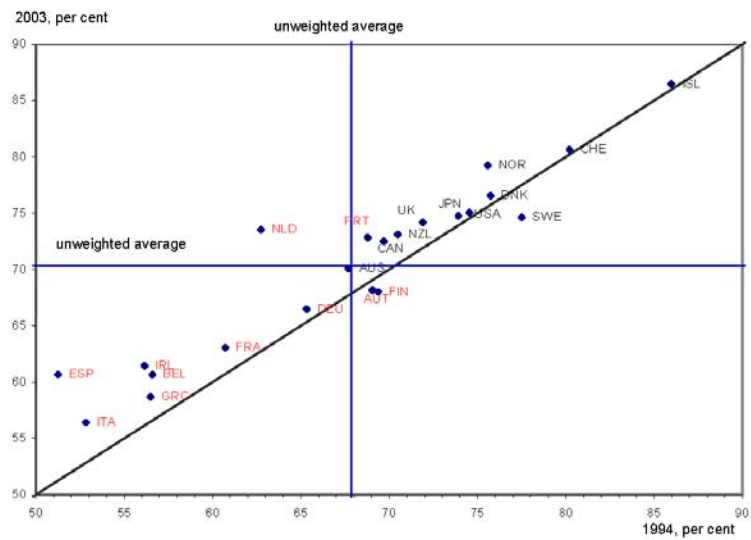
SOURCE: Dyne, E., L.J.Álvarez, et al. (2005).

(a) The numbers mean taht, on average, the x p.c. Of prices are changed on a given month.

EVOLUTION OF EMPLOYMENT AND PARTICIPATION IN OECD COUNTRIES, 1994-2003 (a)

Chart 4.9

CYCLICALLY-ADJUSTED EMPLOYMENT RATE (b)



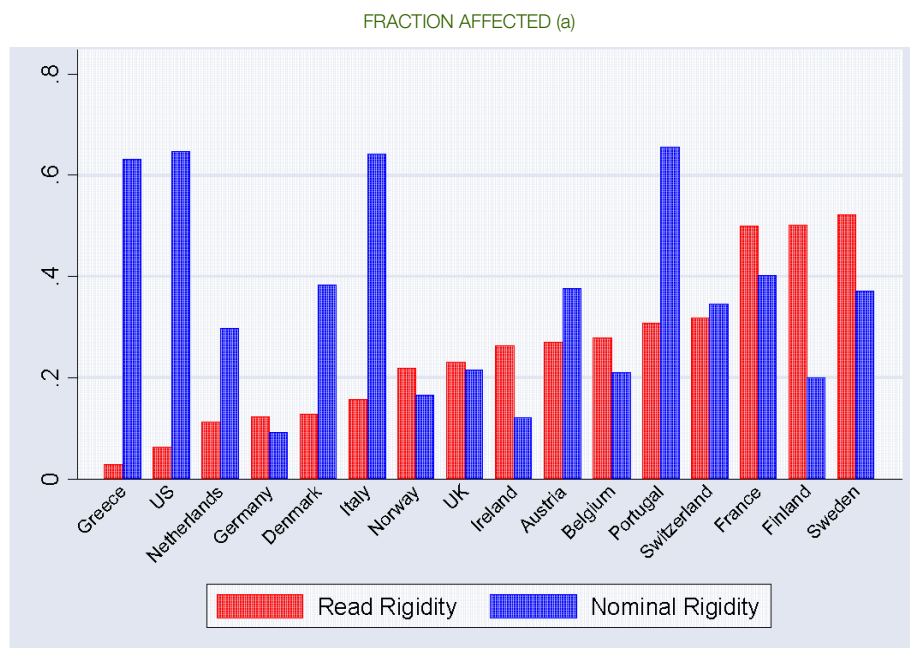
SOURCE: Brandt N., J.M. Burniaux and R. Duval (2005).

(a) 2002 for Iceland and Luxembourg.

(b) Estimated by controlling for the output gap and smoothed by using a Hodrick-Prescott filter.

REAL AND NOMINAL RIGIDITY BY COUNTRY

Chart 4.10



Source: Dickens, W. T. et al. (2005).

(a) Fraction affected means the fraction of workers potentially affected by downward nominal or real wage rigidity. These measures vary between 0 and 1, where 0 indicates perfect flexibility (no one is constrained) and 1 indicates full rigidity (all workers are potentially constrained).

EFFECTS ON DISPERSION FROM DIFFERENT SHOCKS

Table 5.1

Coefficients of variation (a)

	GDP		Private consumption deflator	
	EMU	NO EMU	EMU	NO EMU
Common shocks				
Increase in oil prices				
Unweighted	-0.90	-0.58	0.41	0.50
Weighted	-0.67	-0.44	0.52	0.61
Increase in external demand				
Unweighted	0.27	0.21	0.57	0.61
Weighted	0.21	0.15	0.60	0.67
Increase in government consumption in all EMU countries				
Unweighted	0.33	0.37	0.46	0.57
Weighted	0.39	0.43	0.53	0.65

SOURCE: Banco de España.

(a) Unweighted and weighted coefficients of variation of the percentage deviation from baseline level for the bigger five EMU countries after three years.

Table 5.2

EFFECTS OF AN IDYOSINCRATIC DEMAND SHOCK (a)

PERCENTAGE DEVIATION FROM BASELINE AFTER THREE YEARS

<i>Shock</i>	GDP		Consumption deflator		Short term interest rates	
	EMU	NO EMU	EMU	NO EMU	EMU	NO EMU
1% of GDP increase in government consumption in Germany						
Effect on:						
Germany	0.23	0.09	0.22	0.21	0.12	0.19
France	-0.01	0.01	0.02	0.00	0.12	0.01
Italy	0.02	0.01	0.05	0.03	0.12	0.03
Spain	0.01	0.02	0.03	0.02	0.12	0.03
Euro area (b)	0.09	0.04	0.10	0.09	0.12	0.08
1% of GDP increase in government consumption in Spain						
Effect on:						
Germany	0.01	0.00	0.02	0.02	0.08	0.01
France	0.01	0.00	0.01	0.00	0.08	0.01
Italy	0.02	0.00	0.02	0.02	0.08	0.02
Spain	0.66	0.35	0.27	0.30	0.08	0.45
Euro area (b)	0.09	0.04	0.05	0.05	0.08	0.06

SOURCE: Banco de España.

(a) A backward-looking exchange rate determination rule is used. For example, in the case of Germany, the rule is: $\log(\text{gerx}(t)) = \log(\text{gerx}(t-1)) + 0,25 * \log((100 + \text{ger3m}(t-1)) / (100 + \text{usr3m}(t-1)))$, where gerx is the exchange rate expressed in units of national currency for US dollar, ger3m is the three-month interest rate in Germany and usr3m is the three-month interest rate in the US.

(b) GDP-weighted average of the previous four countries and Netherlands.

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