EFN REPORT ON THE EURO AREA OUTLOOK

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Executive Summary

This Report analyses the current situation in the Euro area economy and discusses a number of policy issues concerned with the effects of fiscal policy and the convergence process in labour markets after the adoption of the common currency. We also look at the dating of business cycle turning points, and consider the consequences for the Euro area of the US current account and examine the extent to which it is structural and unsustainable. We also provide forecasts for key macroeconomic variables for 2002 and 2003 and discuss the nature of the current economic downturn and the light it throws on the conduct of economic policy in a monetary union.

The recovery from the world-wide slowdown during 2001 has proved slightly more sluggish than we expected in the Spring, and we now expect that GDP in the Euro area will grow by only 0.9 % in 2002 compared to 2001. In the Spring we believed that the Euro area would grow by 1.2%. However, our forecast for GDP growth in 2003 remains unchanged at 2.2%. Unemployment in the Euro area will continue to rise into 2003 to 8.6%.

The turning point that we identified in our Spring Report has now been passed and the grounds have been laid for a steady, but slow upswing in economic activity in the Euro area. The trough of the economic slowdown in the aftermath of the IT bubble has now been reached and GDP growth in the first and second quarters of 2002 was encouraging. There has not been as sharp a rise in unemployment as in previous downturns as employers anticipating a shallow slowdown, have hoarded labour. However, the absence of a quick economic recovery means that unemployment will continue to rise into 2003.

Events in the US and Europe have confounded the pessimists. Although the NBER in the US marked March 2001 as the date on which the US went into recession, the slowdown has been very shallow. On a quarter by quarter basis GDP fell slightly in the first, second and third quarters of 2001, but resumed growing thereafter, albeit somewhat erratically. In the Euro area, GDP fell for one quarter only in 2001(q4).

Neverthless the reasonably benign picture for the Euro area as a whole masks big differences in economic performance between member countries, which is relevant because this is the first economic downturn during which monetary policy has been completely centralised at the ECB. The downturn has been felt much more keenly by Finland, Austria, Germany and Belgium, partly because these countries started in 2000 from a much weaker position. Other countries, such as Spain, Portugal and Greece, by contrast have managed to sustain a reasonable (though lower growth rate) throughout the downturn.

The worst performing economy is Finland with 1st quarter GDP in 2002 1.9% lower than the first quarter of 2001, much of this coming from very weak export performance. Finland's high-tech industries are particularly vulnerable to the world wide IT slowdown. Nevertheless, the downturn in Finland has not been as deep as the recession of the early 1990s, and recently, there has been a sharp rise in consumer and business confidence and exports are now rising again. There are also faint signs of recovery in the second quarter of 2002 in Germany, Italy and Belgium, with a particularly sharp improvement in France.

There is a limit to how much monetary policy can insulate a small economy from a major contraction in export markets, even if monetary policy were not centralised at

the ECB. Generally those economies that have performed worst in the current downturn have been those with the greatest exposure to exports to markets outside of the Euro area. In these circumstances there is little that can be done, especially if fiscal policy under the strictures of the Stability and Growth Pact is more skewed towards medium term balance than short run output stabilisation.

While output continues to recover slowly, the outlook for the inflation rate in the harmonised index of consumer prices remains stubbornly high. The ECB is mandated by the Maastricht Treaty to maintain price stability. So the ECB does not have strict goal independence but is at liberty to decide what price stability actually means. Price stability has been defined by the Governing Council of the ECB as annual price increases of less than 2 %. But it has also been made clear that the objective of price stability should be pursued over the medium term. On this interpretation our forecasts of inflation of 2.1 % in 2003 is consistent with this approach. But it makes the 2% objective particularly vulnerable to, for example, a sharp rise in oil prices in the event of military action against Iraq.

We now summarize the contents of the policy papers contained in the Report, starting with the issue of dating the Euro area business cycle.

We need more information about Euro area business cycles as an input to the policymaking process. For example, separating out the cyclical component of fiscal policy from the underlying structural position is essential if under the Stability and Growth Pact the automatic stabilisers are to be allowed to operate while maintaining the medium term commitment to a budget position of close to balance or in surplus. Separating out structural, long term fiscal policies from cyclical variations requires a business cycle chronology.

In the United States the NBER's dating committee has established a business chronology over a long period of time which is widely regarded as the authoritative dating of the US cycle. Economists who come up with a new technique for business cycle identification "prove" their technique by comparing their results with the NBER chronology. The NBER's committee comprises economists with expertise in various sectors of the economy and its approach is avowedly a multivariate one: they use information from a variety of sources in order to unambiguously date business cycle turning points. It would be good for Europe to establish a comparably authoritative chronology for its business cycle, perhaps through similar means to the NBER - perhaps through a different one. At risk of stating the obvious, it bears pointing out that the European situation is different in many ways from the one that faces analysts of the American cyclical experience. Not least, because of the short history of the Euro area economy, country experts might be needed more than sectoral experts. Historical analysis would be complicated by national differences, but all the more necessary for this reason. A complaint that is often made against the NBER procedure is that it can take a long while, in real time, to establish a turning point, partly for reasons to do with data revisions and availability; some of those problems are more acute in the European setting. It could be argued that with techniques at hand today nothing more is really needed than reliable GDP estimates, with the benefit of being robust to revision, to provide reliable dating of the cycle. It would help also if there were a measure of GDP at the monthly frequency for the Euro area. In Part II of this Report we describe and apply some of the methods that are available for creating a business cycle chronology for the Euro area. The finding that most methods generate a very similar chronology and that this chronology is rather common across Euro area contries, are encouraging.

The pooling of monetary policy in the Euro area, has reawakened interest in fiscal policy and in the role that it could play in stimulating economic activity during a cyclical downturn. In the aftermath of September 11th the US not only loosened monetary policy but there was a fiscal relaxation through tax cuts and an increase in military expenditure. Here, in Part III we look, empirically, at the effect of fiscal policy in the four largest economies in the Euro area and separate out the systematic from the non-systematic parts of fiscal policy. The systematic part of fiscal policy in the form of plans for government expenditure and taxes, and the implications that this has for future taxation should have largely been internalised into saving and investment decisions. The systematic component will also contain the automatic stabilisers, or those parts of receipts and expenditures that vary with the business cycle. The non-systematic, or unanticipated part of fiscal policy is that which has more relevance to short term fluctuations and to the discretionary use of fiscal policy at the level of individual countries when monetary policy is centralised in the ECB. We provide a set of stylized facts on the effects of non-systematic fiscal policy in the four largest countries of the Euro area. The stylized facts are then used to shed light on the fiscal policy coordination debate, on the effectiveness of fiscal policy in stabilizing economic activity, and on the interaction of fiscal and monetary policy.

We find that there are relevant differences in the effects of non-systematic fiscal policy across countries, and substantial uncertainty about the size of these effects, which casts doubts on the possibility of a fiscal coordination, or at least complicates its implementation. The presence of spillovers across countries, another justification for a coordinated fiscal policy, is also uncertain, and their size turns out to be small.

Moreover, unanticipated changes in government expenditure are found to be largely ineffective in changing output or reducing its volatility, possibly with the exception of government investment, and, since they are not accompanied by tax increases that balance the budget, they can require deficit financing. There are minor differences between more discretionary policies, such as government consumption, and automatic stabilizers, such as social benefits. Tax shocks also appear to have minor effects on output, and tax cuts could also require deficit financing because of the sluggish reaction of expenditures. These findings suggest to focus more on an accurate specification and implementation of the systematic part of fiscal policy rather than trying to stabilize the economy with fiscal shocks. Finally, non-systematic expenditures and taxes appear to have only minor effects on output .

The single market programme has helped to liberalise markets and to reduce non-tariff barriers to trade between the nation states of the European Union. However, much of this reform process has been confined to product and capital markets. While this matters a lot for the economic benefits that flow from specialisation, greater consumer choice and lower prices, the reform of labour markets has been much more timid. Yet the proper functioning of labour markets is a crucial part of the move towards a better functioning currency area. Labour mobility and flexible wages play an important role in adjusting to non-symmetric economic shocks when individual nations do not have independent control over monetary policy, and fiscal policy is constrained. In Part IV of this Report we consider a number of issues that arise in the labour market with a common currency. There are already in place mechanisms for the regular monitoring of product and capital markets through the so-called *Cardiff Process*. However, there is not an equivalent process for labour markets. The Amsterdam Treaty commits the European Union to a high level of employment as an explicit objective and this was reiterated in Lisbon. But it is not clear how this translates into labour market

performance and the role that the labour market will play in helping the process of economic and monetary convergence. The convergence of unit labour costs and productivity across the countries in the Euro area is studied in Part IV of this Report. It is found that while there has been convergence in the growth of nominal wages across the Euro area as inflation in prices and wages has converged in the movement towards a single currency, convergence in the levels of productivity has been absent. The danger is that with the transparency that a single currency brings, there will be increased convergence of nominal wages without improvements in productivity that ultimately determine standards of living.

Part V deals with an external development particularly important for the Euro area. In 2001 the US current account deficit reached 4.1% of GDP. The worry is that if the deficit does not move back closer to balance or keeps widening, U.S. external liabilities would represent a growing share of world portfolios. At some point investors could become unwilling to hold dollars. The ensuing large adjustment in the current account and fall in the external value of the dollar could lead to substantial dislocations in the world economy and disruptions in U.S. and world financial markets.

The central issue is what is a sustainable current account deficit for an economy such as the US whose currency is very widely used for trading purposes. In Part V we examine two approaches. In the first, an intertemporal approach to the balance of payments emphasises both the importance of domestic saving and investment decisions and the role of international portfolio decisions by both domestic residents and foreigners. The question is what deficit is consistent with a number of reasonable assumptions about US growth, changes in the real exchange rate, import penetration and desired portfolio holdings. Calculations suggest that a deficit of 3.5% of GDP is sustainable.

The second approach is more quantitative, and decomposes the deficit into its cyclical and structural components. The results suggest that there is a distinctive cyclical component to the deficit. The current account shows small surpluses during the recessions of the early 1980s and 1990s and large deficits during the peaks of the mid-1980s and late 1990s. By contrast, the structural deficit is that path for the deficit consistent with the average (1980 – 2001) real exchange rate and US growth relative to the rest of the world. On this interpretation the difference between the actual deficit and the structural deficit can be attributed to the faster rate of growth of the US economy relative to the rest of the world.

A real business cycle interpretation of this finding is that the technological shock coming from electronics and IT has been taken up much more quickly during the 1990s by the US compared to elsewhere. Since domestic savings are unlikely to rise, the investment boom domestically has to imply a current account deficit. The question is what the medium term outlook will be. In the standard growth model a technological shock will only affect growth over the medium term as the capital stock rises. However, once the technology has been fully taken up elsewhere the (comparatively) high growth rate in the US will recede and the current account will move back towards a lower equilibrium. When this will happen depends upon how quickly the rest of the world adopts the productivity enhancing technologies coming from IT as fully as the US.

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1.1 Current economic situation and short-term outlook

1.1.1 Current economic situation – overview

In 2001, Euro area GDP grew by 1.4% on average. Over the course of the year, the growth rates declined, and in the fourth quarter, seasonally adjusted GDP dropped by 0.3%, compared to the previous quarter.

In the first half of 2002 a slight economic recovery has begun in the Euro area. Seasonally adjusted GDP grew by 0.4% in the first quarter and by 0.3% in the second, compared to the respective previous quarter. While in the first quarter Euro area growth had been driven by net exports, in the second quarter household consumption has also started to recover. The latter fell by 0.2% in the first quarter.

A significant unexpected increase of inflation in January has exerted a negative influence on real disposable income. This rise in inflation was caused mainly by an acceleration in food prices, caused by unfavourable weather conditions, and by higher than expected crude oil prices. In addition, households faced a considerable plunge of equity wealth due to the stock market decline. Furthermore, unfavourable employment expectations caused households to curtail spending. This is reflected in the retail confidence indicator which declined in January and February and has remained almost unchanged since then. In the second quarter, private consumption increased by 0.4%. The decline in inflation supported real disposable income. With a negative rate of 0.8% in the second quarter**,** capital formation dropped for the sixth consecutive quarter. Capacity utilization in the manufacturing sector continued to decline in the first half of 2002.

Uncertainty still prevails about future profit prospects. This is reflected in the unclear trend of the industrial confidence indicators published by the European Commission. After stagnating in April, industrial confidence improved slightly in May, but fell again in June and stagnated in July. In the second quarter, exports, including intra area trade, increased by 2%, after a slight increase between January and March.

In 2001, exports have dropped in each quarter. Imports followed the path of domestic demand. They continued to decline in the first quarter of 2002, but increased by 1.7% in the second. Net exports contributed 0.3 percentage points to overall GDP growth in the first quarter and 0.1 percentage points in the second. The resurgence of export growth was driven by the ongoing recovery of the world economy in the first half of the year. In the US, GDP growth was supported by favourable monetary and fiscal policies. The low interest rates and tax cuts stimulated private consumption. The drop in the stock market was compensated by an ongoing increase in housing prices. Profit expectations improve as can be seen from the recent rise in capital formation and inventories.

In the remaining course of this year and in 2003, the dynamics in internal factors will accelerate further. However, the high growth rates of the second half of the 90s will not be reached yet as imbalances resulting from over-investment in the ICT sector have not been fully eliminated.

The slight recovery of the Euro area economy in the first half of this year is also seen in the figures for industrial production. After having declined in each quarter of 2001, seasonally adjusted industrial production grew by 0.9% in the first quarter and by 0.25% in the second. After an increase, from January to March, production of intermediate

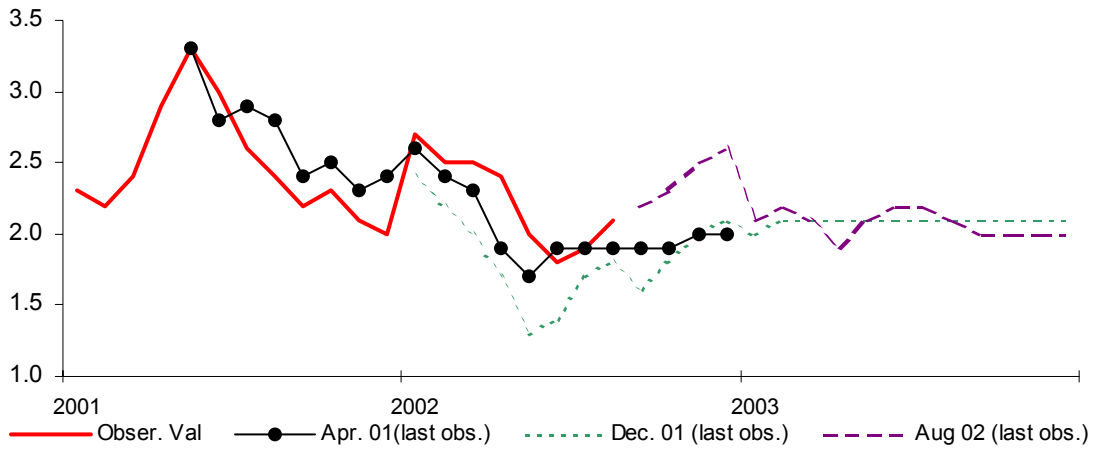
goods declined again in April and May, before recovering again in June. The declining trend in the production of capital goods that started in June 2001 has been reversed in January 2002. This can be taken as evidence for a stabilisation of investment activity. However, the recovery does not seem to be very robust at the current stage, as can be seen from the interruption of the positive development in Spring Report.

As usual, the economic downturn of 2001 affected the labour market with a time lag, so that over the course of last year, the seasonally adjusted unemployment rate was almost constant at 8%. The actual unemployment rate remained roughly unchanged in 2001, and the same was true for the NAIRU. In the fourth quarter, employment was expanded by 0.8% compared to the same quarter of the previous year. This was the lowest employment growth rate in 2001. The unemployment gap did not change significantly and there was no inflationary pressure from the labour market.

In 2002, the unemployment rate rose from 8.1% in January to 8.3% in July. This increase was caused by the slowdown in employment creation. In the first quarter of 2002, the expansion of employment declined even more to 0.7%.

Due to a comparatively high wage rise and a low productivity growth, the increase of unit labour costs accelerated over the course of last year. In the fourth quarter seasonally adjusted labour productivity even decreased by 0.4%. While a decline in productivity growth is normal in an economic downturn, the high increase of wages was unexpected. The decline in labour productivity accelerated to 0.9% in the first quarter of 2002.

Figure 1.1: Inflation forecasts for the EMU (year-on-year rates)



During the first eight months of 2002 the year-on-year inflation rates have been above the forecast path presented in the previous Report, shown as the line Dec01 in Figure 1.1. This has been mainly due to upward innovations, concentrated in the month of January in the prices of food, energy and services. As a consequence, the year-on-year rate of core inflation, which excludes prices of non-processed food and energy, was 2.5% in August 2002 and during the first eight months of 2002 it has been around 0.25 percentage point above the previous forecasts. A study of the forecast errors in the different components of the HICP and a corresponding intervention analysis suggests that rounding effects related to the introduction of the euro could have pushed up the prices of food and services. The global effect on the year-on-year core inflation rate is around three tenths of a percentage point, distributed with the 80% confidence interval given by 0.32 and 0.56 percentage points in services and processed food, respectively,

and a null effect in other manufactured goods. Therefore, it can be said that euro rounding effects are responsible for the slightly higher-than-expected level of core inflation experienced in these months of 2002. Total inflation has also been affected by upward innovations in energy prices.

1.1.2. Outlook for 2002 and 2003

Table 1.1 provides an overview of the expected developments of the macroeconomic indicators for 2002 and 2003. Point forecasts are shown together with 80% confidence bands. The point forecast for Euro area GDP growth is 0.9% for 2002 and 2.2% for 2003. In 2002, given the confidence bands, GDP growth rate will be in the range of 0.7% to 1.1% with a probability of 80%. The expected GDP growth rate for 2003 will lie in the interval 1.7% to 2.7%, at the same confidence level.

In 2002, economic activity will remain sluggish in the Euro area. Therefore, imports will stagnate, while exports will grow moderately. Thus, this year, the main contribution to GDP growth will arise from the growth in net exports.

In 2003, when the recovery of the world economy will stimulate domestic activity of the Euro area, internal demand will be the driving force of GDP growth. Export growth will also be sustained, but compensated by higher import growth, partially due to the current appreciation of the Euro. Notice that the appreciation of the effective exchange rate is smaller than that with respect to the US dollar. Hence, it is more proper to talk of dollar depreciation rather than euro appreciation. Possible reasons for this pattern are discussed in Chapter 5. Potential output will grow by 2.4% in 2002 and by 1.9% in 2003. The decline in the growth rate can be explained by the negative performance of investment. We may note that as in 2002, capital formation will decrease for the third consecutive year, capital accumulation will also be sluggish, with consequent adverse effects on potential GDP. Due to the low growth rates of both actual and potential GDP, the output gap will not be closed until the end of 2003. Therefore, from this side, there will be no inflationary pressure.

Moreover, the annual inflation in 2003 will benefit from the absence of the special factors that contributed to the unexpectedly high inflation at the beginning of the 2002. The labour markets react to the development of production with a time lag. Therefore, and due to weak GDP growth over the forecasting horizon, unemployment will continue to rise until the end of 2003 when it will reach 8.6%. In addition, past high wage growth rates will exert a negative influence on employment creation, again with a time lag. In 2003, wages will increase at a lower rate as actual unemployment increases, whereas the NAIRU will remain more or less stable. Productivity is forecasted to rise since it is pro-cyclical.

After low economic growth last year, the recovery of the world economy, which started in the beginning of 2002, will remain sluggish in the remaining course of this year. It will gain momentum next year. Due to a negative carry over effect and a weak first half of the year, the average annual growth rate of world trade will only reach 4.6% in 2002. In 2003, world trade will increase by 10.2%.

Table 1.2 shows the contributions of the expenditure components to overall GDP growth over the forecasting horizon. The expected developments of GDP expenditure components will be discussed in what follows.

Table 1.1: Economic outlook for the Euro area

	1999	2000	2001	2002: 2nd half		2002: annual		2003: annual	
				Point Forecast	Interval Forecast	Point Forecast	Interval Forecast	Point Forecast	Interval Forecast
					1.1		0.7		1.7
GDP	2.8	3.5	1.5	1.4	1.8	0.9	1.1	2.2	2.7
					2.0		2.1		1.3
Potential Output	2.6	3.2	2.4	2.3	2.5	2.4	2.8	1.9	2.5
					-0.1		0.1		0.6
Private Consumption	3.5	2.5	1.8	0.5	1.1	0.5	0.8	1.4	2.2
Government					1.3		1.6		0.9
Consumption	1.9	1.9	1.9	1.6	1.8	1.7	1.8	1.2	1.6
					-2.3		-2.6		0.0
Fixed Capital Formation	5.9	4.8	-0.6	-0.7	1.0	-1.7	-0.9	2.3	4.5
					-0.2		-0.2		0.0
Inventories / GDP	0.2	0.2	-0.2	0.0	0.2	-0.1	0.0	0.3	0.5
					3.6		1.0		6.8
Exports	5.3	12.4	2.5	4.8	6.1	1.7	2.3	8.7	10.5
					1.8		-0.8		6.3
Imports	7.4	11.1	1.1	3.5	5.3	0.1	0.9	8.6	10.8
					8.3		8.2		8.4
Unemployment Rate	9.5	8.5	8.0	8.4	8.4	8.3	8.3	8.6	8.9
					8.1		8.2		8.0
NAIRU	9.7	9.1	8.5	8.2	8.3	8.2	8.3	8.3	8.5
					7.6		3.9		8.6
World Trade	6.3	12.1	0.5	8.9	10.2	4.6	5.2	10.2	11.8
Euro Nominal Effective					-0.3		0.2		-5.6
Exchange Rate	-5.8	-11.1	1.8	3.2	6.4	2.0	3.6	-0.6	4.3
Euro Real Effective					0.9		1.6		-5.3
Exchange Rate	-5.6	-10.2	2.8	4.3	7.5	3.3	4.9	-0.3	4.5
					3.0		3.2		3.2
Short Term Interest Rate	3.0	4.4	4.3	3.4	3.7	3.4	3.6	3.7	4.4
					4.9		5.0		4.6
Long Term Interest Rate	4.7	5.4	5.0	5.2	5.6	5.2	5.4	5.2	5.8
					3.1		3.4		2.1
Labour Cost Index	2.3	3.2	3.3	3.4	3.7	3.6	3.8	2.6	3.1
					-0.3		0.2		1.6
Labour Productivity	1.0	1.1	0.5	0.4	1.0	0.4	0.6	2.3	2.9
					1.9		2.1		1.3
HICP	1.1	2.4	2.5	2.3	2.7	2.3	2.5	2.1	2.9
Deflator Private					1.9		2.2		1.5
Consumption	1.7	2.1	2.4	2.3	2.7	2.4	2.6	1.9	2.4
					1.5		1.9		1.2
GDP Deflator	1.8	1.3	2.3	2.0	2.4	2.1	2.4	1.7	2.3

Percentage change in the average level compared with the same period a year earlier, except for unemployment rate, exchange rate, NAIRU and interest rates that are expressed in levels. Point forecasts and 80% confidence bounds are taken from EFN forecasting models and based on 2000 stochastic simulations.

Table 1.2: Contribution to change in GDP

	2001	2002	2003
Domestic Demand	*0.9*	*0.3*	*1.9*
Private Consumption	1.0	0.3	0.8
Government Consumption	0.4	0.3	0.2
Fixed Capital Formation	-0.1	-0.4	0.5
Change in Inventories	-0.4	0.1	0.4
Net Exports	*0.6*	*0.6*	*0.3*
Exports	1.0	0.6	3.3
Imports	-0.4	-0.0	-3.0
GDP	1.5	0.9	2.2

Percentage points

Domestic demand

In the first quarter of 2002, domestic demand, including changes in inventories, almost stagnated, while in the second quarter, domestic demand increased by 0.2%. An increase was registered in all components except for investment. On average, in 2002, domestic demand, excluding changes in inventories, will contribute 0.2 percentage points to overall GDP growth, while changes in inventories will exert a small positive contribution of 0.1 percentage points. In 2003, all components of domestic demand will expand, and inventories will be built up again.

Private consumption

After falling in the fourth quarter of 2001 and in the first quarter of 2002, seasonally adjusted household consumption grew by 0.4% in the second quarter. With the decline in inflation from its peak in January, real disposable income will increase in the course of this year. On the other hand, in the first half of this year, unemployment has risen and in addition, the recent stock market plunge has reduced equity wealth. Thus, at the current stage, households are still cautious as the economic recovery has not yet gained momentum. Therefore, in 2002, private consumption will only moderately increase. With the unwinding of the negative factors the consumer's confidence will return next year. This will induce households to spend more. On average, consumption will rise by 0.5% in 2002 and by 1.4% in 2003.

Government consumption

Over the forecasting horizon, some EMU countries, in particular the large ones, will be faced with the need to consolidate their budgets as implied by the Stability and Growth Pact. This is reflected in a declining share of public consumption in GDP. Therefore, in 2002 and 2003, the annual average growth rates of public consumption will be lower than in the past. This year, real government consumption will be expanded by 1.7%, and in 2003 the growth rate will decline to 1.2%.

Fixed capital formation

According to European Commission surveys, in the second quarter 2002 capacity utilization in manufacturing has continued its declining trend, albeit at a lower pace. This picture is confirmed for the whole economy by the macroeconometric approach applied for this Report. In addition, expectations concerning the future economic developments are still weak, suggesting only moderately brighter profit prospects in the months to come. This is partly due to the recent slump of stock market indices and is reflected in the fact that in the second quarter, capital formation fell for the sixth consecutive quarter. Compared to the first quarter, the speed of the decline accelerated from 0.6% to 0.8%. Therefore, only a gradual recovery of investment activity is forecasted for 2002. With a broader global economic recovery in 2003, profit prospects are expected to improve. This positive trend will be reinforced by stronger domestic demand. Therefore, in the course of the year, capital formation will gain momentum. In 2002, due to carry over effects and negative growth rates in the first half of the year, the average annual growth rate of investment will again be negative, with a 1.7% decrease. In 2003, capital formation will increase by 2.3%.

External trade

After negative growth rates in each quarter of 2001, exports, including intra-area trade, rose by 0.1% in the first quarter and by 2% in the second quarter of 2002 (compared to the respective previous quarter). When, in the course of this year, the global recovery will take place, the world import demand will increase. This is reflected in high export growth rates in the Euro area in the second half of the year. Due to the low level at the beginning of this year and the slow pace of the recovery of the world economy, exports will on average rise by a moderate 1.7% in 2002. Furthermore, the appreciation of the euro will dampen higher export growth. Next year, the average annual growth rate will increase to 8.7%, though, in the course of 2003, export dynamics will flatten somewhat when the growth rate of world trade returns to its long-run trend, while the real effective exchange rate of the euro will remain roughly constant.

The development of imports will be in line with the path of domestic demand. Quarterly import growth was negative over the entire year 2001 and in the first quarter of 2002. In the second quarter of this year imports grew by 1.7%. Over the forecasting horizon, domestic demand will only gradually gain momentum. Thus, on average, imports will merely stagnate in 2002. Next year, imports will be expanded by 8.6%.

As in 2002 exports rise faster than imports, net trade will contribute 0.6 percentage points to GDP growth. In 2003, when imports will expand slightly faster than exports, the contribution of net exports will fall to 0.3 percentage points.

Box 1.1: Exogenous variables

The exogenous variables for the forecasts are shown in Table 1.3. For the most important world economic regions outside the EU, i.e. the US and Japan, a gradual economic recovery over the forecasting horizon is expected. This is reflected in an increase both in the GDP growth rates and in the inflation rates. For the oil price, a constant value of 27 US dollar per barrel is expected. The depreciation rate of the capital stock is set to 6% p.a. Results are robust to small changes in this parameter. It is included in the equations for capital accumulation and the user cost of capital.

Table 1.3: Exogenous variables for EFN forecasts

	2002: 2nd half	2002: annual	2003: annual
Population Euro area	292.0	292.0	292.0
Depreciation Rate	6.0	6.0	6.0
Japan Consumer Price Inflation	-0.8	-1.0	-0.6
Japan GDP Growth Rate	0.3	-0.4	1.1
Japan Long Term Interest Rate	1.4	1.4	1.4
Japan Short Term Interest Rate	0.1	0.1	0.1
US Consumer Price Inflation	2.0	1.6	2.4
US GDP Growth Rate	2.8	2.3	3.1
US Long Term Interest Rate	5.1	5.1	5.1
US Short Term Interest Rate	1.9	1.9	1.9
Oil Price, USD / Barrel	27.0	27.0	27.0

Population in million people, oil price in US dollar per barrel, all other variables in percent

Comparison with alternative forecasts

The forecasts presented above are obtained by the global EFN macroeconometric model, described in details in the previous Report. Table 1.4 compares the EFN forecasts regarding the main macroeconomic aggregates with alternative forecasts, notably those of the European Commission, the OECD, the IMF, and Consensus Economics Inc.

Compared to the EU and OECD forecasts, the EFN outlook is more pessimistic. Due to a lower path of private consumption and fixed capital formation, the EFN outlook for GDP growth in 2002 is roughly half a percentage point lower than the EU and OECD projections. Deviations increase in 2003. Due to the EFN forecasts only a gradual recovery in the Euro area can be expected.

These differences can be attributed to the fact that the EU and the OECD published their forecasts earlier in the year when a more favourable outlook for the recovery of the world economy, notably in the US, was prevalent among the profession. Forecasts of the IMF and Consensus economics were published more recently. They use the same outlook for the US and Japan, as the EFN Report does, and are much more in line with the EFN projection.

According to both the IMF and the EFN outlook, GDP growth is mainly linked to net exports in 2002, while the recovery in 2003 is driven by domestic forces. Differences occur in 2003 in the relative contribution of demand aggregates. In particular the IMF forecast for private consumption growth is significantly above the expected path in the EFN Report, due to the confidence bands provided in Table 1.1. In the IMF outlook, net exports exert a negative impact on overall growth in 2003, but they have a slightly positive effect in the EFN projection, see Table 1.2. The different path of private consumption is caused by a more pessimistic outlook of inflation in the EFN Report. Moreover, employment is below the IMF level. According to EFN forecasts, the labour market mimics the economic development with some delay. The lower path of private

consumption restricts import growth, and therefore, a positive contribution of net exports is expected even in 2003.

Nevertheless, our export and import growth rates are substantially higher than the IMF, indicating a more optimistic view concerning the dynamics of world trade. This happens mainly because the IMF forecasts a slower recovery in the US than consensus. In particular, the IMF forecasts for the US output growth are 2.2% in 2002 and 2.6% in 2003, compared with consensus values of 2.1% and 3.1%. Regarding inflation, the EFN outlook is more pessimistic than most other forecasts, but in line with the EU.

Table 1.4: Comparison of EFN forecasts with alternative forecasts

	EFN		EU		OECD		IMF		Consensus	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
GDP	0.9	2.2	1.4	2.9	1.3	2.9	0.9	2.3	1.0	2.3
Private Consumption	0.5	1.4	1.2	2.5	1.4	2.4	0.8	2.3	na	na
Government Consumption	1.7	1.2	1.6	1.4	1.6	1.3	2.0	1.3	na	na
Fixed Capital Formation	-1.7	2.3	0.2	3.8	-0.1	3.5	-1.6	2.1	na	na
Unemployment Rate	8.3	8.6	8.5	8.1	8.2	8.1	8.4	8.2	na	na
Consumer Prices (HICP)	2.3	2.1	2.2	2.0	2.0	1.9	2.1	1.6	2.1	1.8

EU: European Commission, European Economy, No.2, 2002; OECD: OECD Economic Outlook, June 2002; IMF: IMF World Economic Outlook, September 2002; Consensus: Consensus Economics Inc., September 2002; na - not available

Prices

The year-on-year inflation rate is expected to increase from 1.9%, the observed value in July, to 2.5% in December 2002, and then oscillate around a 2.1% mean value in 2003. A similar pattern is expected for the average percentage change in prices, with values of 2.3% for 2002 and 2.1% for 2003 (see Tables 1.2 and 1.5). The higher inflation rates forecasted for the last part of 2002 are mainly due to the expected behaviour of energy prices, which will reach a 4.9% year-on-year rate in December. Core inflation is expected to be quite stable around 2.5% in the remaining months of 2002 and to drop to a rather stable path around 2.3% in 2003, because rounding effects will not influence any more the year-on-year rates. Total inflation in 2003 will also benefit from an expected low inflation rate (1.3%) in non-processed food prices.

The reported results also imply that the inflation target will not be fulfilled in the last four months of 2002 and that the average annual rate for 2003 will reach the target with a probability just below 50%. The important point in this respect is that core inflation has not been below 2% since March 2001. A forecast of a uniform measure of inflation for the Euro area and the US, based on a consumer price index which does not include prices for food, energy and the item corresponding to owner's equivalent rent of primary residence, shows (see Table 1.5) that the average annual rates of growth for 2002 and 2003 are 2.5% and 2.3% in the Euro area and 1.6% and 1.9% for the US. This points out a worrying feature of inflation in the Euro area, i.e. the consumer prices of non-energy industrial goods are growing with year-on-year rates of around 1.5% in 2002 and with expectations of growth rates around 1.2% for 2003. While, the

corresponding rates for the US have negative values of 1.4% for 2002 and of 0.6% for 2003.

This persistent differential has been present since 1998 and, consequently, the exchange rate can not be the only factor causing it. To add weight to this argument is the fact that the industrial cycle has been very similar in both economies during these years (see Figure 1.3). Therefore, the different degree in incorporating technological innovations could be one reason for this important differential. Policy measures which introduce more competitiveness in the European markets could induce firms to invest more in new technologies.

Table 1.5: Inflation rates in the EMU and in the US[(a)]

		Forecasts	
	2001	**2002**	**2003**
TOTAL INFLATION			
Euro area (100%).	2.5	**2.3**	**2.1**
US* (81.5%).	2.6	**1.0**	**2.1**
CORE INFLATION			
Services and Non-energy industrial goods excluding food and tobacco.(b)			
Euro area (70.97%).	1.9	**2.5**	**2.3**
US* (56.4%).	2.1	**1.6**	**1.9**
DIFFERENT COMPONENTS OF CORE INFLATION			
(1) Services.			
Euro area (38.90%).	2.5	**3.2**	**3.2**
US* (27.4%).	3.6	**3.7**	**3.5**
(2) Non-energy industrial goods excluding food and tobacco.			
Euro area (32.07%).	1.1	**1.5**	**1.2**
US (29.0%).	-0.2	**-1.4**	**-0.6**

(a)Average percentage change compared with the same period a year earlier.
(b)This definition of core inflation differs from the one used in the text in order to be able to compare figures for Euro area and US.
*. less owner's equivalent rent of primary residence
Source: EUROSTAT & BLS & IFL, Date: August 21, 2002.

Box 1.2: Core inflation: alternatives measures and their utility.

Different alternatives for core inflation[*]

An important problem concerning the measurement of core inflation is that there is not a clear idea about its definition. It has been imprecisely argued that core inflation is

[*] In writing the first part of this box the works by Wynne(1999)and Vega and Wynne (2001) have been very useful.

related to a definition of underlying monetary inflation, which would be more interesting for central banks. The changes in individual prices depend on two components: a common one given by core inflation and an idiosyncratic one. Then, by averaging out these individual price changes, a core inflation measure can be obtained. The problem is how to define the weights. The theory of the cost of living index provides a solution that consists in using the relative importance of each item, measured by its budget share weight, multiplied by its price and divided by the level of the price index.

The result of this weighted average is the standard inflation measure which, following Vega and Wynne (2001), can be called headline inflation. However, in order to obtain a core inflation value, the weights should be derived considering that all individual prices do not contain the same signal for monetary inflation. Several reasons can be put forward in support. First, prices like energy and food prices can suffer more frequent supply shocks and it can be argued, but without unanimous consensus, that such effects on prices do not contribute to monetary inflation. Second, not all prices are equally well sampled by the national statistical offices, because of specific sampling difficulties. This provides the rationale for core measures based on the exclusion of certain categories of prices from the total inflation rate.

Other alternative definitions include the median of the individual price changes and trimmed-means. However, these seem less related to the quality of signal in each price.

Finally, measures derived from econometric models, usually structural VARs, are also fraught with difficulty. The problem here is that it is by no means clear what vector of variables should be used in the analysis, and there is no universal consensus on how to structuralize the VAR. Moreover, the biggest pitfall of these proposals is that the results are updated each time a new observation is published.

A proposed core inflation measure and its limited utility.

From all the above arguments it can be said that the "ex. food and energy" core measure has several advantages: it is related to the idea that the signal about underlying monetary inflation is not the same in each price, it is very simple to obtain, it is only subjected to the same updates of headline inflation, and it can easily be understood and used by many economic agents.

The prices which should be removed are the ones that include a poor monetary inflation signal. Since monetary policy is relatively stable, prices with relatively high fluctuations can be seen as having poor signal. At the same time, the innovation persistence of these prices should be lower than the persistence of other prices. Espasa et al (1987) proposed removing non-processed food and energy prices for Spain and, later, they propose the same measures for the Euro area, see also Espasa et al (2002). In fact, the "ex components" core measures can be obtained removing not only the mentioned components but some other erratic ones, such as the prices of tobacco and tour packages. This is done for Spain in the above mentioned publication. The problem of removing more components than the more usual ones is that the resulting core measure is not published by Eurostat or national statistical offices, and users must construct it from disaggregated data.

Core inflation is related to underlying monetary inflation, but it is not necessarily a proper measure for it, nor is it either a very good indicator to forecast headline inflation. The usefulness of this proposed core measure is that the included prices have a higher

persistence than the excluded ones (residual inflation). Central banks are less worried by high headline inflation due to residual inflation than to core inflation. And, viceversa, favourable headline inflation is less reliable for central banks when it is due, as it is now, to residual inflation rather than to core inflation.

In summary, carefully constructed core inflation measures help in understanding the movements in the headline inflation.

Box 1.3: A mark-up model for forecasting inflation•

Recent work by Banerjee, Cockerell and Russell (2001) and Banerjee and Russell (2001) have demonstrated the existence of a long-run relationship between inflation and measures of the mark-up. These papers proceed from the maintained assumption that both these variables are integrated of order 1. We report here inflation forecasts from a parsimonious mark-up model of Euro area inflation based on the work cited above.

The long-run structure of our mark-up model is given by:

$$mu = q - \lambda \Delta p \qquad (1)$$

where mu is the mark-up of price on unit labour costs, q is the 'gross' mark-up, λ is the parameter that measures the trade-off in the long-run between inflation and the mark-up (referred to as the inflation cost coefficient), and p is the price level. Lower case variables are in natural logarithms. Δ denotes the first change in the price level. The mark-up is calculated as $p - ulc$ where the price-level, p, is the gross domestic product (GDP) implicit price deflator measured at factor costs and ulc is a measure of unit labour costs. The model is estimated using quarterly data over the period June 1973 to March 2002. This long run is nested within a two dimensional VAR-ECM and conditioned on a variable representing the business cycle measured by the output gap and calculated as the ratio of constant price GDP to potential output.

The long-run inflation cost coefficient may be interpreted as the cost to non-colluding firms (in terms of a lower mark-up) of overcoming the uncertainty they face when coordinating price increases in an inflationary environment. Non-colluding firms respond to higher inflation by changing prices more often and / or by larger amounts in real terms. Russell, Evans and Preston (2002) and Chen and Russell (2002) argue that both responses increase uncertainty leading to a lower mark-up. Furthermore, they argue that this form of uncertainty, and the relationship between the variables, will persist in the steady state. The estimated long-run relationship is interpreted here as the steady-state relationship.

Our results show that we can accept the hypothesis of one negative long-run relationship between inflation and the mark-up. The estimate of the inflation cost coefficient, λ, is 4.925, implying that an increase of 1 percentage point in annual inflation (i.e. an increase in quarterly inflation of 0.025) is associated with a 1.25% fall in the mark-up in the long run. Also worthy of note is we find the change in the mark-up is counter-cyclical and the change in inflation is pro-cyclical.

• The data are from Fagan, Henry and Mestre (2001) updated to March 2002. Further details concerning the model and the data can be found in Banerjee and Russell (2002).

Table 1.6: Inflation forecasts

Period		business cycle	Forecast Inflation Scenario 1	business cycle	Forecast Inflation Scenario 2
2002	March (actual)	- 1.23	1.75	- 1.23	1.75
	June	0	1.66	- 1.44	1.48
	September	0	1.70	- 1.77	1.24
	December	0	1.38	- 1.73	0.48
2003	March	0	1.79	- 1.63	0.38
	June	0	1.78	- 1.37	- 0.05
	September	0	1.83	- 0.83	- 0.35
	December	0	1.76	- 0.24	- 0.61
2004	March	0	1.68	0.15	- 0.74

The business cycle is measured as the log deviation from the mean level of potential output. Inflation is reported as the four quarterly ended changes in the logarithm of the price level.

The second scenario shown in Table 1.6 assumes that the time profile of the output gap is the same as in the recession between June 1993 and December 1994. The model predicts that a severe recession such as that experienced in the early 1990s will lead to negative inflation before the end of the forecasting period. The forecast of negative inflation is in contrast with the experience of the 1990s recession where inflation remained at a positive rate throughout. However, in the early 1990s recession, inflation started at around 3.5% at an annual rate instead of the currently prevailing inflation rate of around 1.75%.

There are two advantages to the approach taken here. First, even though the model is extremely parsimonious the model successfully captures the in-sample swings in the mark-up and inflation data over the past 3 decades. The second advantage is that inflation can be forecast conditional upon the forecast of only one variable, namely the output gap. An implication of the parsimony of the model and the forecasting technique is that a range of short-run influences that might be incorporated in 'judgemental' forecasts are overlooked. This implies that this approach is best suited to forecasting the 'general' level of inflation.

Changes from EFN Spring Report

Compared to the Spring Report, the GDP growth rate forecast is 0.3 percentage points lower for 2002 and identical for 2003. Deviations appear in the relative contribution of net exports and private consumption to overall GDP growth. In spring, we expected a deeper economic downturn in 2002, followed by a steeper upturn. This was mainly due to the setting of the US growth rate which is exogenous to the EFN forecast. In particular, GDP in the US was assumed to grow by 0.7% in 2002 and 2.7% in 2003. At present, a higher US growth rate for 2002, but a less pronounced acceleration in 2003 is projected (2.3% and 3.1%, respectively). Due to the slow recovery in the Euro area, we now forecast a stagnation of imports in 2002, implying a higher contribution of net exports.

The decline in imports compared to the Spring Report is due to a more pessimistic view of private consumption which is about 1 percentage point lower than in the previous Report. The bulk of the difference can be attributed to new data releases, in particular for the first half of 2002. For example, the forecast of consumption growth doubles when only data only up to the last quarter of 2001 are included. In addition, private consumption is negatively influenced by a more pessimistic inflation outlook in this Report. Consumer price inflation was expected at 2.0% in spring, compared to 2.4% in the private consumption deflator now, this for the reasons mentioned before.

Box 1.4: Forecasting methods

Short term forecasts are derived by means of a macroeconometric model. The model treats the Euro area as a single entity and variables are obtained as Euro area aggregates. The underpinning theoretical framework refers to an open economy with competitive markets. Agents have been aggregated into the sectors of households, firms, government and foreign countries. Within each sector, individuals are assumed to be homogeneous. The goods, labour and financial assets markets are included. The latter are money, bonds and foreign exchange markets. Private households and firms maximize individual utilities or profits, respectively. Government and foreign countries are broadly exogenous. Due to sluggish price and wage adjustments, output and employment are demand driven in the short run and determined by the supply side in the long run. Equations are specified in an error correction form. Point forecasts are extended by confidence bands to quantify the uncertainty around the most likely developments. The model is discussed in more detail in the spring EFN Report.

As an exception, forecasts for the HICP are obtained from a disaggregated model for the components of the index, see the Spring Report for details. This gives a better insight into the underlying causes of inflation. Different stochastic trends in the main price components (food, energy, non energy industrial goods, and services) require a disaggregated framework which is based on leading indicators and non-linear structures. Given the access to the components, total inflation is split into core and residual inflation, where the former is especially relevant for competition on international markets. In the sensitivity analyses, the HICP is derived within the model, and regressors are the capacity utilization rate, import prices, unit labour costs and the unit price of output.

1.2. Sensitivity analysis of the Euro area outlook

Several shocks can hit the Euro area economy, and the outlook would change accordingly. The magnitude of appropriate adjustments can be quantified by means of a sensitivity analysis. In particular, shocks to the US growth, to government consumption, short term interest rates and the Euro/US dollar exchange rate are discussed.

In the baseline scenario, consistent with the Euro area outlook given in 1.1, US growth is 2.3% in 2002 and 3.1% from 2003 onwards, according to the August survey of Consensus economics. In the alternative scenario a slower recovery of the US economy is assumed, where growth is 1 percentage point below this path in two subsequent years. Spillovers to the Euro area are expected, and initially they will operate through the foreign trade channel.

The second kind of analysis refers to a fall in government consumption. Budget deficits are stronger reduced than in the baseline, this in order to fulfil the Stability and Growth Pact (SGP) requirements. In particular, autonomous demand drops by 10 Billions euro per quarter, which represents about 3% of the public consumption level. As the share of government consumption has a downward trend in the baseline, which is already in line with the SGP, it is assumed that government consumption has to be lower for 2003 only in order to meet the restrictions of the SGP. Hence, this shock is assumed to last for one year.

Third, a rise in the short term interest rate of 100 basis points is considered. This can be traced to a forward looking reaction of the ECB to prevent earlier inflation pressures, which can be expected according to the economic recovery in the Euro area. Since the recovery is not long lasting, the shock remains for two years only.

Finally, the effects of the (one to one) parity of the euro against the US dollar over the whole simulation period are investigated.

The impacts of the various shocks on the GDP growth and HICP inflation rate are shown in Table 1.7. Differences with respect to the baseline are reported for a 1, 2 and 5 year simulation horizon. For example, GDP growth decreases by 0.1 and 0.4 percentage points in the first two years in response to the growth shock in the US. In levels, GDP decreases by 8 Billions euro per quarter, and 0.8 Millions people would loose their jobs in the Euro area. Due to the decline in aggregate demand, HICP inflation is reduced by 0.1 percentage points in the second year. After a period of 5 years, there is no impact on the Euro area growth rates any longer. Therefore the shock has a temporary growth effect, but a permanent level effect on output and prices.

Table 1.7: GDP growth and HICP inflation in the presence of shocks

Impact on GDP Growth

	1	2	5
US Growth	-0.1	-0.4	0.0
Public Consumption	-0.3	0.1	0.0
Interest Rate	-0.1	-0.3	0.1
Exchange Rate	-0.1	-0.3	0.0

Impact on HICP Inflation

	1	2	5
US Growth	0.0	-0.1	0.0
Public Consumption	-0.1	0.1	0.0
Interest Rate	0.0	-0.1	0.1
Exchange Rate	-0.1	-0.2	0.0

Deviations from baseline in percentage points. Impacts of the shocks are symmetric. When a negative shock is considered instead of a positive one, the figures have to be multiplied by (-1).

The cut in public consumption will take place one year earlier than already fixed in the SGP. Hence the level of government spending is 10BN euro per quarter below the baseline in the first year, and equal to the baseline thereafter. According to this setting, a

contractionary effect on GDP arises in the first and an expansionary effect in the second year.

The effects of a stronger consolidation on the euro economy via government spending are limited. Its lower levels imply a fall in private consumption and investment in the short run due to multiplier effects. However, negative impacts are partly offset by declining imports. This is due to the decrease in aggregate demand and to lower prices for domestic goods, which promote a substitution from foreign to domestic production. Moreover interest rates are temporary lower because of the decline in economic activity. It should be noted that this simulation does not take into account the positive effects on private demand stemming from expectations of a lower tax burden in the future. This Ricardian anticipation can limit the effects of the public consumption shock even further.

Due to sluggish prices, a temporary rise in the nominal interest rate will also affect the real interest rate. Higher user costs of capital cause lower investment and a slowdown in the speed of capital accumulation. Taking into account multiplier effects GDP growth is at most 0.3 points below the baseline. Due to internal dynamics in the price system, some long lasting adjustments of the economy are still in place at the end of the 5 year simulation horizon. They diminish after a longer period.

Finally, according to the results reported in Table 1.7, the parity of the euro against the US dollar contributes to a higher degree of price stability. On the other hand, short run GDP growth in the Euro area is reduced by roughly 0.3 points because of the implied change in the real exchange rate. Exports decrease while imports increase, and multiplier effects are initiated. Substantial J-curve effects of import behaviour are expected in the short run preventing higher losses in the real growth rate.

1.3 NAIRU, NAWRU and the output gap

Estimation and interpretation

The NAIRU (NAWRU) is the rate of unemployment consistent with non accelerating inflation in prices (wages). It may be interpreted as the level of the equilibrium unemployment rate which is related to the institutional conditions in the national labour markets. Thus the NAIRU reflects a form of structural unemployment, and refers to the long run. Since temporary unemployment must be stationary over the course of the business cycle, the NAIRU cannot be influenced by demand side activities. Instead, policies directed to reduce this notion of unemployment must essentially act on the supply side of the economy. As the NAIRU is not observable directly, it has to be estimated.

Because of its micro founded determinants the NAIRU cannot be explained within the framework of homogeneous agents which is the basis of the macroeconometric model. A time series approach is undertaken instead. Since the structural preconditions differ, this exercise is carried out separately for the national economies in the Euro area. Based on the results of individual countries, the NAIRU in the Euro area is uncovered through aggregation. Given this series and its projection, the output gap is derived endogenously within the macroeconometric model by means of the Cobb Douglas technology with constant returns to scale.

Usually the starting point for a NAIRU analysis is the triangle model of the inflation process adopted by Gordon (1997), where a change in inflation is traced to price

rigidities, excess demand and supply shocks. Price rigidities may also proxy backward looking (adaptive) expectations. Excess demand is proxied by the unemployment gap, which is the difference between actual unemployment and the unknown NAIRU. Due to hysteresis effects in European unemployment (Bean, 1994), the concept of a time-varying NAIRU seems to be appropriate (Gordon, 1997). In most empirical work the NAIRU is assumed to follow a random walk, where a drift can be interpreted as the initial deviation between the actual unemployment rate and the NAIRU. This model is then estimated in its state space form by the Kalman filter. A major drawback of the results obtained following this procedure is the lack of robustness, as the maximization process may depend on starting values. Moreover, some of the basic model settings are questionable. For example, the time series properties of the NAIRU are introduced in an ad hoc manner and the variance of the NAIRU innovations is fixed at some arbitrary level. In addition, unemployment gaps resulting from this approach are often long lasting and persistent. According to Okun's law, the length of business cycle fluctuations is likely to be overestimated.

Hence, an alternative method is preferred. In order to extract the long run unemployment from the actual level, the band pass filter is applied, see Baxter and King (1999). Here short run and business cycle fluctuations are removed from the actual unemployment rate, while the remainder serves as a proxy of the NAIRU. To be on the safe side, a period of 10 years is assumed to cover the maximum length of the business cycle in the Euro area member countries, Agresti and Mojon (2001). In fact the results are robust within a plausible parameter range.

Table 1.8: Country specific and Euro area NAIRU

	1991	1995	1999	2001	2002	2003
Germany	7.1	8.7	8.6	8.1		
France	9.9	11.8	10.3	9.2		
Italy	9.4	11.3	10.9	9.7		
Spain	15.6	18.1	13.2	10.7		
Euro area	8.7	10.4	9.7	8.5	8.2	8.3

	Morrow et al (2000)				Richardson et al (2000)	
	1990	1993	1996	1999	1990	1998(99)
Germany	5.6	6.2	7.4	8.8	6.2	8.3
France	9.6	10.2	10.7	11.3	9.4	10.3
Italy	9.9	10.4	10.9	11.3	9.4	10.8
Spain	18.5	18.9	18.2	16.6	17.4	15.8

Upper half: NAIRU estimates derived from the band pass filter, where NAIRU forecasts for the Euro area are derived within the macroeconometric model for a given unemployment gap. Lower half: NAIRU according to Richardson et al (2000) and Morrow et al (2000). Results from Richardson et al (Table 1) refer to the average of Kalman and Multivariate Hodrick Prescott Filter, while those from Morrow et al (Table 1) are linked to a NAWRU obtained by the means of a wage equation.

As a drawback of the method employed, the NAIRU is no longer linked to the process of inflation. Nevertheless, the result can be interpreted in terms of a long run

unemployment rate, because higher frequency fluctuations are removed. Most important, a stationary unemployment gap is indicated. Thus, temporary (insider) unemployment will remain stationary over the course of the business cycle. This in turn implies sensible estimates for the output gap.

The estimation is carried out with harmonized unemployment series taken from Eurostat. The series are seasonally adjusted and observed on a monthly base. The sample runs from 1982.01 to 2001.12, and results are presented in the upper half of Table 1.8. For Germany, the structural break due to unification is taken into account. Country specific NAIRUs are weighted to get the NAIRU of the aggregate, where time varying weights are equal to the fraction of individual to area wide GDP. Ireland, Portugal and Greece were excluded from the analysis due to lack of data.

According to the estimation results, substantial differences in the NAIRU are prevalent across Euro area countries. The German NAIRU is slightly below the average, while the Spanish one is far above. However, a convergence among the larger member countries can be observed, probably due to a reduction in the dispersion of per capita income.

The size and development of the band pass NAIRU is similar to those reported by other recent studies, see for example Richardson, Boone, Giorno, Meacci, Rae, Turner (2000) and Morrow and Roeger (2000), where the latter estimates a NAWRU on the basis of a wage equation taking structural factors like the tax wedge into account. The findings of these studies are shown in the lower half of Table 1.8. The main difference is that the band pass NAIRU seems to be more volatile, and more tied to the movements of the actual unemployment rate. For example the band pass NAIRU accounts for roughly 90 percent of total unemployment in the Euro area, and this number appears to be higher than the one in alternative papers. Since the NAIRU in other studies is more persistent, they do not indicate its decline between 1998 and 2001, except for Spain. However the general impression is unaltered. In any case the bulk of unemployment is linked to the long run and therefore caused by supply side conditions. A significant reduction of unemployment would require structural reforms, which improve the efficiency of the institutional framework, including the individual labour markets.

At a first glance, more stable results appear to be more convincing, because the NAIRU is a long run equilibrium concept. For the Euro area, however, instability of the NAIRU is not an implausible result, given the collective organization of wage setting in most member countries. Collective bargaining between insider-dominated unions and employers can break the dynamics between unemployment and inflation which are usually assumed. In case, e.g., of an unexpected negative demand shock temporarily leading to higher unemployment, wage and (due to some mark up behaviour) price inflation would be lower in a competitive labour market because of downward pressure from the unemployed looking for work. Things run differently if unions represent the interests of employees and disregard those of the unemployed: insider-dominated unions will try to set a wage level compatible with the actual, lower level of employment. As a consequence, the NAIRU follows closely the actual unemployment rate. In this case the concept does no longer appear to be a sensible guideline for wage inflation in the near future.

This simple insider-outsider argument implies that the NAIRU follows the actual unemployment rate in an upswing as it does in a downturn. Indeed, for all countries the NAIRUs estimated in this Report declined during the boom at the end of the 90s as they had risen as a consequence of the recession at the beginning of the decade. Because of the higher volatility of the NAIRU, national unemployment gaps are stationary. For

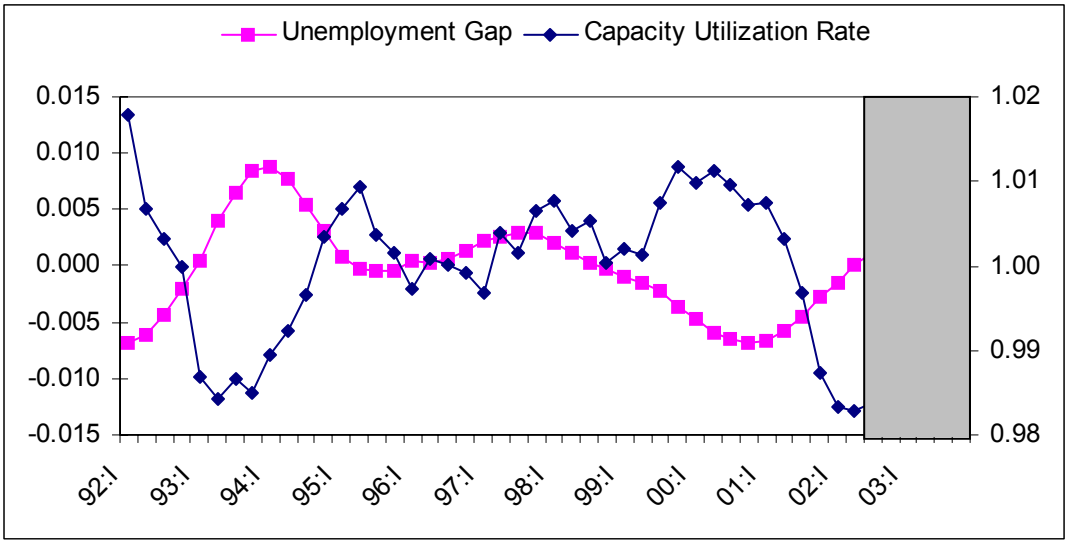
example, the ADF-test rejects the null of nonstationarity usually at the 5 percent level, except for Italy. However a KPSS-test performed in this case did not reject the null of stationarity.

NAIRU forecasts

An ARMA(7,13) model was fitted and used to forecast the Euro area unemployment gap, where the lags refer to the monthly frequency and insignificant regressors are eliminated. Since the actual unemployment rate u is explained inside the macroeconometric model, the long run rate u^* can be recovered via the identity $u^*=u-(u-u^*)$. At this stage the Euro area is treated as a single economy, implying that only the NAIRU of the aggregate can be forecast, see Table 1.8. Due to the present slowdown of economic activity, the fall in the NAIRU observed in recent years is interrupted. Because the recovery in the next year is only moderate, the NAIRU will be roughly fixed at around 8.3%. The NAIRU remains below the actual unemployment rate until the end of the forecasting horizon. Thus, no inflationary pressure is expected from this side.

Finally, a measure for the output gap in the Euro area is provided for a given unemployment gap. This is done by means of a Cobb Douglas production function with constant returns to scale, where the labour share is 0.6. The evolution of the two gaps is presented in Figure 1.3. In order to distinguish both graphs more clearly, the unemployment gap fluctuates around 0 (left scale), while the output gap is centred around 1 (right scale). Because of this setting, the output gap actually refers to the rate of capacity utilization.

Figure 1.2: Unemployment gap and output gap for the Euro area



The shaded area denotes the short term forecast. Since the labour market mimics the business cycle with a delay, some shift in the timing of both series has to be expected, and this is indeed the outcome of the macroeconometric model. The recovery during the next year is not strong enough to close the gaps in the short term. Even at the end of 2003, capacity utilization is roughly half a percentage point below its steady state level, while the unemployment rate is approximately 0.5 points above the NAIRU.

Since the NAIRU is exogenous to the model, there should be a unidirectional relationship between the two disequilibrium measures. Causality is expected to run from the unemployment to the output gap, but not vice versa. Tests for Granger causality confirm this implication. Test statistics are 4.7, when the unemployment gap serves as the predictor, and 1.9 in the opposite direction. The latter is not significant even at the 10% level.

1.4. Disaggregated export and import analysis

In order to get some further insights into the dynamics of foreign trade, the behaviour of exports and imports is examined at the disaggregated level. Export and import volumes for the Euro area are reported for several industrial sectors, including food, drink and tobacco, raw materials, mineral fuels, lubricants and related materials, chemicals and related products, manufactured goods, and machinery and transport equipment. Data are available on a monthly frequency. In contrast to the national accounts for the Euro area as a whole, these series refer to the extra area trade. Hence, the sectorial analysis provides a robustness check of the results obtained with the macroeconometric model. The latter is based on national accounts data, which include the intra area trade.

Sectorial exports and imports are analysed within the error correction approach. Cointegration relations include the real effective exchange rate of the euro and an activity variable for the state of the economy, which is proxied by industrial production (excluding construction) at home (Euro area) and abroad (US). Foreign output helps to explain the evolution of exports, while activity in the Euro area is relevant for imports. In some equations oil prices are included to capture temporary effects. Long run elasticities with respect to industrial production and exchange rates are shown in Table 1.9. Differences across sectors can be observed. For example, imports of machinery and equipment react more to fluctuations in domestic activity than imports of raw materials.

Table 1.9: Long run elasticities of foreign trade by sectors

	Industrial Production		Effective Exchange Rate	
	Exports	Imports	Exports	Imports
Food	0.6	0.6	-	-
Raw Materials	1.0	0.5	-0.3	-
Minerals	-	0.8	-1.1	-
Chemicals	1.2	2.5	-0.9	1.0
Manufactured Goods	1.0	2.0	-0.5	-
Machinery, Equipment	1.4	4.2	-0.5	1.0

Sectorial error correction models are estimated using monthly data from 1990.01 to 2001.12. Exports and imports are obtained as volume indices (1995=100). Error correction terms include the real effective exchange of the euro and industrial production at home (imports) and abroad (exports). Foreign activity in the cointegration relations is proxied by industrial production in the US. A "-" indicates that the variable is not significant in the cointegration relationship.

Movements in output are often more important than fluctuations of the real exchange rate to explain the path of foreign trade. In addition the impact of an equal change in economic activity at home and abroad is usually larger for imports than for exports.

These findings match with the results from the macroeconometric model. Generally, a rise in activity will stimulate exports and imports only by a net effect, since prices are affected. Given a high elasticity of world supply to prices, the dampening effect of rising prices may be less pronounced in the case of imports.

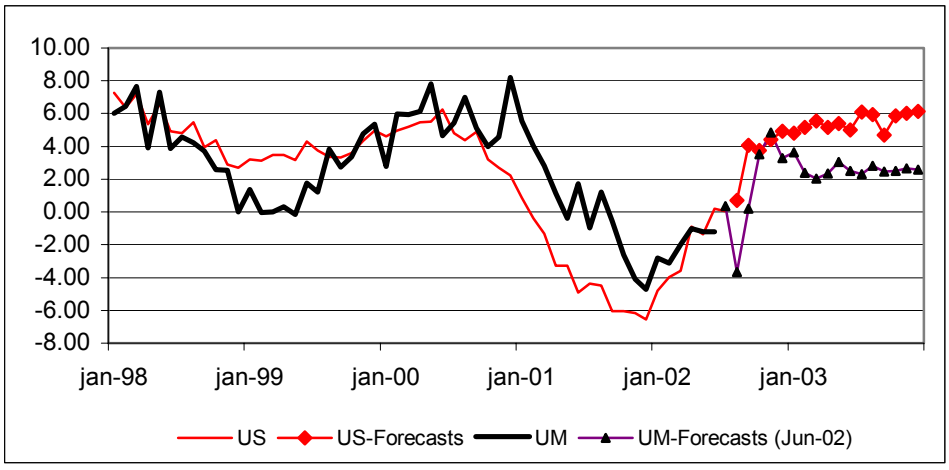
1.5 The industrial cycle in the Euro area and US (monthly forecasts)

In the Spring Report we remarked the common cycle in industrial production shared by the Euro area and US, evident from Figure 1.4, which also shows that the beginning of 2002 marks a clear turning point in growth for both economies.

This recovery has come from the capital and intermediate goods sectors, while durable and non-durable consumer goods still remain in a more uncertain situation. It can be concluded that the recovery in the industrial sector is clear but not very strong.

Table 1.10 includes forecasts for industrial production in the Euro area, disaggregated by production sectors and corroborates the slow recovery of the economy. Negative rates of growth may be observed in 2002, but in 2003 they all will reach positive values. In this sense, in 2002 the average annual rate of growth of industrial production will be slightly negative (-0.2%) due to the remarkably negative rates in the production of capital goods (-2.9%) and durable goods (-4.9%). In 2003, the whole industry production (excluding construction) will grow by 2.6%, with an important recovery in capital goods (3.8%) and intermediate goods (2.5%), but with rates still quite below the previous peaks of the last cycle. The recovery in non-durable goods will be mild (1.3%) and quite small (0.9%) in durables. This confirms a clear but not too strong recovery for 2003. The forecasts for the US signal a positive value for 2002 (0.3%) and a stronger recovery for 2003 (5.5%).

Figure 1.3: Industrial production year on year rates. Observed values and forecasts.



Source: Eurostat, Federal Reserve and IFL. Date: September 6th.

Table 1.10: Observed and forecasts year-on-year rates of growth for industrial production in the Euro area and US.

	2000	2001	2002	2003
Capital goods	8.9	2.1	-2.9	3.8
Durable consumer goods	6.0	-2.8	-4.9	0.9
Intermediate goods	6.0	-0.2	0.9	2.6
Non Durable consumer goods	1.8	0.5	0.1	1.3
Energy	1.4	4.2	3.4	2.9
TOTAL Euro area	5.6	0.2	-0.2	2.6
TOTAL US	4.5	-3.9	0.3	5.5

Forecasts since June 2002 for Euro area and since July 2002 for US. Source: Eurostat, US Federal Reserve Board and IFL /Date: September 6th, 2002.

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Chapter 2. Dating the Euro area business cycle

2.1. Introduction

In this Chapter we present the results of an exercise in dating the business cycle in the Euro area, and in its main constituent economies.

The business cycle can be defined as a broadly-based movement of economic variables in a sequentially oscillatory manner. The term 'cycle' is a misnomer to the extent to which it suggests a regular periodicity; one of the features of real world business cycles is that their length and depth (duration and amplitude) seems to vary. Indeed one of the current preoccupations of US business cycle experts (e.g., Stock and Watson 2002) is to explain the apparent recent lengthening of the cycle there.

The literature recognizes two broad definitions of the cycle - the so-called classical cycle and the growth or deviation cycle. The difference between the two is conceptually simple: in the case of the deviation cycle, turning points are defined with respect to deviations of the rate of growth of GDP from an appropriately defined trend rate of growth. There is a large technical literature (an example is Canova (1998)) which is concerned with the best method of extracting a trend from the data and it turns out that the exact method adopted may carry quite important implications for the subsequent dating of the turning points. The classical cycle, by contrast, selects its turning points on the basis of an absolute decline (or rise) in the value of GDP.

In early post-war decades, especially in Western Europe, growth was relatively persistent and absolute declines in output were comparatively rare; the growth cycle then seemed to be of more analytical value especially as inflexions in the rate of growth of output could reasonably be related to fluctuations in the levels of employment and unemployment. In more recent decades, however, there have been a number of instances of absolute decline in output, and popular description at any rate has focused more on the classical cycle (for example there is a widespread impression that a recession defines itself as two consecutive quarters of absolute decline). In addition, the concern mentioned above that de-trending methods can affect the information content of the series in unwonted ways, has reinforced the case for examining the classical cycle. In this paper we perform our dating exercise on both concepts of the cycle.

There are several reasons for taking an interest in the cycle. The evolution of the cycle carries with it an evolution in variables of considerable consequence for policy-makers: indeed, policy-makers are commonly depicted as endeavouring to reduce the extent of fluctuations by exercising stabilization policy. A closely related interest has been in the use of business cycle evidence in the context of optimal currency area theory and in its indication for the optimality of monetary union. Other things equal, business cycle symmetry is a positive indicator for monetary union as it indicates that a single monetary policy will be broadly appropriate for all participants in the monetary union. On the other side, an asymmetry of business cycle experience is usually treated as a negative indicator for participation in monetary union. Now is a good time to begin the study of the cyclical properties of the Euro area economy, as it is part of the assembly of facts about the "new" European economy given life by the commitment to a single monetary policy.

In contrast to the comparatively rich documentation of the cyclical experience of individual European economies[1], previous work documenting the cyclical experience of the Euro area economy, considered as an aggregate, is quite sparse. Essentially, it is limited to the paper by Agresti et al. (2002), which applies the notion of a growth or deviation cycle based on the use of the band pass filter, and to a work by Pagan (2002) which applies both the notion of the classical cycle and that of the growth cycle. Our results largely confirm those to be found in these previous studies, with some differences that we note below.

Any study of the Euro area economy faces a problem of data availability. The Euro area only came into being on the 1st January 1999, and the study of business cycles needs a larger sample than three-and-a-half years. To extend the data back in time encounters the problem of aggregation when exchange rates are pone to change: in these circumstances there is no "perfect" method of aggregation. We have employed, for the most part, the data that have been constructed for the ECB's Area-wide model, conducting a check against the main alternatively-generated series, that produced by Beyer, Hendry and Doornik (2001) (the comparison allows us to conclude that our results are relatively robust to the method of aggregation).

In the next section, below, we present our analysis of the Euro area broad aggregates. Dating of the classical cycle is accomplished by employing Pagan's algorithm (Pagan (2002); Harding and Pagan (2001)). For the deviation cycle we first review the most popular methods of detrending, those due to Hodrick and Prescott (1997) and to Baxter and King (1999) before presenting our preferred method. In addition, we use a definition of the trend based on a production function approach of the type that is used in calculating output gaps. In section 3 we repeat the estimation for the main individual Euro area countries (France, Germany, Italy), for which we can obtain consistent output series, together with the UK. We compare timing and other measures of the cycle, in addition including the US in the comparison. Section 4 seeks to employ higher frequency data (the GDP data are quarterly), namely (monthly) industrial production data. The advantage of concentrating on this series, besides the fact that it is available over a long period of time, is that its higher frequency should enable a more precise dating of the cycle whilst it is already known that the most cyclically-sensitive component of GDP is in fact industrial production. The disadvantages are that industrial production is a small proportion of total output in many European economies, and has been declining over the period as a whole. Section 5 constructs indices of business cycle diffusion within countries. Section 6 exploits the same technology to evaluate the degree of convergence within the Euro area. Section 7 concludes.

Additional results and a number of appendices which lay out the technical details of what has been done can be found in Artis, Marcellino and Proietti (2002), AMP henceforth.

[1] Many of the studies of individual countries' business cycles were motivated by a concern for evidence of convergence in the context of the EMU project. An early example is that by Christodoulakis et al (1995), a more recent one that by Wynne and Koo (2000).

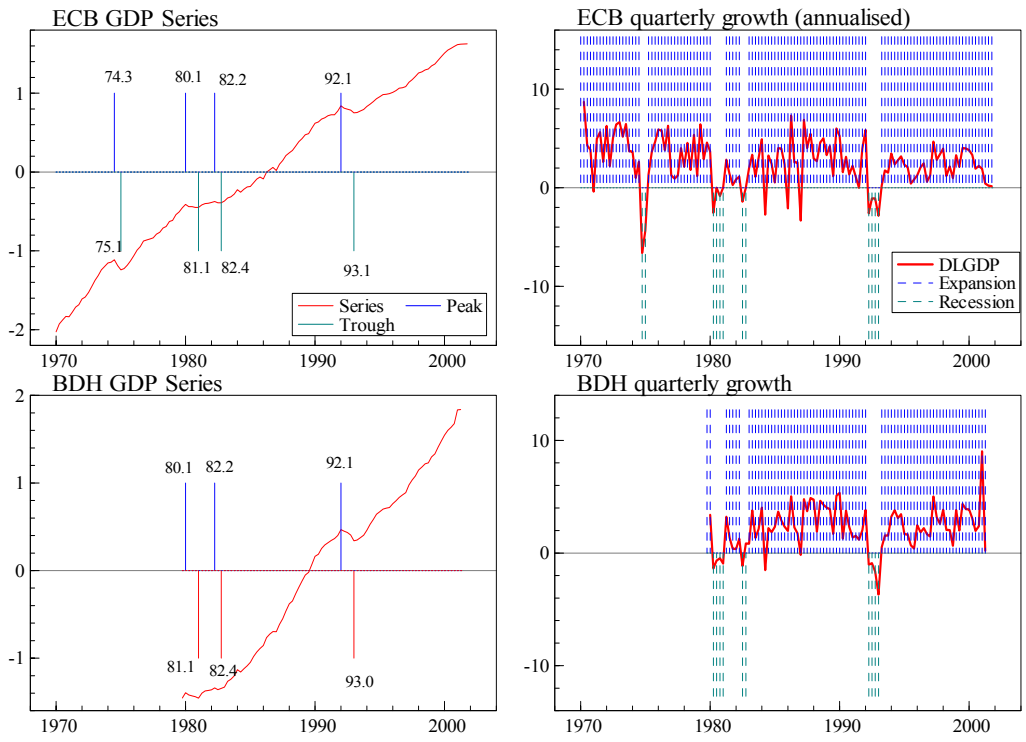
2.2. The aggregate cycle

This section analyses aggregate time series data available for the Euro area both from the classical and deviation cycle perspective. The emphasis is on Euro area GDP, measured at constant prices[2].

2.2.1. The classical business cycle

Classical cycle dating commonly follows the algorithm developed by Bry and Boschan (1971), the so-called BB algorithm, which is designed in its original form for monthly data and claims to replicate the NBER procedures for a single series (this would commonly be that of industrial production at a monthly frequency). More recently, the algorithm has been adapted to the quarterly frequency (by e.g., Harding and Pagan, (2001), in which the resultant algorithm is dubbed the BBQ algorithm, and McDermott and Scott, 1999).

Figure 2.1: Classical cycle turning points, expansions and recessions, in the Euro area quarterly real GDP (seasonally adjusted, logarithms); ECB series and Beyer, Doornik and Hendry (2000) estimates.



This is the lead that we follow here. The classical cycle makes relatively few strict definitional demands: the traditional ones are that a peak (trough) is identified as preceding an absolute fall (rise) in the chosen measure of economic activity, and that

[2] Note that, by construction, the GDP series already provides a multivariate measure of the status of the economy. An alternative approach could be based on dating the single GDP components, and then use some reduction technique. If appropriate weights are used, the two procedures should yield very similar results.

peaks and troughs should alternate. Such a sparse definition might admit blips and bumps in economic activity which should not be recognized as cycles and it is normal to add minimum duration requirements for each phase of the cycle and for the cycle as a whole - as here, where cyclical phases must equal or exceed two quarters to be recognized as such and where the cycle as a whole must last at least five quarters. The algorithm is explained in more detail in Appendix A of AMP, where we show that using the theory of Markov chains, it is relatively straightforward to implement minimum duration requirements, alternation of turning points, and to tailor the dating algorithm to specific needs.

Our classical business cycle chronology is presented compactly in Figure 2.1. Two alternative measures of Euro area GDP are employed: the "ECB series" (this is the data set underlying the application of the "Area-wide model" (Fagan, Henry and Mestre, 2001) and the "BDH" series, constructed by Beyer, Hendry and Doornik (2001). The former has a longer sample period (1970-2001) than the latter (1980-2001) and reveals one more cycle. Otherwise, the three cycles identified in the shorter data period overlap almost exactly, the only difference being in the location of the last trough which is anticipated by one quarter if one takes the BDH measure, and the three decades from 1970 comprise four cycles altogether. The chronology of turning points, not surprisingly, is also exactly as in Pagan (2002). It should also be noticed that the two quarters' recession in 1982 is a minor event and would be censored if the dating algorithm was tailored to impose minimum requirements on the depth of recessions and expansions; we will return to this issue shortly.

Table 2.1 displays some descriptive statistics. There is a notable asymmetry between the average length of expansions and recessions, the former much longer (28 quarters) than the latter (3 quarters), which is to be expected of classical cycles in a growing economy. The probabilities of being in one or other phase reflect the relative values of these phase lengths over the sample period. The amplitudes of the expansion periods are also much bigger than those of the recession periods. "Steepness", following the suggestion of Harding and Pagan (2001), is measured as the quotient of the amplitude and the duration of the phase. Expansions last longer, and are steeper than recessions, which are quite brief and yet more gently sloped.

Table 2.1: BC dating of Euro area time series: summary statistics

	Classical BC dating	Deviation BC dating
Number of cycles P-P	4	10
Number of cycles T-T	4	9
Average Expansion Prob.	0.9032	0.6290
Average Recession Prob.	0.0968	0.3710
Average Duration of Exp.	28	7.8
Average Duration of Rec.	3	5.1111
Average Amplitude of Exp.	0.2117	0.0159
Average Amplitude of Rec.	-0.0143	-0.0168
Steepness of expansions	0.0076	0.0020
Steepness of recessions	-0.0048	-0.0033

2.2.2. The deviation cycle

An alternative business cycle definition refers to the recurrent, though not strictly periodic, deviations around the long term path of the series. The deviation or growth

cycle typically represents an unobserved component and various methods and filters have been proposed to extract it, both in the model-based and the nonparametric frameworks. The appendix of AMP reviews briefly the univariate methods that will be employed, among them the Baxter and King (1999) filter, and a band pass version of the Hodrick and Prescott (1997) filter. We will find it useful to denote the deviation cycle by ψ_t.[3]

Figure 2.2: Turning points for four alternative measures of the Euro area deviation cycle. An asterisk (*) denotes a turning point that was censored according to amplitude considerations (see text for details).

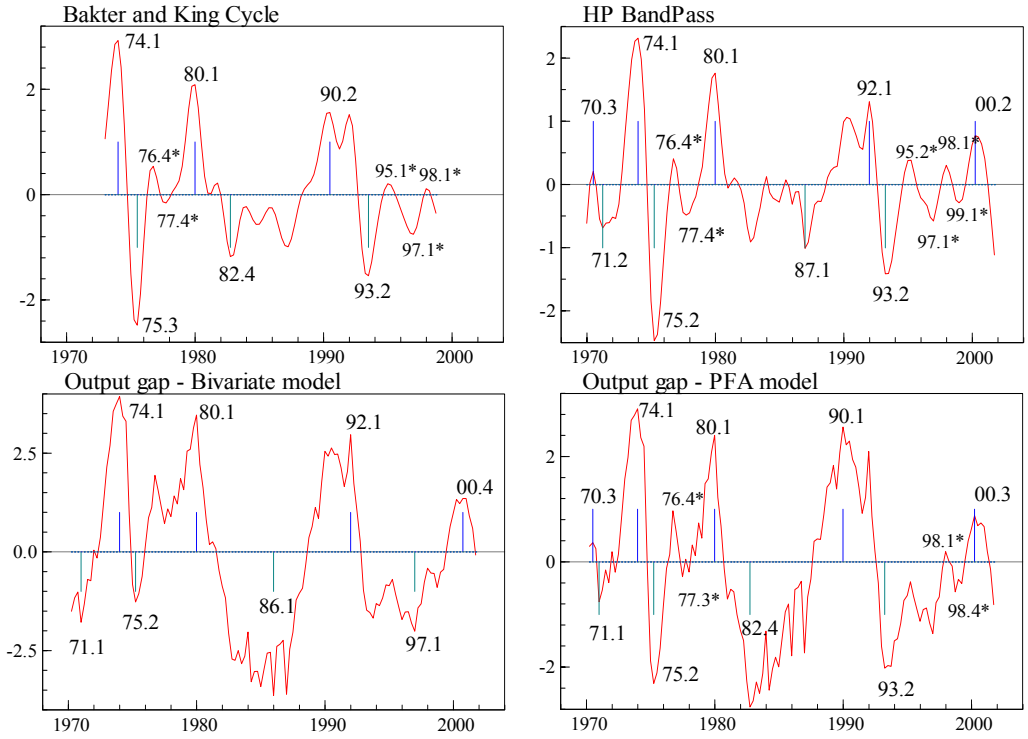


Figure 2.2 presents several measures of the deviation cycle in the Euro area GDP, with the associated turning points detected by the dating algorithm BBQDC2 developed in appendix A 4 of AMP, with restrictions on the size of the fluctuations that will be discussed shortly. The first measure (displayed in the upper left panel) is derived using the Baxter and King filter, which is available for the central part of the sample excluding the first and last 12 quarters: this loss of data is a major drawback of the Baxter-King filter. The second, displayed on the upper right panel, is the HP band pass filtered cycle. This results from applying not one, but two HP filters and subtracting one of the resultant series from the other. By the judicious choice of HP dampening parameter (λ) it is possible to mimic very closely the results of the Baxter-King filter, yet avoiding the penalty of losing data. Specifically, the trended series obtained by applying the HP filter with smoothing parameter λ =0.52, which defines a low pass filter dampening the fluctuations with a period smaller than 5 quarters (1.25 years) is subtracted from the series obtained by applying the filter with dampening parameter λ=

[3] Notice that the classical business cycle dating can be also implemented on growth rates, by applying the usual rules, such as BBQ. More details are provided in AMP.

0.667, which in turn defines a low pass filter cutting off the fluctuations with a period smaller than 8 years. (Later on we shall refer to these filters respectively as HP(1.25) and HP(8), and in general HP($\cdot$) will denote a low pass filter with cut-off period in years indicated in parenthesis) As can be seen for the period covered in common by the two methods, the band pass filter closely replicates the cycle estimates produced by the Baxter-King filter, albeit with some additional noise - without losing the estimates at the beginning and end of the sample. The bottom panels display measures of the output gap derived respectively from a bivariate model of GDP and CPI inflation and a multivariate model based on total factor productivity, labour force participation rates, the unemployment rate, capacity utilization and CPI inflation, implementing the production function approach. See Proietti, Musso and Westermann (2002) for details (the PFA model considered here is the one featuring pseudo-integrated cycles referred to in that paper).

The notion of an output gap, ψ_t, is more specialized than the deviation cycle in output, since it provides a measure of inflationary pressures. This poses a new issue to the dating of the gaps: Pagan (1992) proposes to score $\psi_t>0$ and $\psi_t<0$, as the interest lies in dating periods in which the inflationary pressures are positive or negative. However, as the evidence reported in Proietti, Musso and Westermann (2002) clearly points out, it is the change effect associated with $\Delta\psi_t$ that is more relevant than the level effect exerted by the output gap, which brings us back to the problem of dating expansions and recessions in the level of ψ_t. We also notice in passing that the scoring of the gap according to whether it is positive or negative is a by-product of BBQDC2.

Figure 2.2 shows a broad agreement in the identified turning points: the 74.1 and 80.1 peaks are common to all four representations. The location of the start of the '90s recession is more uncertain since there are two neighbouring local maxima at the beginning of 1990 and 1992 which is featured by the expenditure components and the GDP of individual countries. Also the beginning of the '80s expansion is scored differently by the different methods. This is likely due to minor differences in the timing of the cycle in the largest Euro area countries, (see next section). Comparable similarities and differences are to be found in comparing our results with those arrived at by Pagan (2002) and Agresti (2001) using different methods.

As stated above, the BBQDC2 dating algorithm featured restrictions on the amplitude of the fluctuations: in its first stage, by which changes of sign in ψ_t are identified by using the usual BBQ dating rules on the cumulated cycle, we amended the definition of the expansions and terminating sequences to censor the fluctuations around zero with amplitude less than 0.5% of total GDP. Amplitude restrictions are perfectly sensible, although they inevitably import some degree of arbitrariness, as the amplitude of the deviation cycle differs according to the signal extraction model or technique used, as can be seen from Figure 2.2 (the maximum amplitude is usually delivered by linear detrending of the series). Nevertheless they enhance one of the three key features (the three "D"s) that are used to characterize economic fluctuations as business cycle fluctuations: *duration* is ensured by the ties imposed by the dating algorithm. The second characteristic of the business cycle, *diffusion*, is automatically enforced when we deal with an overall measure of economic activity, such as GDP. The third, *depth,* needs to be enforced by setting up additional restrictions as in appendix A.6 of AMP. Whilst these rules are essentially judgmental, they can be drawn from the history of the series under investigation.

The right hand part of Table 2.1 presents some characteristics of the deviation cycles extracted by the HP quarterly band pass filter when no censoring rule on the amplitude

of the fluctuations is invoked. It can be seen that this results in a relatively large number of turning points and affects the duration and the amplitude statistics. The stylized fact that is however robust to the choice of censoring rules is that the average amplitude of recessions and expansions is about the same, as implied by the symmetry of the cyclical model or signal extraction filter. It is important to stress that this is an implication of the representation of the cycle that is chosen, although a model based framework permits a test for business cycle nonlinearity and asymmetry (see, e.g. Proietti, 1999).

Table 2.2: Classical BC: standardised concordance index

	EA	D	UK	F	I	US
EA	-	7.15	2.48	6.29	6.35	3.40
D	7.15	-	1.93	5.41	5.43	4.43
UK	2.48	1.93	-	3.00	2.33	3.50
F	6.29	5.41	3.00	-	4.59	1.92
I	6.35	5.43	2.33	4.59	-	3.20
US	3.40	4.43	3.50	1.92	3.20	-

2.3. Country-specific cycles

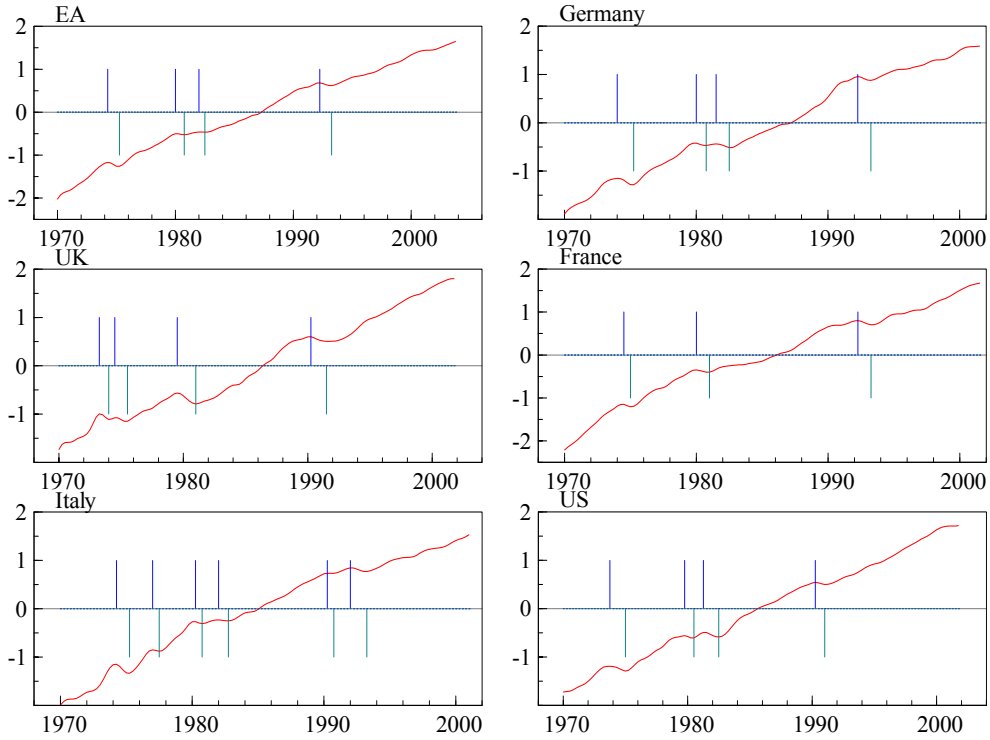
Our analysis of country-specific cycles focuses on two data sets, the first relating to GDP at constant prices for five countries, Germany, France, Italy, UK and the US, starting from 1970 and available from various sources, among them the OECD's Main Economic Indicators and the US Bureau of Economic Analysis. For Germany the series, made available by the IFO, has been seasonally adjusted, corrected for working days and the level shift due to reunification, using the basic structural model with regression effects. The Euro area series is used for comparison. The second set is produced by Eurostat and provides a highly comparable set of statistics on real GDP based on the new system of national accounts (ESA95), for a larger set of countries but for a shorter time span, beginning in 1980 for most countries. Given the new data sources we are able to exploit in this section we have foregone the opportunity to make comparisons with previous studies of country-specific cycles; some differences are bound to emerge as a result of the different vintage of data being used and it would be difficult and largely unprofitable (we think) to attempt to disentangle the various sources of difference.

Figure 2.3 presents the turning points of the classical BC for the Euro area, Germany, France, Italy, UK and the US, identified using the HP(1.25) filtered series on the first data set. We recall that this is a low-pass filter dampening the fluctuations with a period less than five quarters, which strictly do not pertain to the business cycle.

A visual inspection of Figure 2.3 suggests a large degree of synchronization and concordance among the Euro area country specific business cycles. A simple measure of cyclical concordance between two countries can be based on the proportion of the time that they share the same phase (expansion, recession), but because of the bias towards expansion, this is not a very revealing measure; correcting the measure for this bias and then dividing the consequent mean-corrected index of concordance by its standard error, we can arrive at a standardized index of concordance (see AMP for a more complete description). Table 2.2 displays the standardized index of concordance between the classical business cycles for the individual countries and the Euro area

aggregate cycle. The UK cycle shows the least concordance with the Euro area cycle, followed by the US.[4]

Figure 2.3: Classical cycle turning points for EA, Germany, France, Italy, UK and the US, based on HP(1.25) filtered quarterly real GDP.



The standardized concordance indexes computed on deviation cycles are reported in Table 2.3. These results largely confirm the presumption of a high degree of synchronization within the Euro area.

Harding and Pagan (2001) also proposed to regress the recession indicator for one country on the same indicator for another country and compute a t-statistic for BC independence using HAC standard errors. The results (which are given in full in AMP but are not shown here) suggest that the UK cycle is independent of that of the EA, Germany and France, whereas there is a significant association with Italy and the US.

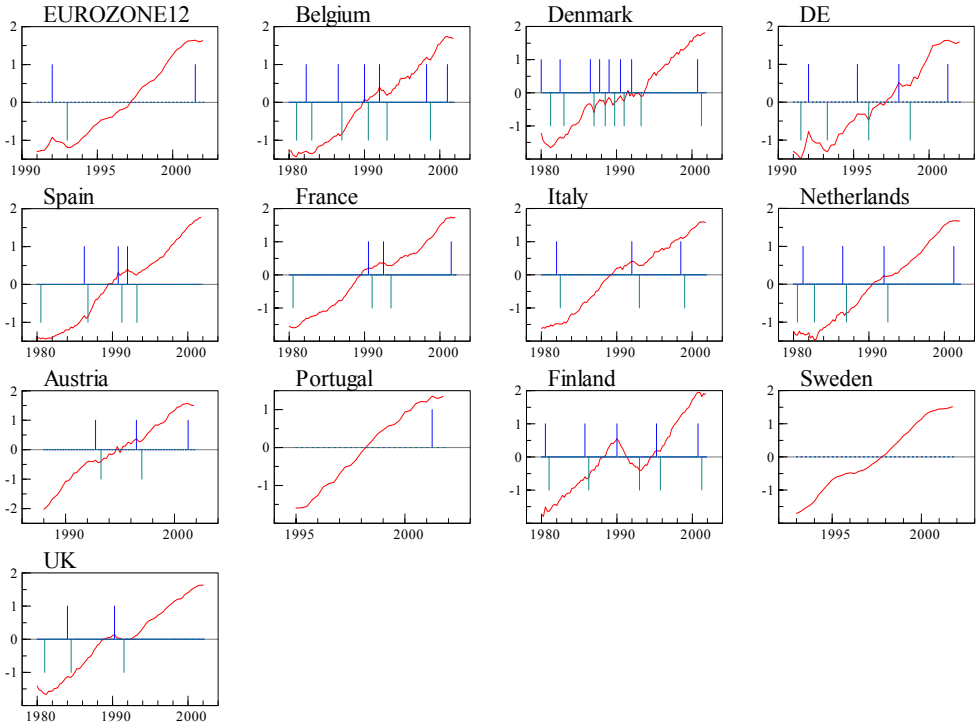
Finally, the analysis of the shorter Eurostat series (see Figure 2.4), is useful in pinpointing an additional peak that was not identified from the other Euro area series considered before, taking place in the second quarter of 2001. This is common to Germany, France and is anticipated in the series for Finland, Belgium, the Netherlands and Austria. No turning point is found for Sweden and Portugal (see AMP for details).

[4] The standardized concordance index has an asymptotic standard normal distribution, so that the reported values can be also interpreted as tests for independent cycles. Yet, the proper finite sample critical values are likely very different from the asymptotic ones, because of the use of binary data.

Table 2.3: Deviation cycle: standardised concordance index

	EA	D	UK	F	I	US
EA	-	4.83	3.42	4.71	5.77	2.75
D	4.83	-	2.95	2.66	3.48	2.53
UK	3.42	2.95	-	2.07	2.33	2.26
F	4.71	2.66	2.07	-	3.67	2.47
I	5.77	3.48	2.33	3.67	-	1.90
US	2.75	2.53	2.26	2.47	1.90	-

Figure 2.4: Classical cycle turning points, for the Euro area countries based on quarterly real GDP (seasonally adjusted, logarithms); Eurostat series, 1980.1-2002.1.



2.4. Monthly indicators

This section focuses on the analysis of business cycles in monthly industrial production series for most European countries and the US. The series, seasonally adjusted, are drawn from the OECD Main Economic Indicators and cover a sample period that differs for the individual countries, but is usually very large. We set off by identifying the major additive outliers; the strategy was to add impulse intervention variables, one at a time corresponding to the sample observation that had a standardized auxiliary residual, for the irregular component of the local linear trend model, greater than 4 in absolute value. See Harvey and Koopman (1992) for the definition of auxiliary residuals and their use for outlier and structural break detection.

Despite the outlier correction, too many turning points are identified due to the presence of high frequency noise that may result from intrinsic volatility, under adjustment of working days variation and other events such as moving festivals and strikes. This problem may be faced either by setting up amplitude restrictions or by smoothing the

series (see AMP for details). The turning points characterization is not particularly sharp as they have attached a rather low probability, which is smeared on adjacent data points, but the recession and expansion probabilities are rather sharp. This results from of the uncertainty surrounding the signal estimates in an environment where noise contamination is at relatively high levels. The shape of the recession probabilities highlights some interesting features, among which it is remarkable that expansion and recession probabilities behave asymmetrically (expansion termination is usually quicker than recession termination). When average growth is reduced, as occurs in France in the second half of the 70s, the probability of recession is higher. For Germany, France and Italy we find a high degree of synchronization (see AMP for graphs and tables of concordance indexes).

2.5. Diffusion and multivariate business cycle assessment

An index of business cycle diffusion measures the percentage of economic time series in a certain state, e.g. recession. It typically aims at assessing on a 0-1 continuous scale how widespread are business cycle movements throughout the economy. This assessment may be a useful input to the classification of variables as, e.g., leading, coincident or lagging.

There are two ways in which diffusion indexes can be constructed. The first amounts to scoring each individual time series and then taking the cross-sectional average

$$D_t = \frac{1}{N}\sum_{i=1}^{N} S_{it} \quad , \quad \text{t= 1,…,T}$$

where S_{it} takes value 1 in recessions and zero otherwise, and N is the cross-sectional dimension. This raises the issue of weighting the series considered according to their economic relevance and/or their proved efficacy in signalling recessionary events. If a system of (possibly time-varying) weights w_{it} is available then

$$D_t = \sum_{i=1}^{N} w_{it} S_{it} \ , \quad \text{t= 1,…,T,} \quad \sum_i w_{it} = 1 \, .$$

The underlying model is that the aggregate index, D_t, is a finite mixture of two states Markov processes, the mixture probabilities being given by w_{it}. Suppose that the individual time series are the components of an aggregate $y_t = \sum_i w_i y_{it}$ and that we score recessions according to the calculus rule, that is $S_t = I(\Delta y_t < 0)$, where I(·) is the indicator function, then

$$E(S_t) = P(\sum_i w_i \Delta y_{it} < 0) > E(D_t) = \sum_{i=1}^{N} w_{it} E(S_{it}),$$

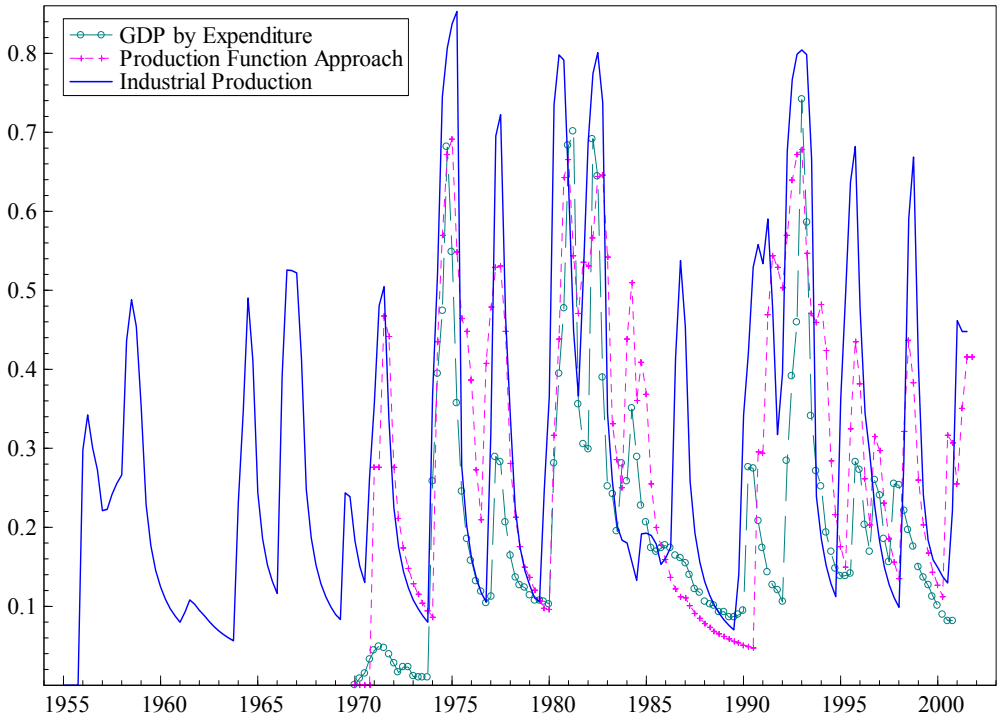
so that the diffusion index does not measure the probability of a recession in the aggregate series; but rather the proportion of the aggregate that is in a recession.

An alternative is to compute diffusion indexes by the dating algorithm of appendix A of AMP, where the transition probabilities are computed using the probability attached to expansion and recession terminating sequences (ETS and RTS) in the following way:

$$\mathcal{P}_T^{(ETS)} = \sum_{I=1}^{n} w_{it} I(ETS_{it}), \qquad \mathcal{P}_T^{(RTS)} = \sum_{I=1}^{n} w_{it} I(RTS_{it}),$$

Under this rule, the transition probabilities depend on the sum of the weights of the series that are in those two terminating sequences. Again, the underlying assumption is that the aggregate ETS_t is a finite mixture of cross-sectional ETS_{it}, and the dating algorithm furnishes probabilities that must be interpreted as $P(D_t=1)$, not as $P(S_t=1)$, and loosely speaking are a smoothed version of the previous diffusion index.

Figure 2.5: Three sets of diffusion indices for classical business cycles in the Euro area.



Assessing the diffusion of the BC in the Euro area requires the evaluation of sector and country specific data and many disaggregated time series, but given our data availability for the time being we consider three sets of data that can be used to produce a multivariate assessment of the classical cycle in the Euro area. The first of these is made up of the 5 expenditure components of GDP (private consumption, government consumption, fixed capital formation, net exports and variation in stocks). The set of weights is immediately available as the GDP shares. The second set considers total factor productivity, as measured by the Solow's residual using the time averaged labour share $\alpha=0.35$ and a constant returns to scale Cobb-Douglas technology, total employment, and capital. This yields another decomposition of log output such that the weights are proportional to the Cobb-Douglas weights. The third set consists of the 12 industrial production series for the EA countries; the weights were obtained from the

total gross value added at basic prices for the year 2001 available from the individual countries account (except for Greece, Luxembourg and Ireland, for which it was interpolated from total GDP estimates).

Figure 2.5 presents the diffusion indexes emerging from the three sets. The plot reveals the following: the diffusion of recessions is higher for industrial production and there is a tendency to peaking with a short lead, usually one quarter. A recessionary pattern that is idiosyncratic to the industrial sector can be found in 1987. Industrial production and the variables in the production function approach signal entry to a recessionary state in 1990 and 1991 respectively, whereas the GDP by expenditure diffusion peaks in 1992. For the second an important contribution is made by labour which peaks before GDP, as noticed before. The diffusion indexes behave asymmetrically along the time axis, this feature stems from the fact that the proportion of time series entering a recession is larger than those leaving it, which explains the positively skewed pattern. The example also illustrates that weighting is a crucial issue: if we were to combine the three diffusion indexes into an aggregate one by simple averaging, then we would presumably overstate the diffusion, due to the influence of the IP diffusion index that dominates the others.

2.6. Degree of convergence within the Euro area

If a diffusion index is constructed from country specific business cycles, as we did for industrial production, it can be argued that D_t provides at least some information on the degree of convergence: $D_t(1-D_t)$ is a measure of dispersion and it is a maximum when $D_t=0.5$, whereas it goes to zero when all the series are in the same state. In this perspective, Figure 2.5 highlights that there is no tendency to cluster around the extremes as time progresses, especially compared to the 70s and the 80s.

There appears to be no systematic tendency for convergence or divergence in the classical business cycle sense. If we look at the cross-sectional dispersion of the member countries growth rates around the Euro area average (constructed with fixed weights) we can establish that it peaked in the seventies, declined until around 1985, is relatively small during 1985-1990 and 1995-1998 and rises again in 1990-1995 and 1999-2000. Basically, cross-sectional dispersion increases in recessionary periods, but the long term trend in the volatility of growth is that in the last 15 years it is lower than in the period 1970-1985. A reduction in volatility implies, *ceteris paribus*, a smaller frequency of recessionary events in a given time span. However, the average growth rates characterizing several of the 12 countries are reduced, not by the same amount, and this increases the frequency of country specific cycles in the classical sense. As a result, at the end of the sample we find less ample but more frequent recessionary patterns, but we have no decisive evidence for either the presence of convergence or divergence.

When we turn to the deviation cycle, we find stronger support for convergence, by which we mean a systematic tendency for cross-sectional dispersion to be reduced over time.

2.7. Conclusions

This Chapter has reported the results of technical exercises in the dating of the Euro area business cycle and the cycles of the main constituent economies. We distinguished

between the classical and deviation (or growth) cycle, and used what we regard as best-practice techniques to identify these cycles, in every case concentrating upon a single, univariate summary of economic activity, GDP or industrial production. A number of topics for further research are suggested by the identification we have made. One, which we have already pursued here, is to examine the issue of synchronicity or coherence between the cycles. In future research one would expect to be able to track movements in the coherence of the cyclical experience of the Euro area economies, whether in the direction of greater convergence or not. Other topics can easily be suggested: thus, following identification of the cycle, one would hope to be able to build leading indicators; and to be able to explain the main determinants of cyclical experience and its evolution over time. As we maintained in the Introduction, this is a particularly good time to initiate further studies of the European business cycle experience, as the adoption of the euro gives the Euro area economy a new identity and can be expected to have important effects on the Euro area cycle.

It may indeed be time to ponder on the following. In the United States the NBER's dating committee has established a business chronology over a long period of time which is widely regarded as the authoritative dating of the US cycle. Economists who come up with a new technique for business cycle identification "prove" their technique by comparing their results with the NBER chronology. The NBER's committee comprises economists with expertise in various sectors of the economy and its approach is avowedly a multivariate one: techniques such as those we deployed in this paper applied to a single series can be regarded as "office assistants", helpful in establishing the dating, not dictating it. It would be good for Europe to establish a comparably authoritative chronology for its business cycle, perhaps through similar means - perhaps through a different one. At risk of stating the obvious, it bears pointing out that the European situation is different in many ways from the one that faces analysts of the American cyclical experience. Not least, because of the short history of the Euro area economy, country experts might be needed more than sectorial experts. Historical analysis would be complicated by national differences, but all the more necessary for this reason. A complaint that is often made against the NBER procedure is that it can take a long while, in real time, to establish a turning point, partly for reasons to do with data revisions and availability; some of those problems are more acute in the European setting. Then also, it might be argued that with techniques at hand today nothing more is really needed than reliable GDP estimates, or data from a factor analysis that proxy GDP, with the benefit of being robust to revision, to provide reliable dating of the cycle. To provide more accurate dating, better monthly data are certainly needed.

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Chapter 3. Some stylized facts on non-systematic fiscal policy in the Euro area

3.1. Introduction

This chapter provides a set of stylized facts on the effects of non-systematic fiscal policy in the four largest countries of the Euro area, using small-scale econometric models estimated on a country by country basis for a rather long time span. The stylized facts are then used to shed light on the fiscal policy coordination debate, on the effectiveness of fiscal policy in stabilizing the economies, and on the interaction of fiscal and monetary policy.

There emerge differences across countries in the effects of non-systematic fiscal policy, and substantial uncertainty about the size of these effects, which casts doubts on the possibility of fiscal coordination, or at least complicates its implementation. The presence of spillovers across countries, another justification for a coordinated fiscal policy, is also uncertain, and their size turns out to be small. On the other hand, non-systematic fiscal policy can be considered as a tool to smooth the consequences of idiosyncratic shocks, so that coordination is less needed than in the case of systematic fiscal policy.

Expenditure shocks are found to be rather ineffective in increasing output, possibly with the exception of government investment, and, since they are not accompanied by tax increases that balance the budget, they can require deficit financing. Tax policies also appear to have minor effects on output, and tax cuts could also require deficit financing because of the sluggish reaction of expenditures. There are minor differences between more discretionary policies, such as government consumption, and automatic stabilizers, such as social benefits. Moreover, non-systematic expenditures and taxes appear to have only minor effects on output gap volatility. Notice that these results do not preclude the possibility of fiscal stabilization through the systematic component of the fiscal policy.

As far as the interaction with monetary policy is concerned, fiscal policy shocks appear to have an impact on interest rates, either direct or trough the output gap and inflation, and the exclusion of fiscal variables can bias in a few cases the evaluation of the effects of monetary policy shocks. Instead, in general, the effects of monetary policy on disbursements and receipts seem to be minor.

The chapter is organized as follows. Section 2 provides a brief review of the recent related literature. Section 3 describes the dataset and develops the econometric methodology. Section 4 evaluates the effects of non-systematic fiscal policy on the output gap, inflation, and the interest rate. Section 5 considers the impact of non-systematic monetary policy, and compares the results when the fiscal variables are excluded from the model, as it is common in the monetary policy literature. Section 6 focuses on the effects of the macroeconomic variables on the fiscal and monetary variables. Section 7 analyzes the presence of spillovers across countries. Section 8 considers the effects of fiscal policy on private consumption and investment, disaggregates receipts and disbursements into several components, and evaluates the role of the government debt. Section 9 concludes.

3.2. Literature review

There have been few attempts to derive stylized facts on the effects of non-systematic fiscal policy in the Euro area using small-scale models, while similar analyses are available for monetary policy, see e.g. Favero and Marcellino (2001), and there are some studies for the US, e.g. Blanchard and Perotti (1999), Fatas and Mihov (2001a, 2001b) or Mountford and Uhlig (2002). Most of the available evidence is based on simulations from large-scale structural models, which differ substantially on the extent of the effects of fiscal policy, mainly because of different hypotheses on the percentage of financially constrained consumers in the economy.[1]

Two recent attempts to bridge the gap are Favero (2002) and Perotti (2002)[2]. The former develops a small scale structural model, and dynamically simulates it by setting to zero the fiscal shocks to compare the behaviour of the output gap and inflation with the benchmark case where the shocks are not set to zero. The difference measures the effects of non-systematic fiscal policy. Perotti (2002) exploits and extends the methodology in Blanchard and Perotti (1999), which is based on the computation of dynamic responses to fiscal shocks using structural VARs, combined with external information on the effects of macroeconomic variables on fiscal variables. Even though these papers represent important developments in this field, they can suffer from (different) identification problems, discussed in more detail in the next section. Following Perotti (2002), we adopt a structural VAR approach, but the choice of the variables under analysis allows a better identification of the fiscal shocks, without relying on external information.

It is worth discussing briefly what we mean by fiscal shocks and how we identify them (more details are provided in the next section) since there is no consensus on this in the literature, see e.g.. Perotti (2002). Some authors, such as Burnside et al. (2001) and Ramey and Shapiro (1999) identify deviations of fiscal policy from its normal path by using dummy variables that capture specific episodes such as the Korean war or the Reagan fiscal expansion. Others identify fiscal shocks starting from the residuals of VARs or simultaneous equation models, e.g. Perotti (2002), Mountford and Uhlig (2002), Favero (2002), Fatas and Mihov (2001a, 2001b). Within this approach, different procedures are implemented to identify the mapping from the residuals to the shocks. In particular, Mountford and Uhlig (2002) impose sign restrictions on the impulse responses, rather than contemporaneous restrictions as in the other papers mentioned above. Our methodology belongs to this second approach, and we use standard structural VAR identification techniques, to stress the point that the main issue is the choice of the variables to be jointly modelled in the VAR, and the restrictions imposed.

A few caveats are also in order to interpret correctly our results. First, there is an implicit hypothesis that the fiscal shock exerts its effects when it is implemented rather than when it is announced. This led Mountford and Uhlig (2002) to use the sign restriction identification scheme, but this can only in part address the issue. If there are announcement effects, these will be hardly captured by the VAR. Second, there are several problems with data collection, in particular for Europe. Perotti (2002) carefully collected a quarterly dataset without interpolating yearly values, but Germany is the

[1] These simulations were presented at the CEPR-ZEI conference on Empirical models of the Euro Economy, held in Bonn in June 2002, and are contained in preliminary and confidential reports of the main international organizations.

[2] See also Ballabriga and Martinez-Mongay (2002) for a discaussion of fiscal and monetary rules in the Euro area.

only country in the Euro area in his data set. We use half-yearly OECD data, as in Favero (2002), which are comparable across countries but whose quality is dubious since some series are interpolated. We also focus first on aggregate expenditures and receipts and then disaggregate them, to have a measure of the overall effect on non-systematic fiscal policy but also to evaluate whether particular taxes or disbursements have different effects, see e.g. Alesina and Perotti (1995). Third, we stress that we focus on non-systematic fiscal policy, and that the effects of systematic policy could be rather different, see e.g. Baldacci et al. (2001), while Hemming et al. (2000) provide a comprehensive survey. Fourth, we focus on the effects of fiscal variables on key macroeconomic variables, such as output growth and inflation, but there can be other welfare effects of fiscal policy, e.g. on income distribution or quality of life that are not captured. Fifth, both Favero (2002) and Perotti (2002) found substantially different effects after the '70s so that we focus on the period 1981-2001 to avoid a serious bias in the results. The drawback of this choice is that the limited number of observations is reflected in substantial uncertainty on the estimated effects. This problem is exacerbated by the identification procedure that requires the estimation of a large number of parameters. Finally, it is difficult to capture within our linear VAR framework non-linear effects of fiscal policy related to specific episodes, such as those arising from re-establishing credibility or solvency, see e.g. Giavazzi and Pagano (1990, 1996), Giavazzi et al. (2000) and Perotti (1999), but some results can be interpreted along these lines.

3.3. The variables and the econometric methodology

In this section we briefly describe the variables under analysis for France, Germany, Italy and Spain, and discuss the identification scheme adopted in the structural VARs for the joint analysis of fiscal and monetary shocks.

The starting point of the analysis is a VAR that includes the output gap (measured as the deviation of real GDP from its HP-filtered values) divided by GDP (y); the CPI inflation rate (p); a raw material price inflation rate (cp); the log of the nominal exchange rate with respect to the Deutsche Mark, or to the US dollar for Germany (e); a short term foreign interest rate, the German one, or the US one for Germany (i*); and the home short term interest rate, as a proxy for the policy rate (i). This is a rather standard choice of variables in monetary VARs, see e.g. Favero and Marcellino (2001). We then add the ratios of total receipts and disbursements to GDP to the dataset (t and g, respectively). We are here interested in an evaluation of the global effects of fiscal shocks, a more disaggregate analysis is presented in Section 8.

The data source is the OECD, as in Favero (2002), and the frequency is half-yearly. This choice contrasts with the standard adoption of monthly data for the analysis of monetary policy. It is dictated first by data availability, and second by the fact that in most countries the major fiscal decisions are taken once a year, and possibly revised once. Perotti (2002) constructs a quarterly dataset, but Germany is the only country within the Euro area for which such data are available. As far as monetary shocks are concerned, the main interest is in a comparison with the results from VARs without fiscal variables.

For all countries the sample under analysis is 1981:1-2001:2. Though for some countries longer series are available, as mentioned before, Favero (2002) and Perotti (2002) found a clear indication of different effects of fiscal policy after the '70s, and

monetary policy was also in general rather different. The eight variables under analysis are modelled by a VAR with 2 lags and a constant for all countries, which in general provides a proper statistical model.

As far as the identification of the structural shocks (e) starting from the VAR residuals (u) is concerned, the scheme in equation (1) below is adopted as a starting point. The tax to GDP ratio can depend on contemporaneous values of gap and inflation. The disbursements to GDP ratio is related to contemporaneous values of the output gap and of the interest rate. The output gap can be affected by contemporaneous taxes and disbursements, and the same holds for inflation that can also depend on the gap. Raw material price inflation and the foreign interest rate are instead modelled as exogenous, and do not react contemporaneously to other variables. The exchange rate is influenced by t, g, y, p and cp. The home interest rate depends on all these variables plus the exchange rate and the foreign interest rate, so that this equation can be considered as an extended version of the Taylor rule. Finally, we allow for a contemporaneous effect of e_t on e_g, and similar results are obtained by reversing the causal direction, a robustness noted also in Perotti (2002).

Notice that the structural fiscal shocks could be also interpreted as the deviation from a fiscal rule where the fiscal variables depend on contemporaneous values of the gap, inflation and interest rate, on their own lags to allow for partial adjustment and hysteric phenomena, and on the lags of all the variables to allow for possible delayed reactions.

$$\begin{bmatrix} 1 & 0 & \alpha_{ty} & \alpha_{tp} & 0 & 0 & 0 & 0 \\ 0 & 1 & \alpha_{gy} & 0 & 0 & 0 & 0 & \alpha_{gi} \\ \alpha_{yt} & \alpha_{yg} & 1 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{pt} & \alpha_{pg} & \alpha_{py} & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ \alpha_{et} & \alpha_{eg} & \alpha_{ey} & \alpha_{ep} & \alpha_{ecp} & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ \alpha_{it} & \alpha_{ig} & \alpha_{iy} & \alpha_{ip} & \alpha_{icp} & \alpha_{ie} & \alpha_{ii*} & 1 \end{bmatrix} \begin{bmatrix} u_t \\ u_g \\ u_y \\ u_p \\ u_{cp} \\ u_e \\ u_{i*} \\ u_i \end{bmatrix} =$$

$$\begin{bmatrix} \beta_{tt} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \beta_{gt} & \beta_{gg} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \beta_{yy} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \beta_{pp} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \beta_{cpcp} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \beta_{ee} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \beta_{i*i*} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \beta_{ii} \end{bmatrix} \begin{bmatrix} e_t \\ e_g \\ e_y \\ e_p \\ e_{cp} \\ e_e \\ e_{i*} \\ e_i \end{bmatrix} \qquad (1)$$

The identification procedures more similar to the above scheme are those proposed by Favero (2002) and Perotti (2002), but there are some important differences. In particular, Favero assumes, in our notation, that α_{yt} and α_{yg} are equal to zero. While this seems a reasonable assumption because of the commonly hypothesized delays in the

effects of fiscal policy, in Perotti (2002) these parameters are estimated and found to be significantly different from zero in several cases.

Perotti (2002), on the other hand, extends a procedure proposed in Blanchard and Perotti (1999) to estimate the parameters α_{ty}, α_{tp}, α_{ti}, α_{gy}, α_{gp}, α_{gi} as elasticities using external information. While such a procedure was uncontroversial in Blanchard and Perotti, it is unclear whether it is suited in this more general context, since, for example, now α_{ty} measures the contemporaneous reaction of t to y conditional not only upon lagged values of the variables but also upon contemporaneous values of p and i, which can be hardly considered as constant in the data used to compute the elasticities. Moreover, Perotti's choice of modelling the log of GDP and of the price level makes the identification of the interest rate shock problematic, since the latter is usually supposed to react to the output gap and inflation.

Our proposed identification scheme addresses both issues. With respect to Perotti (2002), we also use additional information to estimate the parameters that relate t and g to other variables, but this is accomplished by including within the same framework two exogenous variables, cp and i*. Finally, since the restrictions over-identify the model, they can be formally tested.

The main drawback of the suggested identification scheme is that many parameters have to be estimated, which can create numerical accuracy problems in samples as small as ours. We have tried several different starting values for the parameters to make sure that the optimization algorithm converged to a global and not to a local optimum, and checked the robustness of the resulting impulse response functions.

3.4. The effects of fiscal shocks

In this section we evaluate the effects of a shock to the government disbursements (e_g) or receipts (e_t) in the four countries under analysis. In the first subsection we discuss the dynamic responses of the variables of interest to fiscal shocks. In the second subsection we conduct a counterfactual experiment. We dynamically simulate the model setting to zero the fiscal shocks, as in Favero (2002), and compare the actual and the simulated behaviour of the macroeconomic variables to evaluate whether non-systematic fiscal policy managed to stabilize the economies.

3.4.1 The dynamic response of the economy to fiscal shocks

The estimated counterparts of equation (1) are reported in Table 3.1, and four main comments are in order. First, the over-identifying restrictions implied by equation (1) are rejected by the data. This turns out to be due to some significant coefficients in the commodity price and foreign interest rate equations. Once the proper zero restrictions are relaxed, the same identification scheme is accepted for France and Germany, with only some minor differences for Italy and Spain. Second, the restriction of no contemporaneous effects of fiscal shocks on the output gap and inflation ($\alpha_{yt} = \alpha_{yg} = 0$) is accepted for all countries, indicating at least a six month delay for fiscal policy to manifest its effects. Moreover, the coefficient β_{gt} is small and not significant in all countries, indicating no coordination in tax and expenditure shocks, which can create deficit problems. Third, α_{ty} and α_{gy} are smaller in Germany than in the other countries, and the estimates of the other coefficients related to the contemporaneous effects of taxes and expenditures are also rather varied, though in many cases the estimated

standard errors are large, reflecting a substantial uncertainty. Finally, when a contemporaneous effect of the interest rate on output, inflation and the exchange rate is allowed for, it turns out to be not significant and the responses do not change substantially.

It is worth mentioning that the size of the structural shocks is about 2% of total expenditures or receipts. No major outliers are evident, with the exceptions of a large expenditure shock in Germany, corresponding to the unification. The fact that the behaviour of the shocks is similar in the '80s and '90s suggests that the Maastricht treaty and the Stability and Growth pact mainly influenced the systematic fiscal policy, which is a positive finding. The correlation across countries of these shocks is also rather low, as discussed in more detail below.

The relevant impulse response functions generated by the VAR models identified as in Table 1 are gathered in figures 3.1-3.4. Those pertinent to this section are reported in the first two columns of each figure.

As far as the expenditure shock is concerned, three main comments are in order. First, its effects on the output gap are very limited in all countries, except Germany where the response is positive and significant. Second, inflation increases significantly in France, which also leads to an increase in the interest rate (a non significant increase takes place also in Italy and Spain). The reaction of inflation in the other countries is instead limited and not statistically significant. Third, in all countries, the expenditure shock is very persistent, so that what was likely intended as a temporary deviation becomes close to a permanent shock, and the reaction of taxes is delayed and not sufficient to balance the budget. Overall, this picture casts serious doubts on the stabilization role of fiscal policy implemented trough expenditure shocks, whose effects on output appear to be limited, while they could lead to an increase in inflation and require deficit financing.

Let us now make three comments on the effects of a (positive) tax shock. First, the output gap decreases, as predicted by Keynesian theory, in Germany only. In the other countries the effects are very limited, but positive and significant in Italy, perhaps as a consequence of the improvement in the government deficit and more generally in fiscal solvency, see e.g. Giavazzi and Pagano (1990, 1996). An alternative explanation for the positive effects of a tax shock could be that, since it is actually a revenue shock, it can be due either to an increase in the tax rate or to an increase in the tax base, and the latter is positively correlated with the output gap. Yet, if this were the case, an increase in the output gap should be also associated with higher revenues, while this does not appear to be the case, as we will see in more details in Section 6.

Second, the consequences of the tax shock on inflation are in general limited, as well as those on the interest rate, though it significantly decreases in France and increases in Spain. The latter effect is explained by an associated increase in the price of raw materials, which appears to lead Spanish inflation.

Third, in all countries, a tax shock is associated with only a limited increase in expenditures, so that overall the deficit is reduced.

In summary, the effects of fiscal shocks are rather different across countries and surrounded by considerable uncertainty. Yet, a consistent pattern is that expenditure and tax shocks have limited stabilization effects, a result in line with Perotti (2002), but tax shocks can play a role in deficit reduction while expenditure shocks may require deficit financing. Monetary policy seems to react to non-systematic changes in fiscal variables in a few circumstances, but the main effects appear to be through the impact of fiscal policy on output and inflation.

3.4.2 Assessing the in-sample effects of fiscal shocks

To provide further evidence on the effects of non-systematic fiscal policy, we simulated the structural VAR models setting to zero the fiscal shocks and to their realized values all the other shocks. Thus, a comparison of the actual and simulated behaviour of the macroeconomic variables provides an indication of the in-sample effects of non-systematic fiscal policy.

The results are reported in the first two rows of each panel in Table 3.2. Fiscal policy shocks appear to have a negative effect on the average output gap in all countries except Italy. In other words, the output gap improves without fiscal shocks. Moreover, its standard deviation is reduced by non-systematic fiscal policy only for France and Spain. The effects on the levels of inflation and the interest rate are minor, with a slight generalized increase in the standard deviation of these variables.

To evaluate whether there are differences between discretionary policy and automatic stabilizers, we have repeated the same exercise using, respectively, government consumption and social benefits instead of total expenditures. The results are reported in the remaining rows of Table 2. The major interesting finding is that social benefits slightly improve the output gap in Germany, but at the cost of a higher inflation and interest rates. Moreover, except in Germany, the output gap volatility increases more without government consumption than without social benefits.

In summary, this analysis suggests that non-systematic fiscal policy played in general only a minor role in stabilizing the four largest economies of the Euro area over the period 1981-2001, with a limited impact also on inflation and the interest rate.

3.5. The effects of monetary shocks

The responses of the variables of interest to a monetary (i.e. interest rate) shock are reported in the last column of figures 3.1-3.4. We are interested first in the effects of the shock on fiscal variables, and then in a comparison of the responses of output and inflation with those obtained from a VAR without the fiscal variables (but using otherwise the same identification scheme). The latter are reported in Figure 5 in Marcellino (2002).

The fiscal variables appear to react very little to the monetary shock in all countries. Instead, the inclusion of the fiscal variables in the VAR appears to exert an important role in a few cases to evaluate the impact of a monetary shock on macroeconomic variables. Specifically, in a VAR without fiscal variables estimated for Germany, a higher interest rate seems to lead to higher inflation and, with a delay, to higher output, a result that contrasts with the traditional wisdom and was also found with monthly data in Favero and Marcellino (2001). Yet, both reactions become very small and have the proper sign when the fiscal variables are included in the VAR.

In summary, including fiscal variables in monetary VARs can lead to a better assessment of the effects of monetary shocks, at the cost though of having to use lower frequency data, while in general the reaction of fiscal variables to non-systematic monetary policy appears to be limited.

3.6. The effects of macroeconomic variables

The effects of shocks to the output gap and inflation on the other variables are reported in the 3rd and 4th columns of figures 3.1-3.4.

A higher unexpected output gap is associated in all countries with higher inflation, and in turn with higher interest rates, in agreement with a Taylor rule type of explanation of monetary policy. Expenditures decrease in all countries, and then increase. Receipts follow a similar pattern.

As far as an inflation shock is concerned, it leads to an increase in interest rates in all countries, except Spain where the effect is slightly negative and it is also associated with a non significant decrease in the output gap. In Germany the output gap reacts instead positively, while it is virtually unaffected in Italy and France. In all countries the impact effect on the fiscal variables is very limited, with the exception of Germany and Spain where there is a delayed reduction in receipts.

In summary, the response of fiscal and monetary variables to unexpected changes in the output gap and inflation is rather similar across the four countries, though with some differences in the magnitude of the effects.

3.7. Cross-country spillovers

To evaluate whether non-systematic fiscal policy generates significant spillovers across countries, we estimate 6-variable VARs that include the output gap, expenditures and receipts (all as ratios to GDP) for Germany and the same variables for, in turn, France, Italy, and Spain. Thus, we focus on spillovers from and to Germany.

We use a Choleski decomposition to identify the structural shocks, with the variables in the order above. Thus, the main assumptions we make are that there is no contemporaneous feedback of foreign variables on Germany, and that the output gap is not contemporaneously affected by home fiscal policy, which is substantially in line with the identification in the larger VARs.

The relevant responses are reported in Figure 6 in Marcellino (2002). Here we comment on the main findings, focusing on the reaction of foreign countries to German shocks, since German variables react very little to foreign shocks.

A positive output shock in Germany has a positive and significant effect in all countries, marginally so for Spain. Fiscal variables in turn react, and the general pattern is a slight reduction in expenditures, accompanied by a similar reduction in receipts, a result similar to what we obtained before in the case of a home output shock.

German fiscal shocks, instead, appear to have a limited direct effect on foreign variables, the responses are rather small and not significant, possibly with the exception of an increase in German expenditures on France (French expenditures and receipts react positively and significantly). This limited effect is also confirmed by the fact that the coefficients that relate German fiscal shocks to home variables in the Choleski decomposition are in general not statistically different from zero.

The results we obtained so far should be interpreted with care because the analysis in the previous sections suggests that there could be an omitted variable bias. To address this issue, and provide more information on the usefulness of non-systematic fiscal policy coordination, we adopt an alternative approach. We simulate the 8-variable

VARs in Section 3.4, substituting each country fiscal shocks with the German ones, in order to mimic the effects of an extreme form of policy coordination.

The results are summarized in Table 3.3. Substituting home for German fiscal shocks improves the average output gap for Spain only, at the cost of a slightly higher volatility and of a mild increase in inflation and the interest rate. The decrease of the output gap is rather marked in Italy, and is accompanied by higher inflation and interest rates, while the effects in France are minor for all the three variables.

In the last part of Table 3 we also report the correlation between the German and the other countries structural fiscal shocks. The figures are all rather small, the largest value is 0.29 for the German-Spanish expenditure shocks, and even negative values are obtained in a few cases. Similar figures are obtained with the VARs residuals. Hence, the coordination in non-systematic fiscal policy appears to be very low, and the results we obtained in this section on the size of the fiscal spillovers and the low efficacy of following German policy cast further doubts on the usefulness of a closer coordination.

3.8. Further results

In this section we address three issues. First, are there any differences in the effects of the fiscal shocks on private consumption and investment? Second, are there any types of taxes or expenditures that are more effective stabilization tools? Third, does the level of public debt play a role in determining the consequences of non-systematic fiscal policy?

3.8.1. Disaggregating y

Using VARs similar to those of section 3.4, but substituting the output gap with consumption or investment (as a ratio to GDP), it turns out that tax shocks have the strongest effects in Italy, with a comparable increase of consumption and investment, confirming the previous finding. Expenditure shocks have instead no or negative effects in all countries, with the exception of consumption in Italy, likely related to the wealth effects induced by higher interest rate payments.

Overall these results confirm and are in agreement with what was detected about the effects of fiscal policy using the output gap, and no particular differences in the reaction of consumption and investment to non-systematic fiscal policy emerge.

3.8.2. Disaggregating t and g

We now disaggregate the receipts into revenues from taxes on business (t_b) and on households (t_h), from indirect taxes (t_ind), and from social contributions (t_soc). Similarly, we consider separately three components of disbursements: government consumption (g_c), investment (g_i), and social benefits (g_soc). Since g_c and g_soc are usually considered as examples of, respectively, discretionary policy and automatic stabilizers, we can evaluate whether there are major differences in the effects of these two types of non-systematic policy.

Using VARs similar to those of section 3.4, substituting in turn each aggregate fiscal variable with one of its components (as a ratio to GDP), the main results are the following (see Marcellino (2002) for details).

Taxes on business or households do not appear to have a significant negative effect on output, except in Germany, or a positive effect on prices. Indirect taxes and social

contributions lead instead to a generalized mild increase in inflation, but the output gap decreases in Germany only, and only in the case of social contributions.

The results on expenditures are also rather varied. Government consumption has a small or even negative effect on output in all countries except Italy. Government investment instead has a positive but delayed effect on the gap, except in Germany, where the impact is also positive. The results for social benefits are more mixed, but in general positive, possibly with some delay. The consequences on inflation are usually positive but minor and not statistically significant.

To conclude, it may be worth recalling once more that here we are measuring the effects of the non-systematic components of fiscal policy, so that the level of each of the taxes or expenditures we have considered could generate additional effects on the output gap or inflation. It is also remarkable and relevant for policy making that there are several differences across countries in the effects of fiscal policy. One possible explanation is that we are using different identification schemes (though this is due to rejection of the same transmission mechanism by the data). Yet, the differences are still present in the case of Germany and France, for which exactly the same identification scheme is applied.

3.8.3. The role of the debt

The presence of a high level of public debt can affect both the conduct of fiscal (and monetary) policy and its effects on the economy, see e.g. Sargent and Wallace (1981), Perotti (1999). Moreover, the criteria in the Maastricht treaty and in the Stability and Growth pact have imposed binding constraints on some countries, such as Italy. Hence, we now evaluate whether the inclusion of the debt to GDP ratio in the VAR affects any of the results we obtained in Section 3.4.

The effects of receipts and disbursements are virtually the same, and also the consequences of macroeconomic shocks on fiscal variables are basically unaltered with respect to the case without the debt variable in the VAR, see figures 12 and 13 in Marcellino 2002 for details on the impulse response functions.

Overall these findings indicate that, though the debt to GDP ratio can have a relevant role in the determination of the impact of systematic fiscal policy, see e.g. Giavazzi et al. (2000), its contribution in explaining the sources and the effects of non-systematic fiscal policy is minor.

3.9. Conclusions

This chapter provides a set of stylized facts on the effects of non-systematic fiscal policy in the four largest countries of the Euro area, and discusses their policy implications.

A remarkable and policy relevant finding is that there emerge several differences across countries in the effects of fiscal shocks, which cannot be attributed to the econometric methodology (and also cast serious doubts on analyses based on panel data). This makes non-systematic fiscal policy coordination difficult to be implemented, and the absence of direct spillovers across countries further limits its scope. A thorough examination of the source of these cross-country differences is beyond the scope of this chapter, since it requires a careful institutional analysis, but can be an interesting topic for future research.

With reference to the effects of fiscal policy shocks, the overall picture that comes out is that expenditure policies are rather ineffective in reducing the output gap or its volatility, possibly with the exception of government investment, and can require deficit financing. Tax shocks appear to be rather ineffective too in reducing business cycle fluctuations, but could be used to reduce the government deficit when needed.

Moreover, non-systematic fiscal policy appears to have an impact on interest rates, either direct or trough the output gap and inflation, and the exclusion of fiscal variables can bias in a few cases the evaluation of the effects of monetary shocks. Instead, in general, the effects of monetary policy on disbursements and receipts appear to be minor.

A final caveat is that this analysis covers a period when the fiscal conditions of the countries changed considerably, in particular in the '90s after the signing of the Maastricht treaty and of the Stability and Growth pact. The question then is whether the enhanced fiscal discipline, combined with a single currency, can be expected to change substantially the results we obtained. For example, the requirement of a close to balanced budget can force the governments to improve the efficacy of government expenditure by carefully selecting its composition or changing the decision and implementation process. Or the pressing comments of the European Central Bank on those high debt countries that could create problems for the stability of the euro could convince them to create stronger links between taxes and expenditures. But the recent experience has shown that it takes time for the governments to accept the stricter rules imposed by the monetary union, so that the results we derived could provide a good guide also for the near future.

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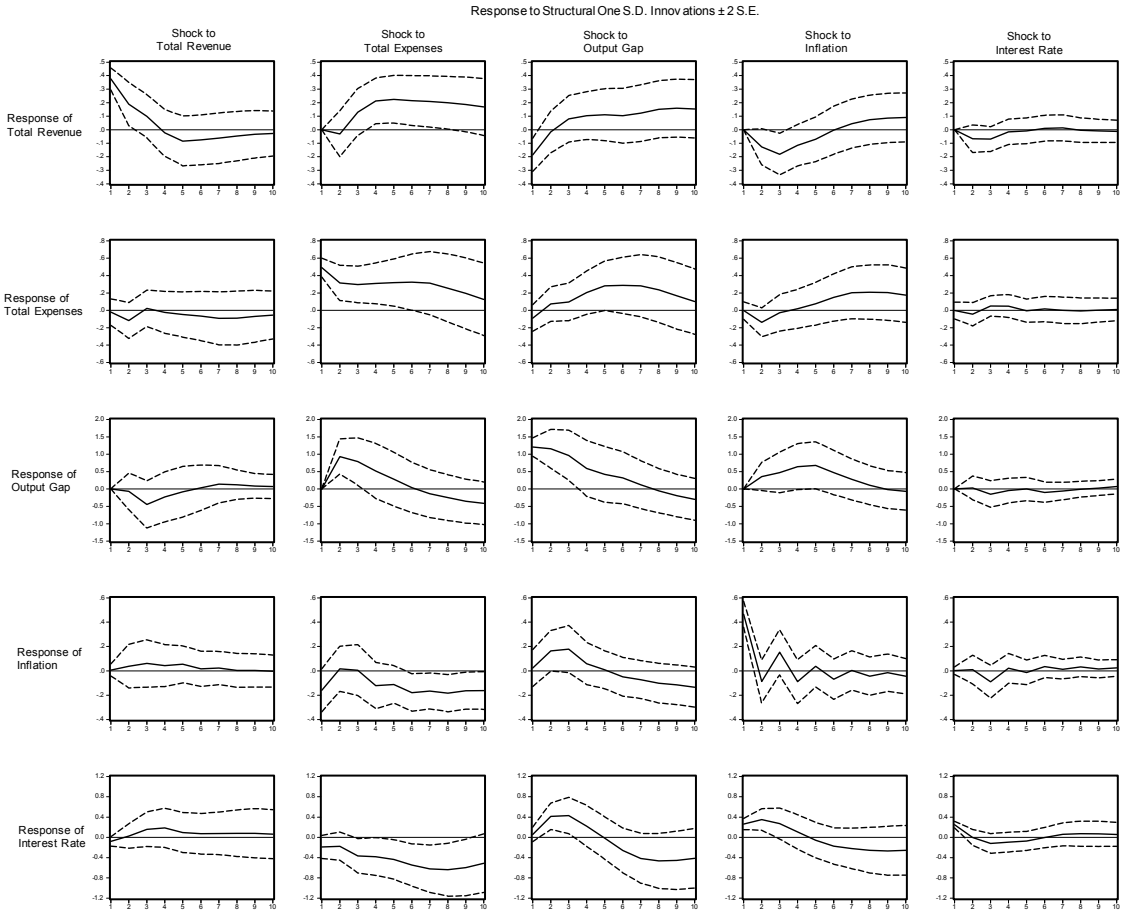
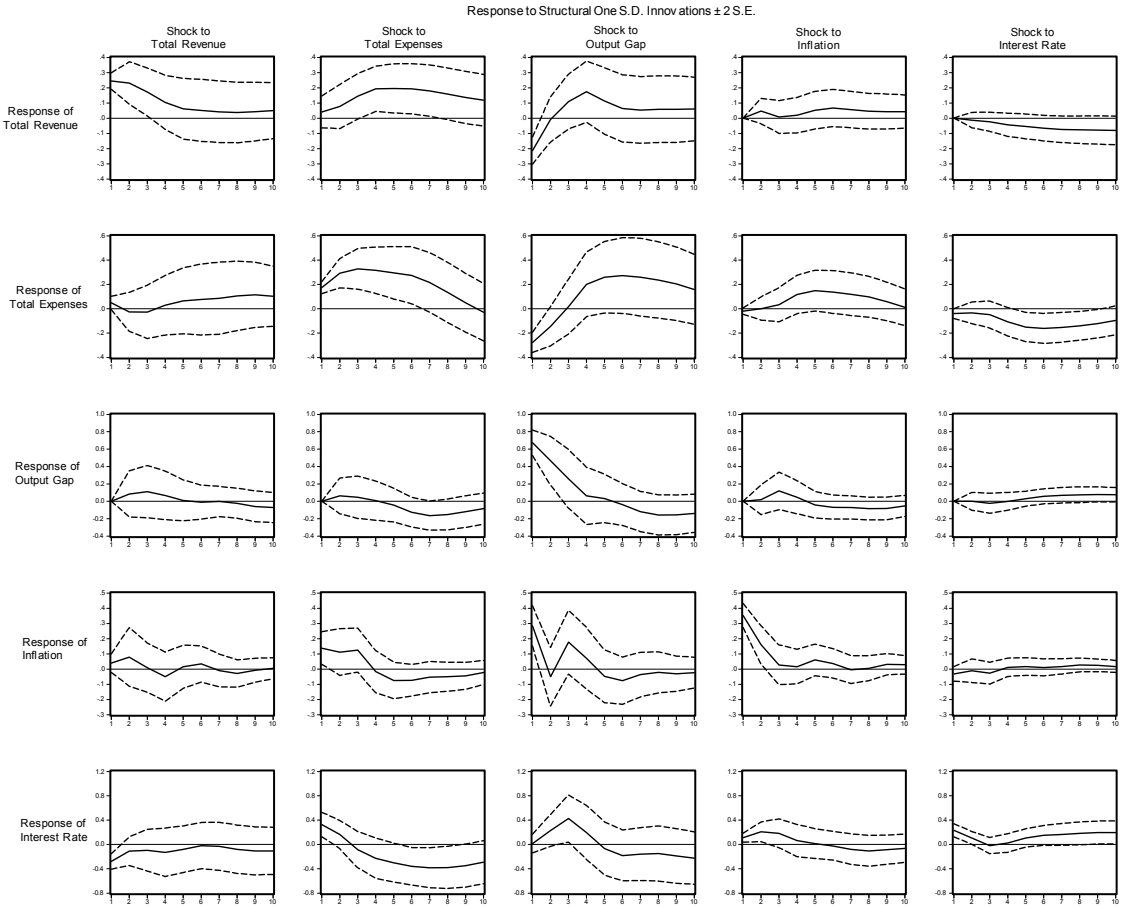
Figure 3.1: The base case VAR for Germany.



The base case VAR is made up of eight variables (total revenue/GDP, expenditure/GDP, output gap/GDP, commodity price inflation, commodity price index, the exchange rate with the US dollar, the US short-term interest rate and the country's short term interest rate) and is estimated on 1981:01-2001:02.

The figure contains the responses and the 95% confidence bands of only five of the eight variables (total revenue/GDP, expenditure/GDP, output gap/GDP, commodity price inflation, interest rate) to each shock.

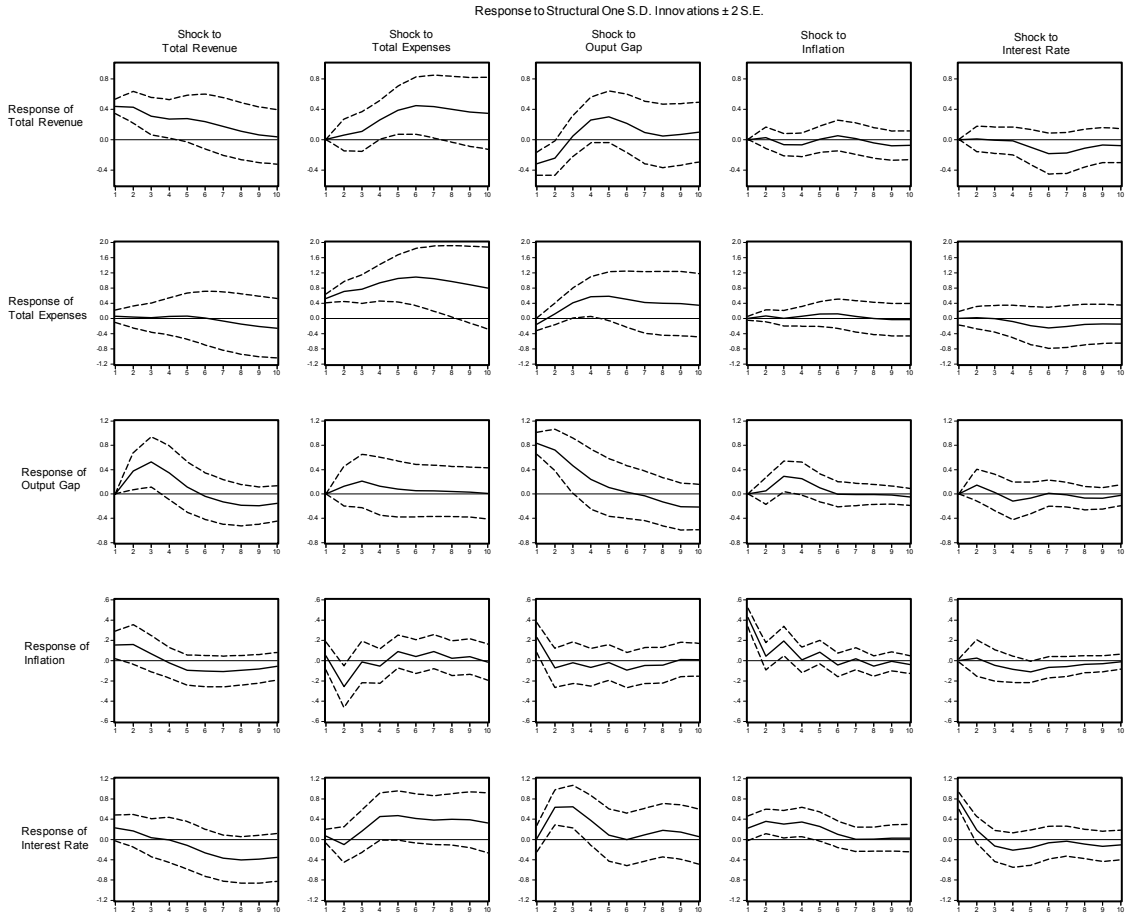
Figure 3.2: The base case VAR for France.



The base case VAR is made up of eight variables (total revenue/GDP, expenditure/GDP, output gap/GDP, commodity price inflation, commodity price index, the exchange rate with the Mark, the German short-term interest rate and the country's short term interest rate) and is estimated on 1981:01-2001:02.

The figure contains the responses and the 95% confidence bands of only five of the eight variables (total revenue/GDP, expenditure/GDP, output gap/GDP, commodity price inflation, interest rate) to each shock.

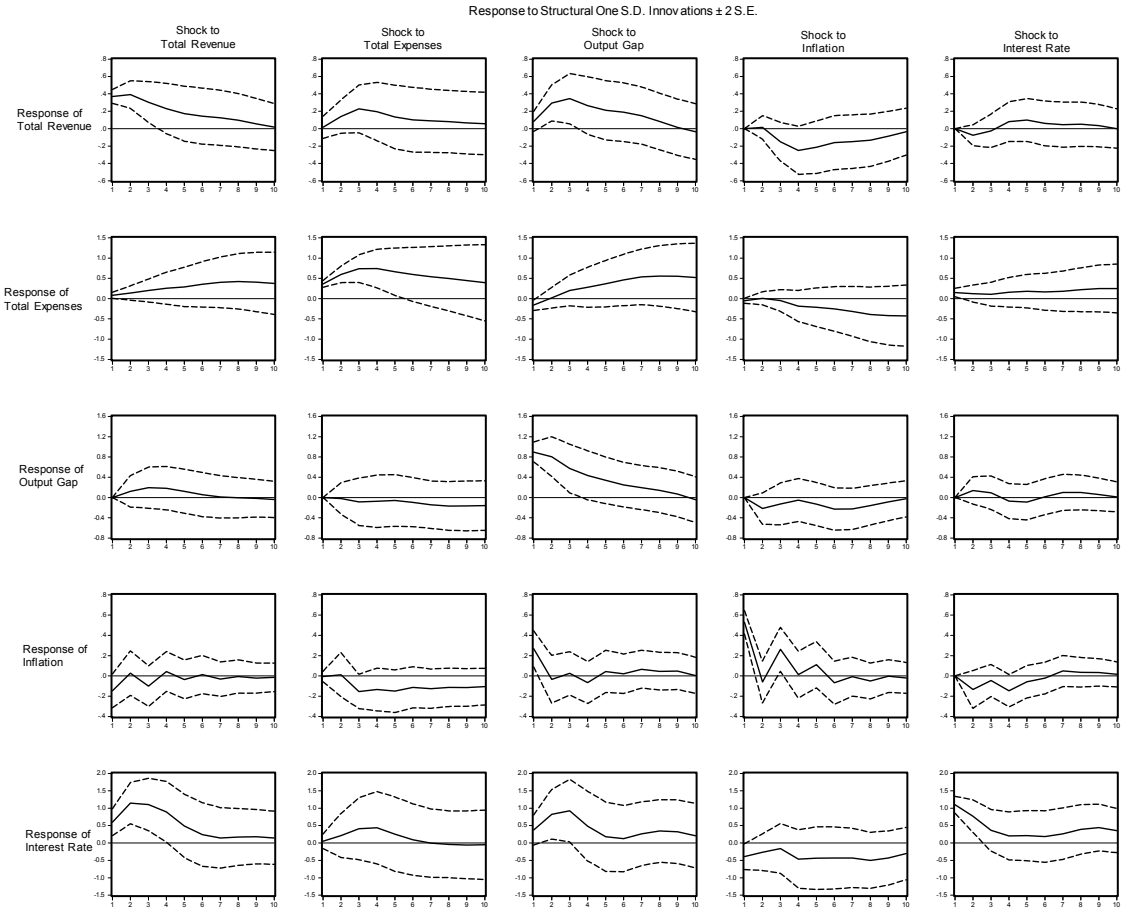
Figure 3.3: The base case VAR for Italy.



The base case VAR is made up of eight variables (total revenue/GDP, expenditure/GDP, output gap/GDP, commodity price inflation, commodity price index, the exchange rate with Mark, the German short-term interest rate and the country's short term interest rate) and is estimated on 1981:01-2001:02.

The figure contains the responses and the 95% confidence bands of only five of the eight variables (total revenue/GDP, expenditure/GDP, output gap/GDP, commodity price inflation, interest rate) to each shock.

Figure 3.4: The base case VAR for Spain.



The base case VAR is made up of eight variables (total revenue/GDP, expenditure/GDP, output gap/GDP, commodity price inflation, commodity price index, the exchange rate with Mark, the German short-term interest rate and the country's short term interest rate) and is estimated on 1981:01-2001:02.

The figure contains the responses and the 95% confidence bands of only five of the eight variables (total revenue/GDP, expenditure/GDP, output gap/GDP, commodity price inflation, interest rate) to each shock.

Table 3.1: Structural VAR estimates

Germany:

A

1	0	0,15 (0,05)	0	0	0	0	0
0	1	0,07 (0,06)	0	0	0	0	0,01 (0,19)
0	0	1	0	0	0	0	0
0	0,33 (0,17)	0,05 (0,06)	1	0	0	0	0
0	2,31 (2,19)	-0,29 (0,73)	0	1	0	0	0
0	0	0	-0,04 (0,02)	0	1	0	0
0	0	0	0	0	0,21 (2,75)	1	0
0,24 (0,09)	0,33 (0,09)	0	-0,51 (0,09)	0,05 (0,01)	-1,16 (0,61)	-0,33 (0,03)	1

B

0,38 (0,04)	0	0	0	0	0	0	0
0,02 (0,08)	0,49 (0,06)	0	0	0	0	0	0
0	0	1,20 (0,13)	0	0	0	0	0
0	0	0	0,46 (0,05)	0	0	0	0
0	0	0	0	5,58 (0,61)	0	0	0
0	0	0	0	0	0,06 (0,01)	0	0
0	0	0	0	0	0	1,17 (0,13)	0
0	0	0	0	0	0	0	0,25 (0,03)

France:

A

1	0	0,32 (0,06)	0	0	0	0	0
0	1	0,41 (0,05)	0	0	0	0	0,17 (0,12)
0	0	1	0	0	0	0	0
0	-0,80 (0,33)	-0,75 (0,16)	1	0	0	0	0
0	-11,61 (3,74)	-6,21 (1,84)	0	1	0	0	0
0	0	0	0,01 (0,01)	0	1	0	0
0	0	0	0	0	15,27 (7,95)	1	0
1,58 (0,24)	-1,68 (0,27)	0	-0,36 (0,13)	-0,02 (0,01)	-2,74 (5,41)	-0,71 (0,10)	1

B

0,24 (0,03)	0	0	0	0	0	0	0
0,04 (0,05)	0,23 (0,05)	0	0	0	0	0	0
0	0	0,67 (0,07)	0	0	0	0	0
0	0	0	0,37 (0,04)	0	0	0	0
0	0	0	0	4,40 (0,48)	0	0	0
0	0	0	0	0	0,01 (0,01)	0	0
0	0	0	0	0	0	0,52 (0,06)	0
0	0	0	0	0	0	0	0,32 (0,04)

Italy:

A

1	0	0,381 (0,080)	0	0	0	0	0
0	1	0,183 (0,097)	0	0	0	0	-0.004 (0.116)
0	0	1	0	0	0	0	0
-0,344 (0,151)	-0,087 (0,131)	-0,420 (0,099)	1	0	0	0	0
0	0	0	0	1	0	0	0
-0,032 (0,008)	0	-0,005 (0,006)	0,001 (0,008)	0	1	0	0
0	-0,656 (0,132)	-0,258 (0,086)	0	0,088 (0,013)	0	1	0
-0,097 (0,334)	0	0,056 (0,212)	-0,529 (0,275)	0	-6,886 (5,229)	-0.122 (0,180)	1

B

0,436 (0,047)	0	0	0	0	0	0	0
0,055 (0,085)	0,522 (0,057)	0	0	0	0	0	0
0	0	0,832 (0,090)	0	0	0	0	0
0	0	0	0,425 (0,046)	0	0	0	0
0	0	0	0	5,217 (0,569)	0	0	0
0	0	0	0	0	0,022 (0,002)	0	0
0	0	0	0	0	0	0,448 (0,048)	0
0	0	0	0	0	0	0	0,761 (0,083)

Spain:

A

1	0	-0,09 (0,06)	0	0	0	0	0
0	1	0,24 (0,06)	0	0	0	0	-0,13 (0,04)
0	0	1	0	0	0	0	0
0,39 (0,22))	0	-0,33 (0,09)	1	0	0	0	0
-3,88 (1,87)	2,76 (1,63)	0	0	1	0	0	0
0	0	0,01 (0,00)	0,01 (0,01))	0	1	0	0
0	0	-0,18 (0,07)	-0,24 (0,11)	0,03 (0,01)	15,83 (2,05)	1	0
-1,40 (0,47)	0	-0,31 (0,23)	0,99 (0,33)	0	-7,42 (9,01)	-0,93 (0,42)	1

B

0,37 (0,04)	0	0	0	0	0	0	0
0,01 (0,06)	0,36 (0,04)	0	0	0	0	0	0
0	0	0,90 (0,10)	0	0	0	0	0
0	0	0	0,53 (0,06)	0	0	0	0
0	0	0	0	4,55 (0,50)	0	0	0
0	0	0	0	0	0,03 (0,01)	0	0
0	0	0	0	0	0	0,37 (0,04)	0
0	0	0	0	0	0	0	1,08 (0,12)

Estimated A and B matrices in Au=Be, as in equation (1) in the text, with standard errors in parentheses.

Table 3.2: Mean and standard deviation of actual and simulated series.

		Germany		France		Italy		Spain	
		mean	*sd*	*mean*	*sd*	*mean*	*sd*	*mean*	*sd*
Output Gap	*(actual)*	-0.2407	2.8167	0.1098	1.1888	0.1022	1.3027	-0.2949	1.5629
	(base)	-0.2135	2.5650	0.1742	1.5489	0.0287	1.3565	-0.2733	1.7978
	(gov con)	-0.2299	2.4098	-0.1272	1.9217	0.0411	1.3409	-0.2171	1.9732
	(soc ben)	-0.2557	2.8326	0.1249	1.3692	0.0705	1.2358	-0.1169	1.4954
Inflation	*(actual)*	1.2347	0.9635	1.8446	1.6798	3.0470	2.1083	3.0478	1.7899
	(base)	1.2339	0.9263	1.9351	1.7003	3.1218	2.0122	3.0112	1.6363
	(gov con)	1.2370	0.8992	1.6347	1.7913	3.0903	2.0497	2.8066	1.9869
	(soc ben)	1.1148	0.9989	1.8945	1.6858	3.0673	2.0938	3.3296	1.6391
Interest r.	*(actual)*	5.9257	2.4962	8.1512	3.6383	11.3304	4.9669	11.1043	4.8841
	(base)	5.9361	2.2330	8.9889	3.1972	11.1974	4.8695	11.0456	5.3162
	(gov con)	5.9571	2.2944	5.8596	5.8816	11.3385	4.7993	11.3204	5.6622
	(soc ben)	5.5048	2.6038	8.8894	4.0230	11.3690	4.8356	11.2975	4.0296

(actual) = actual series; (base) = series simulated by setting to zero the fiscal shocks in the base case scenario; (gov con) = series simulated by setting to zero the government consumption/GDP shock and the shock to total revenue/GDP in VAR with government consumption/GDP instead of total expenditures/GDP; (soc. ben) = series simulated by setting to zero the shock to social benefits/GDP and the shock to total revenue/GDP in VAR with social benefits/GDP instead of total expenditures/GDP.

Table 3.3: Mean and standard deviation of actual and simulated series (with German shocks).

		France		Italy		Spain	
		mean	*sd*	*mean*	*sd*	*mean*	*sd*
Output Gap	*(actual)*	0.1098	1.1888	0.1022	1.3027	-0.2949	1.5629
	(simulated)	0.0858	1.5831	0.0528	1.2018	-0.1464	1.6371
Inflation	*(actual)*	1.8446	1.6798	3.0470	2.1083	3.0478	1.7899
	(simulated)	1.8252	1.7880	3.1690	1.9932	3.2134	1.6902
Interest r.	*(actual)*	8.1512	3.6383	11.3304	4.9669	11.1043	4.8841
	(simulated)	8.1587	4.4920	11.3590	4.7164	11.2967	4.3993
	(corr_s G)	0.1486		0.0339		0.2918	
	(corr_s T)	-0.1166		-0.2582		-0.1517	

(actual) = actual series; (simulated) = series simulated using Germany fiscal shocks instead of country specific shocks; (corr_s G) and (corr_s T) = correlation among each country structural fiscal shocks (G total government expenditure, T total government revenues) and Germany structural fiscal shocks;

Chapter 4. Convergence of labour costs and productivity in Europe: evidence and policy issues.

4.1. Labour costs evolution in the context of a currency union.

Within a currency union, the exchange rate can only be used to win competitiveness against third countries but not against other countries participating in the union. For this reason, to keep a territorial equilibrium in terms of economic activity and employment, the relationship between wages and productivity is important. However, it is expected that market competition and the introduction of the euro will reduce wage differentials between European countries, and this fact could imply a convergence process of unit labour costs. There are three causes that could explain this reduction in wage differentials: migration, the Balassa-Samuelson effect and the role of trade unions.

First, with regards to migrations, if workers from low wages economies move to those with high wages, the process towards wage equalisation could be enhanced. However, the existing evidence runs counter the facts: Flanagan (1993) shows that, in the 30 years after the Rome Treaty, wage differences have remained quite stable although intra-EU migrations were quite relevant.

Another possible explanation of the reduction in wage differentials is the existence of the Balassa-Samuelson (B-S) effect. Countries with fast growing labour productivity in the tradable sector face, in their non-tradable sector, an inflation higher than their trade partners. As a result, even if they have a fully fixed exchange rate, a currency board or indeed a common currency with their trade partners, they will experience higher wages and consequently higher overall inflation . If in low-wage countries, the non-tradable sector is more relevant than in high-wage countries, there could be a process towards wage equalisation. However, since the considered effect is more likely to be a rise in the relative price of non-tradables goods rather than a general increase in the price level, the inflation differential due to the B-S effect would have no implications for the competitiveness of the country's tradable goods sector. Alberola and Tyrväinen (1998) find out evidence about the existence of this effect but only for three economies of the EU (Germany, Spain and Belgium). So, at first glance, the evolution of differences in whole economy wages would not be completely explained.

Finally, Demertzis and Hughes Hallet (1995) and Jackman (1997) predict that EMU could reduce wage differentials across countries due to a “demonstration” or “fair wage” effect (see European Commission, 1997). In this sense, the possibility of comparing wages in a same currency between European countries could enhance a convergence process between wages.

While productivity rates are lower in poorer economies, wages may be influenced by factors at the national level, such as wage bargaining between unions and employers (regional economies are treated by Faini, 1999). The experience of the United States shows that, in a first stage, unions tried to reduce geographical wage differentials and then only the pressure of external competitors has changed this trend towards a higher wage differentiation. In the case of the Germany reunification, the trend has been similar (Reder and Ulman, 1993). However, the European case has and is likely to be different: historical, cultural and institutional differences together with the pressure of external competitors, could act in opposite direction. Moreover, the coordination could be complex, as the Doorn initiative (a bargaining cooperation of the trade union federations of Belgium, Germany, Netherlands and Luxembourg) shows. It is also

worth mentioning in this context the wage moderation effect of the price stability target of the ECB.

This chapter analyses the evolution of wages, productivity and labour costs among Euro area countries and is organised as follows. The next section considers the relationship between wages and productivity in the different European countries and the role of the different labour markets institutions as a mechanism to limit wage increases to productivity gains. Section 3 presents empirical evidence about convergence of wages, productivity and unit labour costs in Euro area countries. Finally, the chapter ends with some policy guidelines.

4.2. Determinants in the evolution of unit labour costs: the wage-productivity link.

4.2.1. Wages, productivity and exchange rates.

As stressed in the previous section, within a currency union bilateral exchange rates could not be used as a policy tool to restore the lost competitiveness if the evolution of wages in the different participants is not in line with the evolution of their respective productivity, For this reason, in order to keep a territorial equilibrium in terms of economic activity and employment, the relationship between wages and productivity is determinant.

The relationship between wages, productivity and exchange rates is usually summarised in unit labour costs. In fact, unit labour costs are usually used as a measure of the competitiveness of a country relative to their competitors. Although there are different problems related on how unit labour costs should be measured (see Annex 1 of Suriñach et al. (2002)), unit labour costs for country i at time t are usually defined by the following expression:

$$Unit\ Labour\ Cost_{i,t} = \frac{Wages_{i,t} \Big/ Employment_{i,t} \cdot 1 \Big/ Exchange\ rate\ \$_{i,t}}{\dfrac{Gross\ Domestic\ Product\ PPP_{i,t}}{Employment_{i,t}}} \qquad (4.1)$$

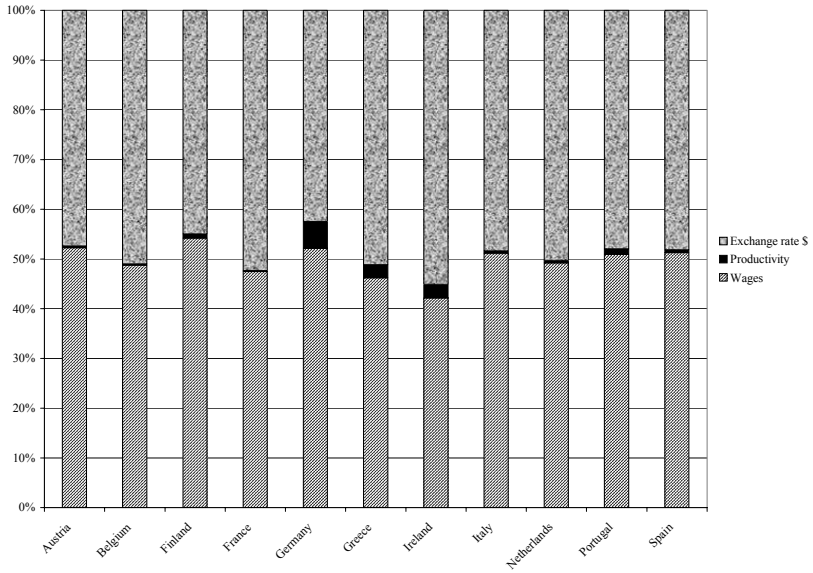
Using data on compensation of employees, the number of employees, the Gross Domestic Product expressed in terms of PPP and the US dollar exchange rates, unit labour costs have been calculated for Austria, Belgium, Finland, France, Germany, Greece, Italy, Ireland, Netherlands, Portugal and Spain from 1981 to 2001. These data have been obtained from OECD National Accounts for the period 1981-2000 while information for 2001 comes from OECD Quarterly National Accounts, except for Greece, Ireland and Portugal. In these last three countries, adjusted data from OECD Economic Outlook 71 (June 2002) has been used.

Using these data, it is possible to explain the dynamics of unit labour costs for the considered period in the different Euro area countries by analysing three different components: the evolution of nominal wages per employee, the evolution of productivity in real terms and the evolution of the exchange rate against the dollar (technical details can be found in Annex 2 of Suriñach *et al.* (2002)).

In Figure 4.1, the percentage of the variance of unit labour costs growth rates attributed to each of these three components is shown. The results in this figure show that the two

most important components in the evolution of unit labour cost are wages and the exchange rate. Productivity has a very limited role in the evolution of a country competitiveness. However, there are some differences among countries that should be highlighted. Germany is the country where the evolution of productivity is more relevant and in Belgium, France, Greece and Ireland, exchange rates explain a higher proportion of the evolution of unit labour costs.

Figure 4.1: Decomposition of the variance of unit labour costs growth rates from 1981 to 2001 in Euro area countries.[7]



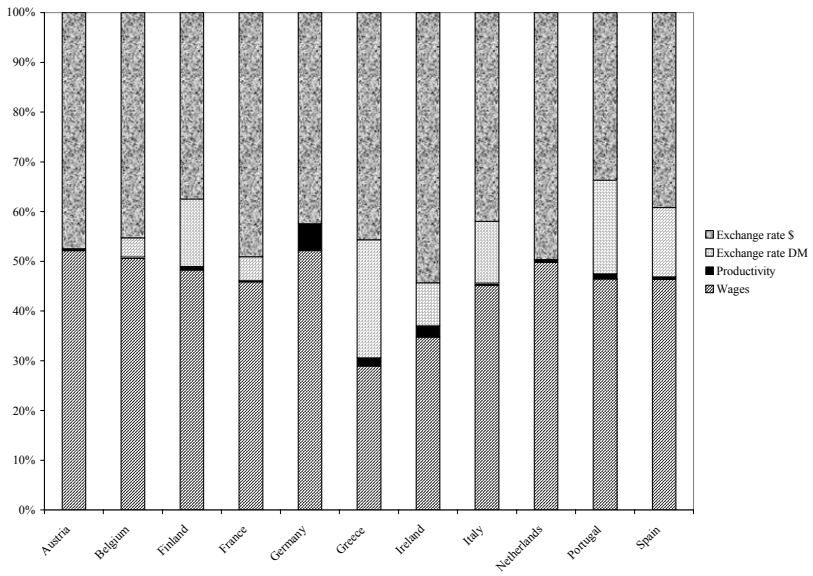
Source: Own calculations from OECD data.

Additional results can be found if we decompose the evolution of the exchange rate against the US dollar in two components: the bilateral exchange rate with the Deutsche mark and the bilateral exchange rate of the Deutsche mark with the US dollar. The idea is that now we can analyse the relative contribution of intra-EU exchange rates (the ones that have disappeared as a result of the introduction of the Euro) and extra-EU exchange rate (the one that can be used as a response to adverse symmetric common shocks). Technical details are given in annex 2 of Suriñach *et al.* (2002) and the results are shown in Figure 4.2.

It turns out that, although one of the most important relative component is still the evolution of the exchange rate against the dollar, we can see that the evolution of the exchange rate against the mark has also been relevant. Again, the relative contribution of this last component is quite unequal among considered countries. While in Finland, France, Greece, Ireland, Italy, Portugal and Spain, the exchange rate against the mark has been used as a way of reacting when wages evolution goes out of line with productivity, in other countries such as Austria and Netherlands it has not been used.

[7] Interactions between variables are not considered. See Annex 2 of Suriñach *et al.* (2002) for further details.

Figure 4.2: Decomposition of the variance of unit labour costs growth rates from 1981 to 2001 in Euro area countries.[8]



Source: Own calculations from OECD data.

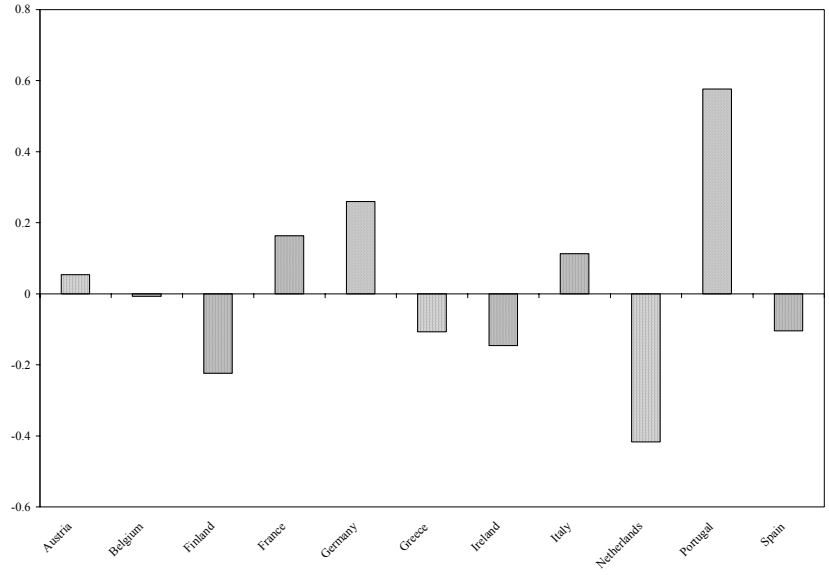
The implications are clear: what is relevant for the analysis intra-EU labour costs evolution is the behaviour of wages and productivity, however if one is worried about the competitiveness of EU countries against external competitors the investigation should also include the exchange rates evolution.

4.2.2. The link between wages and productivity: Evidence from aggregate wage equations.

Have wages in Euro area countries evolved in line with productivity during the last decades ? A very simple way to measure the intensity and sign of the relationship between wages and productivity consists in calculating the correlation coefficient among their growth rates. The values of the correlation coefficients between both variables are shown in Figure 4.3. It seems clear that only in the case of Portugal the relationship is positive and significant at the usual levels, while in the other countries no significant relationship is observed.

[8] See footnote 1.

Figure 4.3: Correlation coefficient between wage and productivity growth rates 1982-2001.



Source: Own calculations from OECD data.

The critical value according to the Brandner and Neusser (1992) criteria is $2/\sqrt{N}$ where N is the number of observations included in the analysis. For the period 1982-2001 the critical value is 0.45.

However, and according to different wage determination theories, the evolution of wages is also influenced by other factors, such as inflation and unemployment, that have been omitted in the previous analysis. As Broersma and Den Butter (2002) highlight, traditional empirical studies on wage formation consider these variables to explain the determinants of the change in the wage rate (Phillips curve specification) or to explain the wage level (wage curve specification). However, while the Phillips curve specification is based on the theoretical model of Phelps (1968), where wages are set by firms, in the wage curve approach, wages are the outcome of a bargaining process between firms and unions. From a theoretical perspective, nowadays most economists prefer to use a wage curve specification rather than a Phillips curve specification[9] For this reason, to obtain a quantitative measure of the intensity of the relationship between wages and productivity, we have estimated aggregate wage equations for the considered European countries, plus six other OECD countries (Australia, Canada, Japan, Norway, Switzerland and the United States)[10]. In the general static specification of the aggregate wage equation (see Bell *et al.*, 2000 or Broersma and Den Butter, 2002, among others), the wage level of country *i* at time *t* is explained using the following expression:

$$\log(W)_{i,t} = c_0 + c_1 \cdot \log(P^e_{i,t}) + c_2 \cdot \log(PR_{i,t}) + c_3 \cdot \log(U_{i,t}) + +u_{i,t} \qquad (4.2)$$

where,

$log(W_{i,t})$ is the logarithm of the level of nominal wages in country *i* at time *t*,

[9] Although some recent works, such as Hsing (2001), use a Phillips curve specification.

[10] The data sources for the variables and countries analysed in this section is the same reported in the previous one. The sample has been expanded from the one considered in the previous section in order to obtain more reliable estimates.

$log(P^e_{i,t})$ is the logarithm of the expected level of prices[11] in country i at time t,
$log(PR_{i,t})$ is the logarithm of productivity in country i at time t,
$log(U_{i,t})$ is the logarithm of the unemployment rate in country i at time t, and,
$u_{i,t}$ is a random error term which is supposed to follow a normal distribution.

In this equation, the estimates of c_2 would approximate the effect on wages of changes in productivity, taking also into account the evolution of other economic factors in the different countries.

Detailed results of the estimation procedure are shown in Table 4.1[12]. The explained proportion of the variance of wages is very high for all countries and the estimated coefficients have the expected sign and magnitude. The stability of the estimates has also been checked using sequential Chow tests and the CUSUM and CUSUM-Q residuals tests.

The elasticity of wages to prices is close to unity in most countries, although it is considerably higher in Norway, Sweden and Switzerland, countries with highly coordinated collective bargaining. Country differences in this coefficient show that in the presence of a common negative supply shock, inflationary pressures would be of different intensities.

The results for the coefficient associated to the unemployment rate are in line with the ones obtained by Blanchflower and Oswald (1994), who found a negative relationship between unemployment and wages with a value of the elasticity close to –0.1 for several countries.

Focusing on the estimates of the coefficient associated to productivity, the results are much more reasonable than using the correlation coefficient. In the twenty countries considered, a positive and significant relationship between wages and productivity has been found. The countries were the response of wages to changes in productivity is higher are Canada, Netherlands, Spain, United States, Switzerland, Italy, France and Japan.

What explains these differences in the response of wages to productivity? In other words, what factors determine that the evolution of wages is in line with productivity? This aspect will be considered next.

[11] The lagged level of prices has been used to proxy the expected level of prices as in many other studies (see, for example, Hsing, 2001).

[12] To assess the sensibility of the results to the specification considered here, Phillips curve equations have been estimated using the specification used by McMarrow (1996) from the Quest and Interlink OECD models. The results from this approach are quite similar to the ones presented here.

Table 4.1: Results of the estimation of the elasticity of nominal wages to expected prices, productivity and unemployment.

Country	Sample	Intercept	$\log(P_{i,t-1})$	$\log(Pr_{i,t})$	$\log(U_{i,t})$	R^2
Euro area						
Austria	1966-2001	10.17 (18.13)	1.01 (22.04)	1.36 (27.96)	-0.03 (-1.41)	0.99
Belgium	1971-2001	11.17 (16.71)	0.73 (3.76)	1.31 (3.94)	-0.11 (-1.75)	0.98
Finland	1962-2001	9.83 (34.39)	1.00 (4.05)	1.17 (8.44)	-0.09 (-2.17)	0.82
France	1966 2001	13.69 (23.00)	0.49 (4.67)	1.56 (6.71)	0.08 (1.59)	0.96
Germany	1962-2001	8.50 (9.32)	1.02 (12.93)	0.90 (4.88)	-0.15 (-3.32)	0.98
Greece	1962-2001	8.49 (69.25)	1.06 (38.38)	1.28 (16.57)	0.04 (0.94)	0.99
Ireland	1962-2001	9.39 (7.27)	1.04 (8.67)	1.13 (4.56)	-0.14 (-2.01)	0.99
Italy	1962-2001	9.94 (20.36)	1.10 (13.29)	1.57 (10.47)	-0.06 (-3.31)	0.97
Netherlands	1971-2001	14.68 (7.81)	0.67 (3.73)	2.20 (4.55)	-0.08 (-3.39)	0.99
Portugal	1962-2001	9.51 (169.01)	1.02 (47.12)	1.34 (12.72)	-0.05 (-1.14)	0.99
Spain	1962-2001	10.47 (173.53)	0.74 (12.23)	2.13 (16.81)	-0.08 (-1.68)	0.98
EU countries						
Denmark	1962-2001	9.39 (157.89)	1.02 (4.27)	0.49 (6.41)	-0.14 (-7.87)	0.99
Sweden	1962-2001	7.44 (32.99)	1.38 (29.55)	0.27 (2.56)	-0.10 (-1.67)	0.98
United Kingdom	1962-2001	11.24 (22.74)	1.09 (33.15)	0.89 (8.85)	-0.07 (-3.93)	0.98
Other countries						
Australia	1980-2001	10.51 (17.23)	1.12 (23.86)	1.02 (6.33)	-0.17 (-4.13)	0.99
Canada	1963-2001	15.29 (9.79)	0.96 (9.56)	2.56 (6.16)	-0.27 (-2.96)	0.98
Japan	1962-2001	11.97 (59.48)	1.04 (12.07)	1.36 (14.43)	-0.06 (-1.25)	0.99
Norway	1962-2001	8.66 (12.27)	1.23 (11.14)	1.03 (4.13)	-0.29 (-5.64)	0.97
Switzerland	1962-2001	11.76 (48.18)	1.37 (20.07)	1.73 (17.95)	0.01 (1.46)	0.96
United States	1962-2001	15.34 (24.46)	1.13 (24.32)	1.94 (11.79)	-0.11 (-3.14)	0.98

Source: Own estimates from OECD data. $\log(P_{i,t-1})$: log of expected prices; $\log(Pr_{i,t})$: log of productivity; $\log(U_{i,t})$: log of unemployment rate

4.2.3. Policy issues: the relationship between the elasticity of wages to productivity and labour markets institutions?

Using as an endogenous variable the estimates of the elasticity of wages to productivity, obtained in the previous section, we have estimated different multiple regression models where three different groups of explanatory variables have been considered:

- *Labour market institutions*: factors related to collective bargaining such as the degree of centralization, the level, the coverage, the degree of coordination between firms, the duration of agreements, the synchronization, among others could explain the differences of the translation of productivity improvements to wages. Another potential explanatory variable is the trade union density.
- *Economic factors* such as the proportion of big and small firms in every country and the sectorial structure could also have influence on the intensity of the relationship between wages and productivity.
- Other variables approximating the different *technological level* of the economy and the different capital endowments or capital intensities could have also influenced the considered endogenous variable.

The results of estimating these models are shown in Table 4.2. Before summarising them, there are two aspects that should be highlighted: the number of observations in

these models is reduced and there could be problems associated to the way the different qualitative explanatory variables have been coded[13]. For these two reasons, the results should be taken with caution.

Table 4.2: Determinants of the response of wages to productivity. OLS estimates.

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	2.472	2.564	2.672	2.995	2.045
	(5.862)	(3.844)	(6.266)	(5.170)	(3.182)
CI	-0.108	-0.122	-0.115	-0.149	-0.151
	(-1.715)	(-1.718)	(-1.939)	(-1.958)	(-1.783)
CI^2	0.007	0.007	0.008	0.008	0.008
	(1.696)	(1.638)	(2.124)	(1.852)	(1.596)
UNION	-0.019	-0.016	-0.022	-0.015	-0.021
	(-3.240)	(-1.764)	(-3.746)	(-3.301)	(-3.487)
SYNCHRO		-0.146			
		(-1.252)			
TECHNOLOGY			-0.199		
			(-2.778)		
COORF				-0.136	
				(-1.205)	
SMALLF					1.157
					(0.824)
N	18	16	18	18	15
R^2	0.629	0.629	0.701	0.648	0.638
Adj. R^2	0.549	0.494	0.607	0.54	0.493
F	7.923	4.667	7.589	5.996	4.414

Variable	*Definition*	*Source*
CI	Wage bargaining centralization: ranking	Calmfors and Drifill (1988)
UNION	Trade union density: percentage	OECD Employment outlook 1997
SYNCHRO	Bargaining synchronization: 2-completely, 1-some, 0-not exist	Layard, Nickell and Jackman (1991)
TECH	National patent applications in 1992: Germany=100	OECD, Statistical Compendium.
COORF	Degree of firms coordination: 3-high, 2-middle, 1-low	Layard, Nickell and Jackman (1991)
SMALLF	Small firms percentage	OECD Employment outlook 1997

From the results in Table 4.2, the intensity of the relationship between wages and productivity depends on:

- *The degree of centralisation*: in highly centralised economies or highly decentralised economies the relationship between wages and productivity is more intense than in countries with intermediate levels.
- *Trade union density*: In countries with lower union density, wages are more in line with productivity.

[13] The way the qualitative variables have been coded establishes a particular metric over the different categories that could seriously affect the results. A possible solution would consist in using *k-1* dummy variables for the different *k* categories of each variable. However, the low number of degrees of freedom has made impossible to apply this solution.

- *Technology*: In countries with higher technological levels, the transmission of productivity increases to wages is weaker.

Moreover, other factors such as the degree of coordination between firms, the synchronization in the collective bargaining or the presence of small firms do not seem to have any influence on the relationship between wages and productivity.

In this context, there are some policy options that should be taken into account: the collective wage bargaining systems should be more decentralised, the level of collective bargaining should be closer to the firm, and it should be possible to apply opt-outs at the regional or at the firm level. The idea is that workers, unions and firms should take into account regional, sectorial and firm conditions when negotiating wages[14]. Although, it could be seen as "unfair", wage divergence can have better long-term economic effects than wage convergence.

In the next section, empirical evidence is shown, we focus on the convergence process of wages, productivity and unit labour costs in Euro area countries during the last two decades.

4.3. Convergence of wages, productivity and labour costs in Euro area countries.

The literature on convergence of labour costs does not show uniform evidence. On one hand, Erickson and Kuruvilla (1994) analysing the period 1980-1986 find no convergence in unit labour costs, while on the other hand, Jung and Doroodian (2001), using a more recent (and longer) data set, find convergence in manufacturing labour costs between Belgium, Denmark, France, Germany, Italy, the Netherlands and the UK from 1960 to 1991. This result can be due to the behaviour of wages. Forces as free trade and migration, seem to have contributed to the convergence process.

In this section, convergence of wages, productivity and unit labour costs is analysed using different approaches, as Freeman and Yerger (2001) and Soukiazis (2000) suggest. These different approaches can be divided in two classes: cross-section tests of the average growth rates of the considered variable across a sample of countries (β convergence); measures of the dispersion of this variable across countries over time (σ-convergence); time series tests of the stationarity of differences in the variable levels over time (mainly, unit root and cointegration tests).

The assumptions behind these approaches are different. As pointed by Bernard and Durlauf (1996), with cross-section tests economies are assumed to be in transition towards a unique steady state (absolute convergence), and initial differences should tend to shrink over time. Different steady states can also be considered (conditional convergence) introducing other explanatory variables (Barro and Sala-i-Martin, 1995) or using panel data with fixed effects (Marcet, 1994). However, in time series tests, economies are assumed to be near steady-state equilibrium.

Table 4.3 shows results on β convergence[15] for Euro area countries in the period 1981-2001. From this table, we can conclude that there is β convergence in terms of unit

[14] In line with the proposal of Davies and Hallet (2001) analysing the situation of German, Italian and Spanish regions.

[15] Implementing an analysis of β-convergence means to assume some important restrictions about the model considered. In this sense, the Solow-Swan model implies constant returns to scale, a constant share

labour costs and compensation per employee,. However, for labour productivity, the speed of convergence is not significant[16]. The values of the speed of convergence for unit labour costs and compensation per employee imply that, in the first case, thirty-eight years would be required to reduce by one half the initial differences among countries, while for the second more than fifty years would be required.

Table 4.3: β-convergence: cross-section results.

β-convergence EU-11 (1981-2001)		Cross-section	Panel data (pool)	Panel data (Country fixed effects)
Unit labour costs	β	1.82 %*	5.82 %*	10.84 %*
	R^2	0.668		
Compensation per employee	β	1.34 %*	4 %*	8.30 %*
	R^2	0.607		
Labour productivity	β	1.63%	0.73%	1.74%
	R^2	0.17		

Source: Own estimates from OECD data.
EU-11: Austria, Belgium, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal and Spain. * significant at the 5% level

As the literature shows, when we use panel data the speed of convergence increases notably. For instance, for labour costs, it rises from 1.82 % (cross-section) to 5.82 % (pool). Additionally, if we estimate the speed of convergence allowing different steady states (countries fixed effects) the speed doubles for both unit labour costs and compensations per employee. In the former case, β convergence increases from 5.82% to 10.84% and, in the latter, from 4% to 8.30%. However, it has to be noticed that the results obtained estimating with a panel data with fixed effects show values for the speed of convergence that are upward biased (Shioji, 1997; Di Liberto and Symons, 1999).

Summing up, we have found convergence for unit labour costs and compensation per employee but not for labour productivity. The main implication of these results is that convergence in labour costs is just related with the process of convergence in compensations. Although this result can be seen as counter-factual, if the initial dispersion of compensations per employee is higher than the initial dispersion of productivity, a reduction in the disparities of this first variable will reduce the differences in terms of unit labour costs. The value of the coefficient of variation for compensation per employee in 1981 is of 41% while for productivity, it is 18% (see, Suriñach *et al.*, 2002 for further details).So, productivity is not following the same pattern as unit labour costs,. Therefore, as unit labour costs are converging, investment will choose localization in areas with higher productivity levels. This problem for lower productivity European countries can be aggravated if we take into account the lower unit labour costs of countries that do not belong to the European Union. However, we must take into account that β convergence results are studying the behaviour of a representative economy, an assumption which may be considered doubtful as pointed out by Quah (1993).

of national income going to labour, similar preferences, equalized saving rates as well as free availability on technology. Therefore, we should wonder about the presence of these elements in the considered countries.

[16] However, Mora (2002) finds presence of a convergence process from regional productivity data in Europe (NUTSII).

Another possibility for testing convergence, defined as the reduction of deviations from the mean value, consists in using time series techniques. Define the variable of interest as the difference between the value for country *i* in time *t* minus the average value for the sample of considered countries in time *t*. If a unit root is found in this new variable, this can be interpreted as evidence of no convergence (differences between countries would be permanent). If we apply standard Augmented Dickey Fuller tests for every individual country, bilateral convergence with the average behaviour of the considered countries can be assessed. Moreover, under the null hypothesis, the long-run differential between the countries and the sample average group will grow and shocks in levels will be permanent. By contrast, under the alternative, the shocks will be temporary. In the latter case, we face with two alternatives: convergence to equal levels -absolute convergence- or convergence to equal growth rates -relative convergence- (Evans, 1998). Combining the information for the different countries along time, it is also possible to test for the existence of convergence in a panel data framework, applying standard procedures as those described in Durlauf and Quah (1999) or Evans (1997).

The results[17] from applying both procedures show that the null hypothesis of no convergence is rejected for all variables. But, with respect to bilateral convergence in unit labour costs, only Austria, Finland and Netherlands converge towards the mean. Therefore, the majority of countries presents no convergence, although, in a general sense, the Maddala and Wu (1999) test confirms the presence of convergence for the whole sample. In the case of compensations per employee, only Austria converges to the sample average and, finally, regarding productivity, Austria and Portugal converge to the sample average. Regarding long-run differentials between countries, all results have to be interpreted with caution. They have been calculated under the alternative hypothesis of convergence. In this case, they have unknown distributions that depend on the convergence hypothesis. Long run differentials results for unit labour costs show that Austria converges around 132%, Finland 139% and the Netherlands 126% (taking Germany as the base country). For compensations, Austria converges to the Germany economy over the 114% in the long-run. Last and regarding productivity, the convergence long-run relatives are: Austria (19.6%) and Portugal (26%).

In general, the last sets of results show that there is no evidence in favour of bilateral convergence for all the variables considered and for the majority of the countries analysed. This contrast, between the results using time series and the outcomes using β convergence, reinforces Bernard and Durlauf (1996) point, that the choice of the appropriate technique depends on the steady state characteristics of the data. So, our results, show that for the variables considered in the period 1981-2001 European economies would be in transition towards a steady state position. This result is reinforced by the huge values of the long-run relatives that we have obtained. As a consequence, β convergence detects a catching up process towards a mean value that is not supported by the evidence of time series results. Therefore, as there is a problem when we assume a unique and representative economy, we test a different kind of convergence: the reduction of disparities, that can be analysed by the σ-convergence method[18].

In Figure 4.4 we report the time evolution of the standard deviation of the growth rates of unit labour costs, compensation per employee and productivity for EU-11 from 1981 to 2001. From this figure, we can see how, for every considered variable, the dispersion

[17] Detailed results can be found in Annex 3 of Suriñach *et al.* (2002).

[18] We have to notice that σ-convergence analysis is sensitive to small samples. However, the results of box-plot analysis have detected a similar evolution of disparities.

at the last year is always lower than the dispersion at the initial period[19]. However, there are differences between the behaviour of productivity and the performance of the other two variables. Regarding productivity, this variable shows a rise in its level until 1984 and then begins to decrease slowly. On the other hand, unit labour costs and compensations per employee increase until 1987 and, they decrease continuously afterwards, being in the last year around 70% of the initial value. It is also important to remark that the disparities of the three variables are more or less similar since 1997. This would be a signal that the most recent policy measures or the adoption of the single currency did not have great incidence on the evolution of differences. Additionally, the slow reduction of disparities during the second half of the nineties coincides with a substantial wage moderation in the European Union (Gros and Hefeker, 1999). One factor that should be taken into account to understand this result is the process of disinflation experienced by most European countries during the second half of the nineties. As Wehinger (2000) highlights, there is a clear relationship between the slowing down of wage increases and the inflation decline in EMU countries during this period. However, Gros and Hefeker (1999) have shown that the evolution of labour costs is not the same as the evolution of wages, because wages plus labour taxes have been roughly constant as percent of GDP over the last decades. Therefore, labour taxes increases have produced the maintenance of labour costs, and so on small benefits in building up employment rates.

Three general conclusions can be drawn from this analysis. First, compensations per employee influence the behaviour of unit labour costs while productivity does not. Second, since the entrance of economies with low levels of development (Greece, Portugal and Spain), a reduction of disparities has taken place. Third, the relative stagnation during the second half of the last decade has been conditioned by labour taxes behaviour.

An additional issue to take into account, is the criticism to σ-convergence about the possible non detection of a polarization process[20] (Esteban, 1994). Figure 4.5 plots the evolution of the polarization of the three variables normalized with respect to their initial values, as it is more relevant than its levels in order to observe its evolution. If there is an increase in the values of the polarization index, data should be considered in different groups instead of as a whole. As we can see from the Figure 4.5, compensations per employee and unit labour costs show the same pattern, while productivity presents higher values of polarization since 1991. For compensations and unit labour costs, final values are lower than the initial ones. Another point worth stressing concerns the period between 1991 and 1995. In this period, the increase in polarization coincides with a soft rise in disparities measured by means of σ-

[19] In order to analyse statistical significance of changes between initial and final period, we have computed Carree and Klomp (1997) statistic. The results show that σ-convergence is only accepted for EU-11 countries in terms of unit labour costs and compensation per employee from 1981 to 2001, but not for productivity.

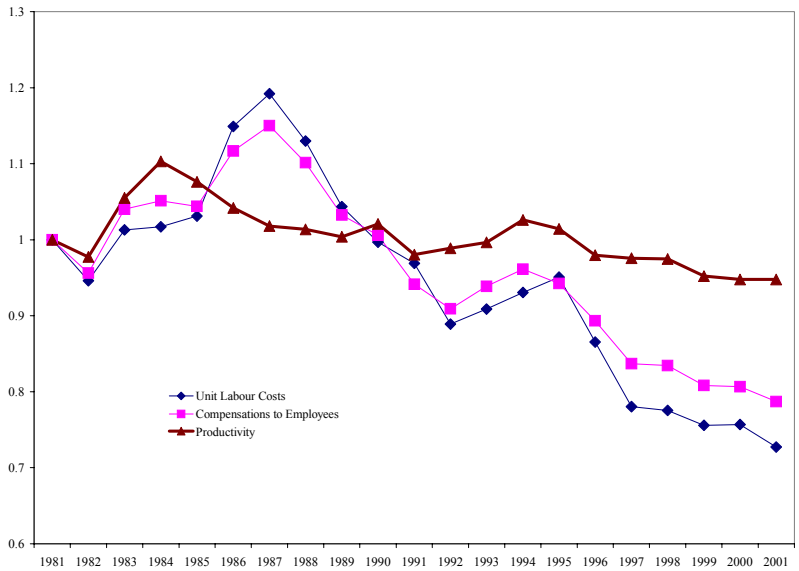
[20] Polarization means to compute the degree in which population is grouped around different poles. In order to detect its presence on the variables that we have analysed, we must calculate the following expression:

$$P(\omega) = \sum_i \sum_j \pi_i^{1+\omega} \left| \ln\left(\frac{y_i}{y_j}\right) \right| \pi_j$$

where w is the degree considered (sensibility to polarization), y_j is the considered variable and π_i represents the percentage of population related to total population of the area. An increase in the values of the index shows that data should be considered in different heterogenous groups instead of an homogeneous one.

convergence (1991-1994 for compensations per employee and 1991-1995 for unit labour costs). Thus, this difference in behaviour in the reduction of disparities could be explained by a non homogenous behaviour of the whole sample of economies.

Figure 4.4: σ-convergence of unit labour costs, compensations and productivity.

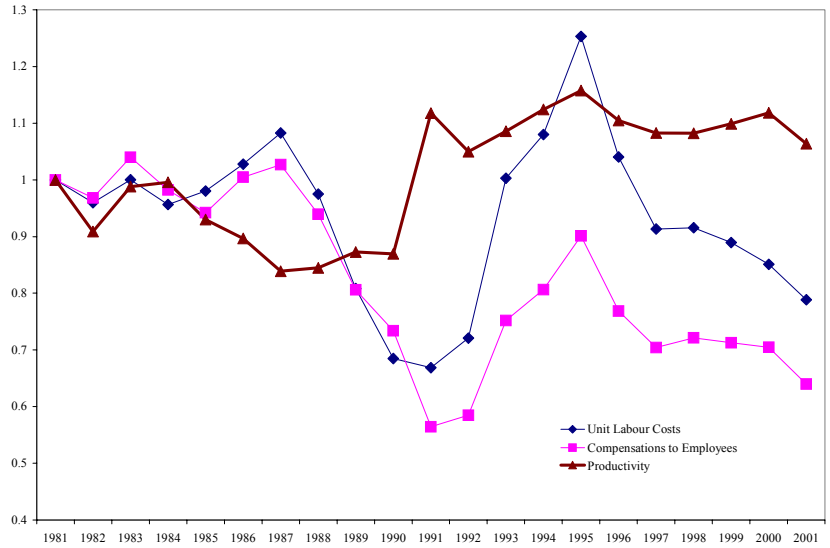


Source: Own calculations from OECD data.
The values of σ-convergence have been normalised to unity in the initial period.

In other words, it can be seen again that productivity does not have the same behaviour as the other two variables. The polarization index shows an increase since 1990, being another indicator about the presence of no convergence in productivity. Moreover, it shows an increase of disparities between two different poles, which is confirmed by the histograms (twin-peaked distribution in Quah terminology). So, this result is related to the analysis of detection of convergence clubs in productivity, that is not possible to be detected by β-convergence or time series analysis. In a regional context, Mora (2002) shows that, when density functions are estimated, there is an important mass of probability for regions with low levels of productivity. As these lower values are concentrated in two countries (Portugal and Greece), a country level analysis shows, as in our case, that there is no convergence for this variable. Then, it should be noticed that a polarization process in productivity country level could have taken place in Europe.

Summarising, the analysis of convergence in this section has shown that, during the last twenty years, there has been a reduction in the disparities between Euro area countries in terms of wages and unit labour costs but not in terms of productivity. It is important to stress that the introduction of the euro does not seem to have accelerated the process of wage equalisation.

Figure 4.5: Evolution of polarization index: unit labour costs, compensation per employee and productivity.



Source: Own calculations from OECD data.
The values of the index have been normalised to unity in the initial period.

4.4. Final comments and policy guidelines.

It is expected that, after introducing the euro, wage differentials will shrink due to a "demonstration" or "fair wage" effect among other reasons. If this reduction is not in line with the evolution of productivity, in some countries competitiveness would be damaged and the exchange rate could not be used to restore it.

Competitiveness is usually measured as unit labour costs. Focusing on the evolution of unit labour costs in the last twenty years, there have been a majority of countries that have used exchange rates to improve their relative position with respect to the other members of the Euro area. For this reason, increases in wages should be accompanied by productivity improvements as the only way to maintain competitiveness[21].

Using the Phillips curve augmented with expectation, a quantitative measure of the intensity of the relationship between wages and productivity is obtained. Differences in the reaction of wages to productivity increases are explained by some factors related to labour market institutions (the degree of centralisation in collective bargaining, the level of collective bargaining and the degree of firm coordination) and with the bargaining power of trade unions. In this context, there are some policy options that should be taken into account: the collective wage bargaining systems should be more decentralised, the level of collective bargaining should be closer to the firm and it should be possible to apply opt-outs at the regional or at the firm level. The idea is that workers, unions and firms should take into account regional, sectorial and firm conditions when negotiating wages. Although, it could be seen as "unfair", wage divergence can have better long-term economic effects than wage convergence.

[21] In order to achieve long term growth and competitiveness and reduce unemployment, other factors that should be taken into account are the ability to innovate and the adaptability of the different structures to the new economic framework (see Porter, 1990).

But, is there a convergence process of wages, productivity and unit labour costs? Looking at the time evolution of these variables for Euro area countries from 1981 to 2001, a reduction in the dispersion of wages and unit labour costs (but not of productivity) has been found. The disparities of the three variables are more or less the same since 1997. This is a signal that the latest policy measures or the constitution of a unique currency area have not had great incidence on the evolution of differences. However, for productivity a polarization process is also detected.

Therefore, previously mentioned labour market reforms should be carried out in order to improve the territorial equilibrium in economic activity.

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Chapter 5. US Imbalances

5.1. US current account deficit

In 2001 US current account deficit reached 4.1% of GDP. According to the OECD and IMF forecasts, it could escalate to 5% by 2003[1]. Such a trend, begun in the second half of the 90s, is a source of constant worry among the international institutions, as its sustainability could become very problematic. If the deficit keeps widening, US external liabilities would represent a growing share of world portfolios that at some point investors could become unwilling to hold. The ensuing large adjustment in the current account and fall in the external value of the dollar would lead to substantial dislocations in the world economy and disruptions in US and world financial markets.

The deficit rose very quickly from 1.5% of GDP in 1995, a reading in line with the previous two decades average, to 4.5% in 2000. The rapid growth of the US economy relative to the Euro area and Japan, coupled with a steady strengthening of the dollar driven largely by capital inflows are the main factors contributing to the emergence of the deficit. The domestic counterpart was the investment boom occurring between 1996 and 2000 and the contemporaneous drop in private agents' saving rate. The mild slowdown in economic activity slightly contributed to reduce the gap.

However, the most recent developments have raised new doubts about the possibility of a return of the deficit to a less worrying level. First of all, the reduction in economic activity coupled with the sizeable measure of fiscal stimulus enacted by the Bush administration has turned US government budget to deficit. Economic theory and the historical evidence establish a strong linkage between government and current account deficits, with the latter growing in line with the former. Following an expansionary fiscal shock (i.e. a combination of lower taxes and increased expenditures, such as the recent policies implemented by the US administration) national savings decrease, leading to a worsening of the current account position. One of the most striking examples is the occurrence of the so-called "Twin deficit" in the United States during the 80s. The huge increase in government (mainly defence) spending coupled with hefty tax reductions pushed the government deficit to roughly 5% of GDP in 1985. At the same time, it contributed largely to a continuous deterioration of the current account position, reaching its trough in 1987, when deficit the totalled 3% of GDP.

Secondly, if the recovery is to be faster in the US than elsewhere, American imports could pick up once again while international demand would stagnate, widening the trade deficit. In the short run the drying up of the flows of foreign capital needed for financing the deficit can be ruled out. The long term growth prospects of the US economy appear brighter than those of the other parts of the world, and investors still find the US financial market quite attractive, despite the strong correction in stock prices. However this situation is not at all warranted in the medium run, especially after the Enron crisis and the widespread concern about US corporate accounts.

Officially, the current position of the current account is not a concern for the US Government[2]. According to US officials, such a situation is just a result of rational saving and investment decisions by private agents, which are willing to invest in America expecting higher returns.

[1] See IMF (2000,2001a, 2002) and OECD (2001,2001)
[2] See *The Economist (2002)*

The rest of the paper is organised as follows. In Section 1 we describe some stylised facts about the current situation of the US external balance. Section 2 provides a selective review of the recent literature about the determinants of current account imbalances. It briefly discusses the concept of "Current account sustainability" referring to the most recent research, especially the one carried out at the IMF. Moreover, we present two estimates of the structural current account deficit, based on a simple calculation on intertemporal solvency and structural VAR analysis. In Section 3 we then consider the likelihood of a reversal in the US current account deficit with the multinational model Marmotte and assess the possible effects on the Euro area. This analysis will be complemented with some other observations drawn from the analysis of the patter of trade specialisation of the European countries. Section 4 concludes and draws some implication for fiscal and monetary policy.

5.1.1 The US current account: stylised facts

Figures 5.1 to 5.3 show the profile of the US current account position over the last twenty years in relation with some economic variables. We can sketch a preliminary analysis of the most likely causes of the deficit and draw a comparison with what happened in the 80s.

It is easy to notice (Figure 5.1) that higher economic growth is closely linked to the deepening of the deficit: this relationship is particularly strong in the most recent period, when the strong growth in the US was not matched in the rest of the world. Figure 2 plots the current account and a measure of trade weighted real exchange rate. Looking at the most recent years quite a strong negative correlation between the two variables appears; however such a relationship is not very clear in other periods.

The charts are also useful in order to compare the deficit that occurred in the second part of the 90s with that of the 80s. Looking at Figure 5.3, we can easily see that the current deficit of the most recent years is much bigger than those occurring in the 80s and entirely due to private sector imbalances, as the US public budget has shown a sizeable surplus over the last four years. The figure also shows the IMF projections for 2002 and 2003. According to them the current account deficit is not going to shrink much, as the sharp reduction in private sector deficit will be to a large extent offset by deteriorating government balance. Moreover, the marked real depreciation occurred in the second half of the 80s had virtually no impact on the external deficit, which shrank thanks to the massive retrenchment of the government deficit and, afterwards to the sharp decrease in GDP growth in the early nineties. It is also worth noting that a quick comparison between United States GDP and GNP figures shows that almost all the current account deficit is due to the trade deficit, and that its Net Foreign assets position is much less deteriorated than that of other developed countries.

5.2. Current account determinants

There are two strands in the literature on current account determinants. The first one concentrates on medium-long term analysis and views the current account from the perspective of saving-investment balance, abstracting from the impact of business cycle and financial variables, such as stock market performance, and therefore is well adapted to study issues such as long term sustainability. The second approach considers the behaviour of current account at higher frequencies, and focuses on the deviation of the current account from the equilibrium path, due to factors such as international business

cycle asyncronisation, exchange rate movements, supply shocks, and can be used to assess the effects of reversals.

Modern theories are based on intertemporal optimisation and stress the role of the current account, defined as the difference between national saving and investment, as a buffer against transitory disturbances to output and demand. In this view, it acts as a shock absorber to temporary changes in national cash flow or net output in order to smooth consumption and maximise welfare in the face of unexpected shocks.

Figure 5.1: The US current account deficit and the GDP growth rate

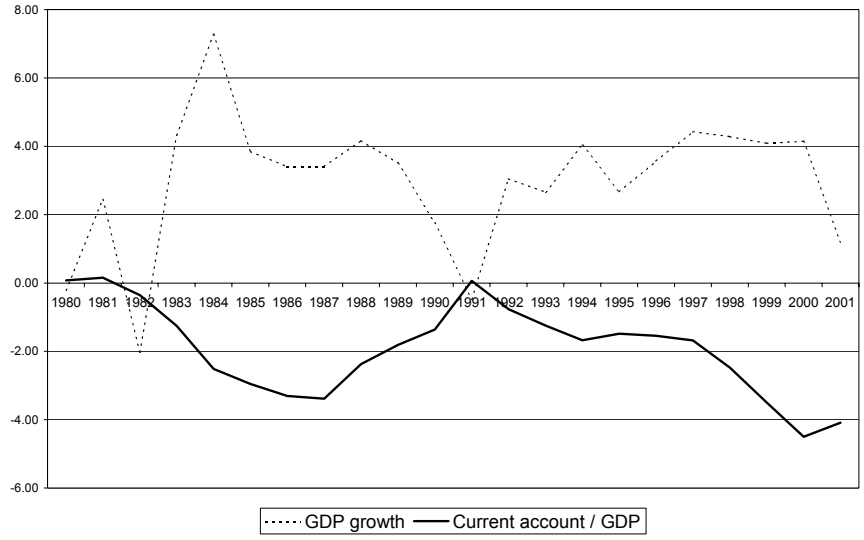


Figure 5.2: The US current account deficit and the real effective exchange rate

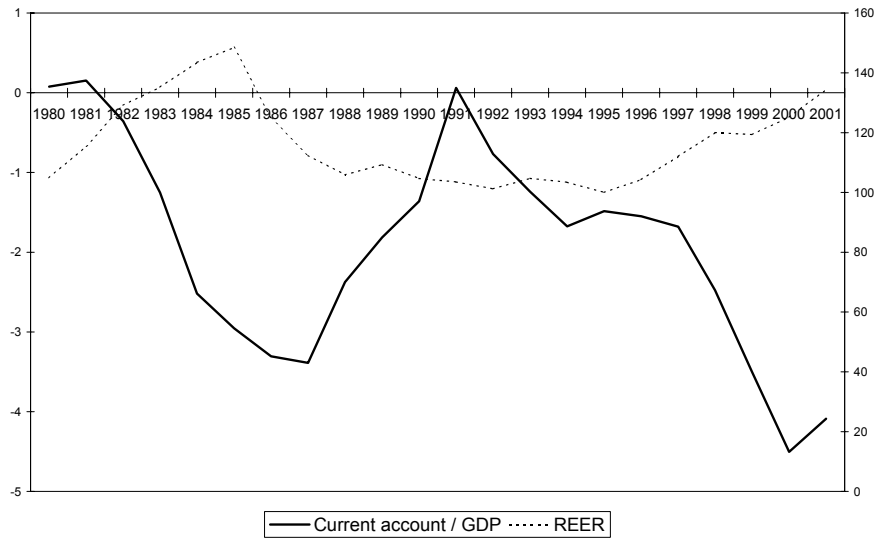
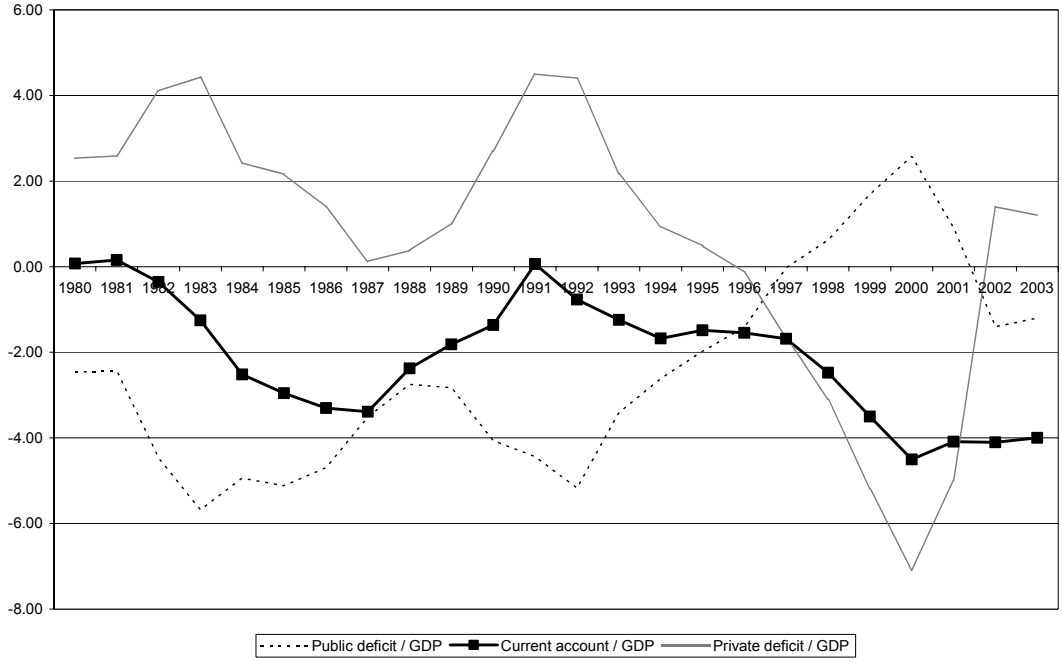


Figure 5.3: The US current account deficit and the US public deficit surplus



Such an approach, reviewed by Razin (1995), Obstfeld and Rogoff (1995), and the European Commission (2000a) in a less technical way has proven to be very useful in explaining current account movements at business cycle frequencies. But it also has many things to say about longer horizons. Intertemporal decisions by economic agents determine a desired long run stock of net foreign assets. The factors underpinning this choice can be considered as the structural determinants of the current account. The empirical literature (for example Debelle and Faruqee (1996) and Chinn and Prasaad (2000)) has identified two fundamental components. First of all the demographic profile of a country is likely to play an important role: the size of dependent population (aged below 16 years and above 65) is negatively linked with savings. Secondly, fiscal policies have an important role, with persistent deficits contributing to a worse external balance.

A better understanding of the medium-long term determinants of the current account is extremely helpful in assessing the compatibility between policies aimed at domestic objectives and external equilibrium[3]. At the same time a distinction between short run and medium-long run determinants is essential for policy making. In order to assess the sustainability of a country's current account deficit, it is important to gauge the extent to which deficits will need to be financed on an ongoing basis. High deficits resulting from the difference in business cycle patterns or from a temporary real exchange rate appreciation are likely to be easier to finance than imbalances depending on structural factors, such as, for example too high government expenditure. Conversely, countries building up excessive deficits due to structural factors, as for example a large and growing public deficit and debt as in the case of Italy in 1992 are in principle more prone to sudden current account reversals.

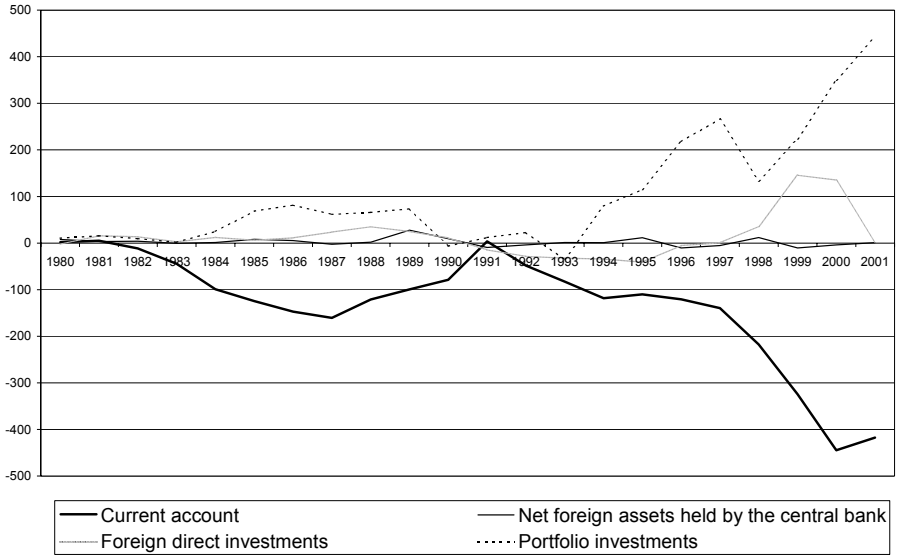
Turning to the short-term determinants of external imbalances, most of the empirical literature stresses the different role played by idiosyncratic versus global shocks. One of

[3] Swan (1963) is the classical reference.

the most important studies on this subject is the one by Glick and Rogoff (1995). Using panel techniques they find that country specific productivity shocks have a significantly negative impact on the current account, as firms revise upwards their investment plans and at the same time consumers dissave anticipating a higher future permanent income.

Another crucial aspect of current account analysis to consider is the way a deficit is financed. The recent cases of balance of payment crisis show that the sudden outflow of "hot money", i.e. short-term investment, is usually one of the primary sources of troubles. Therefore a look at the composition of the capital inflows into the US is useful. Figure 5.4 displays the current account, the net flows of FDI, portfolio investment and the change in net foreign assets owned by the central bank. It appears that long-term investment started playing an important role only in the last few years and declined sharply in 2001. Therefore the bulk of the deficit is financed by short-term capital, which theoretically could be withdrawn quickly, triggering a crisis.

Figure 5.4: The financing of the US current account deficit♦



A comprehensive econometric study of the cyclical factor behind the US Balance of Payments dynamics can be found in Kandil and Greene (2002), which also provide some insights about the ability of the deficit to be financed by foreign capital flows. Historical evidence shows a strong cyclical pattern in the components of the US balance of payments, with current account recording surplus during recession and deficit in periods of strong growth. Conversely, the other posts of the Balance of payments show strongly cyclical behaviour. For instance it can be observed that during the second half of the 90s, when growth was much faster in the US than in the other industrialised countries, both the balance of financial account and the inflow of foreign direct investment grew strongly. Using time series analysis, Kandil and Greene show that, as expected, factors such as GDP growth or real exchange rate appreciation have negative effects on the current account. These variables (together with stock prices) have a positive effect on the financial account. The important result is, however, that cyclical factors have a stronger effect on short-term fluctuations of the current account than on

♦ Source: International Financial Statistics (IFS) of the IMF.

the capital and financial account. This suggests that capital inflows to the US have a long-term nature, even though short-term assets compose them. This can possibly reflect the confidence investors historically had on long run growth prospects of the economy and hinting that the U.S "can sustain a considerable current account deficit during periods of above average economic growth" (Kandil and Greene, 2002).

5.3. The notion of sustainability

The whole issue of current account sustainability can be summarised to the following question: what is the highest level of deficit that can be sustained without a drastic change in economic policy and/or an abrupt exchange rate adjustment? During the second half of the '90s several attempts to find a consistent measure of sustainability were carried over. Milesi-Ferretti and Razin (1996), looking at historical evidence, mainly for developing markets, develop a framework for current account analysis based on inter-temporal solvency. Their main conclusion is that a specific threshold for deficit size and persistency, such as the widely quoted 5 per cent of GDP for 3-4 years, is not *per se* sufficiently informative as an indicator of sustainability. They propose a set of operational indicators that, in conjunction with the size, could provide some guidance about the likelihood of a reversal. First of all one has to consider the structural features of the economy under analysis. Higher levels of investment, even though they depress the current account in the short run, normally lead to higher growth, enhancing thereby inter-temporal solvency. Coupled with a higher level of savings, it would act as a signal of creditworthiness, as they raise the perceived ability of debt service and reduce external debt. High and sustainable growth, driven by human capital accumulation and improvements in total factor productivity, reduces the external-debt to GDP ratio and raises solvability. Trade openness plays an important part, as a source of foreign exchange. Clearly, countries with a large export sector face fewer problems in servicing the external debt, as debt service absorbs a lower fraction of export proceeds. The last structural determinant of sustainability is the composition of external liabilities. A higher share of equity financing would in principle lead to less painful adjustment, as part of its burden would be borne by foreign investors via lower asset prices.

Of course macroeconomic policy stance has to be carefully checked too. The International Monetary Fund has developed over the years a methodology to arrive at a quantitative measure of sustainability, based on several Macroeconomic indicators[4], which at the same time provides an indication of exchange rate misalignment. The approach consists of determining first the current position that would exist in the long run given the current level of the exchange rate once the temporary effects of past levels of activity have been absorbed by the economy, or in other words, the economy operates at a 'normal level' of capacity utilisation. This "underlying" measure of the current account is then compared with a measure of "sustainable" balance, which would be financed by nominal capital flows assuming that the country under investigation and its trade and financial partners have low inflation and operate to a reasonable rate of capacity utilisation. The following steps imply finding a level of the effective real exchange rate that equates the two definitions of balance described above, and therefore derive the necessary adjustment. According to IMF estimates (see IMF, 2001, p. 30), the sustainable long-term deficit for the US should fluctuate around 0.5 % of GDP, within a range of 0-2.5%.

[4] Knight and Scacciavillani (1998) provide an extensive overview of the methodology employed, together with an exhaustive survey of theoretical models of current account determination.

The framework for policy analysis sketched above is applied for both developing and industrialised countries. However, given the strength of the US economy and, above all, the widespread international use of the dollar, one could legitimately ask if such a model could be fully applied to the United States. More specifically, one could question the likelihood of a dramatic collapse of the currency even though the imbalance continues to widen.

McKinnon (2001) points out that the peculiar role of the dollar in international transactions imposes some corrections to the standard current account analysis, but that nevertheless the size of the deficit can become a problem for less evident reasons. The economic developments occurred since the end of the Second World War gave the dollar the status of truly international money, as most of the international trade transactions are invoiced in this currency[5]. It can be observed that, in normal times, the international dollar prices are relatively invariant to dollar's exchange rate fluctuations. Any country whose currency is free to fluctuate widely against the green back is likely to experience a considerable degree of price variability as a consequence of exchange rate pass through: moreover, in case of depreciation it will have a hard time servicing dollar denominated foreign liabilities. These are the reasons why most countries do not let their currency fluctuate too much against the dollar, the "fear of floating", well documented by Calvo and Reinhard (2000). On the other side a non-completely free-floating regime constraints monetary policy, as witnessed by the extreme case of currency board agreements. Taking this line of reasoning to the extreme (and remembering the consistent exception of Europe), only the United States have the freedom of conducting its own monetary policy, and therefore the American price level becomes the nominal anchor for the international monetary system. This reinforces the role of the dollar, making governments prefer to accumulate exchange rate reserves denominated in dollars and consisting of US Treasury securities. The implication of this is that basically foreign countries cannot avoid being creditors of the United States. This allows the US to enjoy a "soft budget constraint" on its international borrowing. The demand of (dollar denominated) international liquidity rises with global income growth. It can be satisfied by US, through paper currency, corporate or government bonds and so on) and represent claims on American firms and households without a well defined time frame for net repayment for the country as a whole. Therefore, according to McKinnon, even though the current account deficit would at some point trigger a run on the dollar, this will be offset by foreign central banks accumulating reserves in order to prevent their currency from appreciating and thereby undermine trade competitiveness. However, this argument is somehow weakened by the notorious ineffectiveness of foreign reserves management in stabilising the exchange rate, but can keep its relevance noticing that reserves are not the only tool central banks have for managing the exchange rate, and that interest rate policy can play an important role.

The true problems McKinnon sees in the widening current account deficit are linked to the decline in creditworthiness by America's private sector, and the threat of protectionism that stems from the continuing trade deficit eroding America's industrial base. The leveraging of American households and firms has reached very high levels, due to the fact that they can finance themselves easily on the international capital markets. However the problem is much less important for firms, as they can sell to foreign investors stocks and bonds. Consumers obviously cannot issue these instruments: therefore the a considerable part of foreign capital inflows contributes to the build-up of household debt, as American banks finance household, issuing on the

[5] Of course the advent of the euro will alter substantially this picture, at least for the European economies.

international market claims on their profits, satisfying a strong international demand for dollar denominated liquidity. Such a massive spending translates into the problem of the low saving rate.

In the case of the United States, the current account deficit is mainly the reflection of the gap between exports and imports. Given the size of protectionism and state intervention for agriculture and, partially, services the burden of the swings in trade balance is borne by the industrial sector. Therefore if, the inflow of capital persists at this rate, the ensuing trade deficit widening will imply a contraction of American manufacturing industries. Such a pattern is already visible, as America has already exited some industries, giving rise to a sort of "Dutch Disease" phenomenon. This trend, if coupled with a cyclical downturn, is very likely to increase the demand for protectionism, with the obvious dangerous consequences on free trade.

Ventura (2001) presents an innovative explanation of current account dynamics, based on very recent research on the linkages between current account and international investors' portfolio choices (see Kraay and Ventura, 2000 and 2002). According to this approach, current account dynamics is determined by changes in the country portfolio, defined as the sum of productive assets located in a country plus its net foreign assets position, and by its recomposition. Ventura claims that this model is capable to explain the surging of the deficit in the 90s as the manifestation of the unprecedented increase in US wealth. During the late 90s a bubble or a Ponzi scheme appeared in the stock exchange. Stocks were bought with the expectation of reselling them later at a higher price, and not expecting higher expected firms' profits. Prices must incorporate the possibility of not finding a buyer, therefore the higher the probability of a crash the higher the price increase. When no buyers are found the bubble eventually burst. Under the assumption of risk adverse investors, holding mean-variance efficient portfolios, the increase in wealth produced by the bubble induce the investors to buy more productive capital in order to keep the shares of their portfolios constant. This implies capital stock and GDP expanding along with the bubble. Assuming that on average, risk aversion and the distribution of asset returns do not depend on wealth, and determine solely the portfolio shares, as in standard portfolio theory, changes in wealth modify just the size of the country portfolio, and not its composition. Therefore, the stocks of net foreign assets increase linearly with wealth. If asset price revaluation is not too big, the current account position corresponds roughly to the product between national savings and the share of NFA in the country portfolio.[6] In such a model, an increase in saving increases or reduces the current account depending on the country having a positive or negative share of NFA. During the late 90s US investors enjoy hefty returns, which were invested roughly in the same proportion as the average country portfolio. Being US portfolio short in NFA, this implies that US investors borrowed abroad to invest in domestic assets. The final result was the surging current account deficit. The immediate implication of this model is that the future dynamics of the current account is closely linked to the development of the stock exchange, and namely on the bursting of the bubble. A correction in stock prices engenders a reduction in wealth and savings: being the US a debtor country this will in turn imply a parallel reduction of the external deficit. The magnitude and the speed of the adjustment depend on how quick the bursting of the bubble takes place.

[6] Kraay and Ventura (2000) found evidence for this claim for a sample of thirteen industrial countries.

Box 5.1. Sustainable deficit: a quantitative assessment

In this section we develop two methods to construct an estimate of a long term or "sustainable level of current account deficit/GDP ratio, employing two contrasting methodologies. In the first case we use a debt dynamics equation stressing the role of potential GDP growth, exchange rate and reserves. The approach is in many ways similar to the one applied to developing countries by Milesi-Ferretti and Razin (1996).

Consider first an economy in steady state. Call L the liabilities as ratio to GDP that foreigners are willing to hold. In equilibrium, i.e. with L kept constant the accumulation of net liabilities, in proportion to long run nominal GDP growth is equal to the current account deficit plus the net accumulation of international reserves. We then have

$CAD + \Delta FX = \gamma L$

With

CAD : current account deficit to GDP ratio

FX : foreign reserves to GDP ratio

γ : long run GDP growth rate

The level of import is obviously an important determinant of the demand for reserves. Denoting its growth by μ we have that the variation in the desired reserve ratio is

$\Delta FX = [(1+ \mu) / (1+\gamma)] FX – FX$

we therefore have

$\gamma L = CAD + [(\mu - \gamma) / (1+\gamma)]FX$

In the long run, due to the Balassa Samuelson effect, relative growth leads to real exchange rate appreciation, reducing both debt and foreign reserves as ratio of GDP. Denoting by ε the real exchange rate appreciation by unit of GDP, we get

$(\gamma + \varepsilon)L = CAD + [(\mu + \varepsilon - \gamma) / (1+\gamma)]FX$

solving for CAD we get the steady state current account deficit that can be sustained in the long run if the debt ratio remains constant and the reserves ratio grows in line with import

$CAD = (\gamma + \varepsilon)L - [(\mu + \varepsilon - \gamma) / (1+\gamma)]FX$

We use this equation to provide an estimate of sustainable Current account deficit. The value chose for the parameters are the following

γ is average nominal annual GDP growth over the 1980-2001 period, and equal to 6.38

ε has been calculated from the long run trade elasticities calculated in Hooper et al.(2000) 0.003

μ is the average annual nominal growth rate of import over the 1980-2001 period and equal to 7.83

L is desired long run average of the debt to GDP ratio which is assumed to be 50%

FX is half of the import to GDP ratio over the 1980-2001 period, equal to 5.5

According to these simple calculation, the sustainable level of current account corresponds to roughly 3.3% of GDP

It is evident that these simple calculations provide just an indication of the sustainable deficit, and depend heavily on some assumptions. However, they offer a crude measure of the interdependence of the macroeconomic variables important to determine the current account.

The second approach utilises a structural VAR methodology and tries to assess how much of the deficit is due to cyclical factors, in order to derive a measure of long run current account, which should be the true variable to observe in assessing sustainability. To this end we estimated a four variable VAR, including GDP growth in the US and its main trade partners (Euro area, United Kingdom and Japan) the IMF measure of real effective exchange rate and the current account to GDP ratio. We use the method developed by Sims (1980) and applied to Balance of Payment issues by Clarida and Prendergast (1999). Assuming that there is a stable underlining structure linking the current account to other variables such as domestic growth, foreign demand and real exchange rate, the current account position will be the result of a combination of cyclical and idiosyncratic factors. Structural identification then allows decomposing the level of deficit into cyclical and structural components.

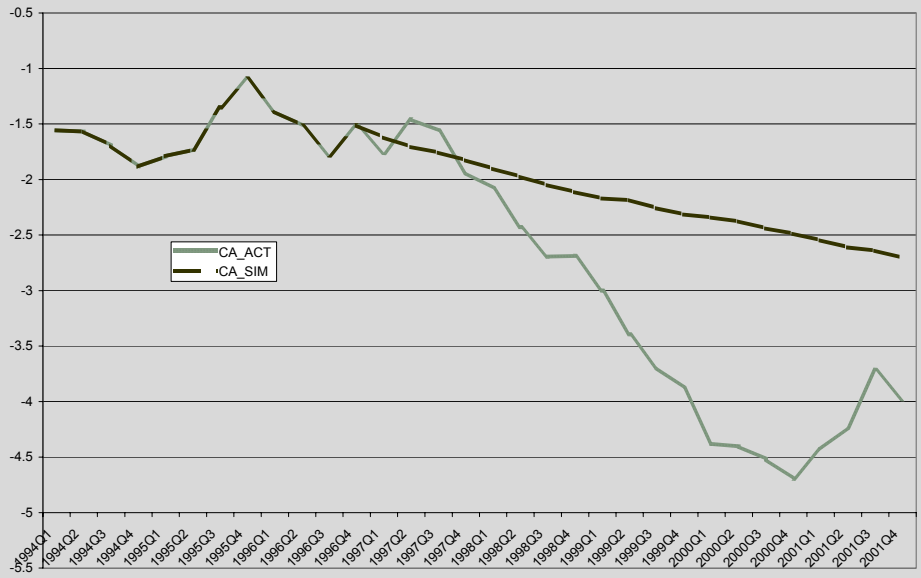
The methodology is the following. First we estimate a VAR model of the current account, the domestic GDP growth rate, the world GDP growth rate (a weighted average of GDP growth in the Euro area, United Kingdom, Canada and Japan) and real effective exchange rate. The structural shocks are identified using a Choleski decomposition, assuming that current account deficit reacts instantaneously to domestic and GDP growth, and with a lag to real exchange rate. Given this identification structure, we compute the time varying structural component of the current account deficit. This latter is defined as the path that the current account to GDP ratio is most likely to take if world growth, domestic growth and real exchange rate are constant and equal to their long run[7] during the adjustment process. Thus we can interpret the difference between the observed and the "structural" path as the consequences of the deviation of domestic and world GDP growth from their long run average.

We estimate the four variables VAR over the 1980-2001 period using quarterly data. After imposing the identifying restrictions we computed the structural component of GDP starting from 1996. The results are displayed in Figure 54. According to this interpretation, the quick deepening of the deficit is almost entirely attributable to the huge asyncronisation in the business cycles between the US and the rest of the world. As a sensitivity test, we run the same model without constraining the real exchange rate to its long ran average, obtaining very similar results. In Figure 5.5 we present this latter result.

The structural component of the external deficit has a downward trend, but it is much less pronounced than that observed in the actual figures. Concerning the last two years, the "structural" component of the current account deficit, is roughly 2 percentage point of GDP smaller than the actual value.

[7] I.e. the 1980-2001 average.

Figure 5.5: Observed and "Structural" current account deficit



5.4. Current account reversals

Leaving aside the consideration of current account sustainability, it can be nevertheless interesting to understand what happens when a reversal occurs.

Milesi-Ferretti and Razin (1997, 1999) study the determinants and consequences of sharp reductions in current account imbalances in low and middle-income countries. Their main finding is that current account reversals do not necessarily imply a currency crisis or a substantial fall in GDP growth afterwards.

Freund (2000) focuses on developed countries, studying twenty-five episodes of current account improvements occurred between 1980 and 1997. She finds that typically a current account reversal begins when deficit is about 5% of GDP. The most immediate result of such a reversal is a real currency depreciation ranging from 2 to 10% during the first year of the adjustment. Nominal depreciation is substantially greater than real depreciation, suggesting that current account adjustment involves a relatively high inflation. The depreciation of the currency normally occurs within two years of a current account reversal. Income growth normally falls below trend for the two years following the adjustment, due mainly to a sharp fall in investment. This evidence is fairly consistent with that obtained from large scale macro-econometric models, which predict that US current account change by 1% of GDP is associated with roughly a 10% real exchange rate change.

In a related study on the transfer problem, Milesi-Ferretti and Razin (2000) find that a negative net foreign asset position has a strong long run relation with a depreciated real exchange rate.

Obstfeld and Rogoff (2000a) develop a stylised version of a standard "new open macroeconomics model" (see Lane (2001) for a survey), to analyse the effect of a reversal in the current account position on the exchange rate. They show the important

role of global market integration, which is however still on a low level.[8] Two elements are worth stressing. First of all trade costs limit the share of tradable goods in GDP to roughly 35 percent in the US, as well as in most OECD countries, therefore a 4-5 percent deficit actually represents up to around 15 percent of tradable goods GDP. Secondly, the marked preference showed by investors towards domestic assets (the so-called "home bias puzzle", see for example Lewis, 1999), would limit their willingness to accept US liabilities, should the external deficit widen further. The authors simulate the effect of the current account returning from a 4.4 percent of GDP deficit to a balanced position under the assumption that US monetary policy is particularly keen on price stability. The first scenario developed assumes full price flexibility and can be interpreted as a gradual and perfectly anticipated adjustment over a three-four year period. The reversal corresponds to approximately a 16% drop in traded goods consumption. Assuming unitary elasticity of substitution between tradable and non-tradable, full employment in the non-tradable sector requires its price to fall by 16% and therefore an increase in the relative price of tradable of the same size. If the Fed aims at CPI stabilisation and assuming that 75% of output is non-traded, this would imply a 12% rise in traded good prices and a 4% fall in non-traded ones. Being traded goods prices set in world markets, this amounts to a 12% nominal depreciation of the dollar. Introducing sticky prices, and therefore considering a shorter time period (say one-two years), and acknowledging the fact that on average exporters to the US price to market passing through only about one half of an exchange rate change to importer within a year, the picture changes quite drastically. CPI stabilisation and full employment in the non-tradable sector would then require a 24% nominal depreciation. Price stickiness would magnify the effects in case of the current account returning too quickly to balance. Supposing high short run price rigidity and that imports are one half of total tradable consumption, the maintenance of internal balance would require a depreciation of up to a 50%, quite an extreme value, given the repercussion that would have on US and global financial markets. Although very stripped down, the model has the merit of highlighting the main mechanisms at work during a current account reversal. Furthermore, it conveys the very important result that the effects on exchange rates are not at all negligible and depend mainly on the sudden elimination of the deficit, rather than its size.

The biggest limit of this analysis rests in its partial equilibrium nature, which sheds no light on the effects of a sudden US depreciation and a sizeable redistribution of capital flows on the world economy.

IMF (2001b) presents a detailed study of the sustainability of the US external deficit, and an investigation of the causes and consequences of a reversal. The analysis is conducted using the IMF MULTIMOD econometric model: the evaluation of current account sustainability employs the income elasticity approach. The medium term adjustment of the external balances would occur if income and output growth in the US and the other major economies converge. The transition would be facilitated by a real depreciation of the dollar, to be achieved by a slower rise in US traded good prices compared to those of the competitors. Additionally, some nominal depreciation would be required, whose magnitude would depend to a large extent on the expected returns on US assets. If we believe that the widening of the current account deficit was determined by the strong productivity improvement in the US vis-à-vis the other economies, a reversal in this trend could trigger a quick external adjustment. A weakening of US

[8] Obstfeld and Rogoff (2000b) provide a deep and well-documented analysis of these phenomena, based on trade costs.

productivity would lower comparative rates of return, reduce capital flows and therefore the deficit: the speed of this process, and the accompanying US dollar fall would depend on the rapidity of these developments. A rapid catch up of the rest of the world productivity to US level would entail a real depreciation of up to 8% and a slowdown of GDP growth due to a substantial retrenchment of investment. The effect would be more pronounced if a US productivity growth slowdown occurs at the same time.

The concern that a current account adjustment would necessarily cause a large real depreciation of the US dollar is motivated by the fact that, over the years, income elasticity of US imports has always been substantially larger than that of exports. However, theoretical analysis (Krugman, 1989) and empirical evidence point out that in the long run the elasticity tends to converge toward each other, being related to (converging) trend growth in domestic and foreign GDP. Regression results confirm this trend for the US between 1970 and 2000. Therefore, according to the IMF study, current account sustainability, defined as a long term balance that could be maintained without a large real depreciation, would therefore be achieved within less than a decade. The external deficit would fluctuate between 0 and 2.5 percent of GDP, under the assumption of converging trend growth rates and provided that inflation remains low and fiscal policy meets the long-term needs of the social security while keeping the rest of the budget balanced.

We carried out a somehow different exercise with a modified version of the MARMOTTE[9] multicountry model, which includes just the US, Japan and the Euro area as a whole. The basic question we tried to address is the following: is it possible to replicate the most important features of the US business cycle of the last recent years (namely, the investment boom, the deepening of the current account and the massive real appreciation of the US dollar) by means of simple shocks? The aim of the exercise is twofold. On the one side we seek to interpret the past by identifying the most important shocks. On the other side, we try to give some hints about the future developments of the current account and the real exchange rate. Especially we aim at assessing the likelihood of a reversal in the current account deficit.

Our hypothesis is that, starting from the second half of the 90s two kinds of shocks hit the US economy: a positive permanent productivity shock and a reduction in the risk premium on US assets.

The introduction of the IT technology led to a permanent increase in total factor productivity, whose magnitude was partly unexpected by agents. Insofar as agents had to revise upward their expectations on the productivity path over the first few years, this surprise phenomenon is modelled by a sequence of unexpected additive shocks to total factor productivity.[10] Furthermore, to account for expectations of a sustained higher growth and profitability in the US economy compared to the Euro area and Japan, the second shock has been calibrated as a significant reduction of the US risk premium. It was modelled as a temporary sequential reduction of the US risk premium over a period of three years, followed by a reversal at the end of the fourth year, which brought it back to the level prevailing at the end of the first year.

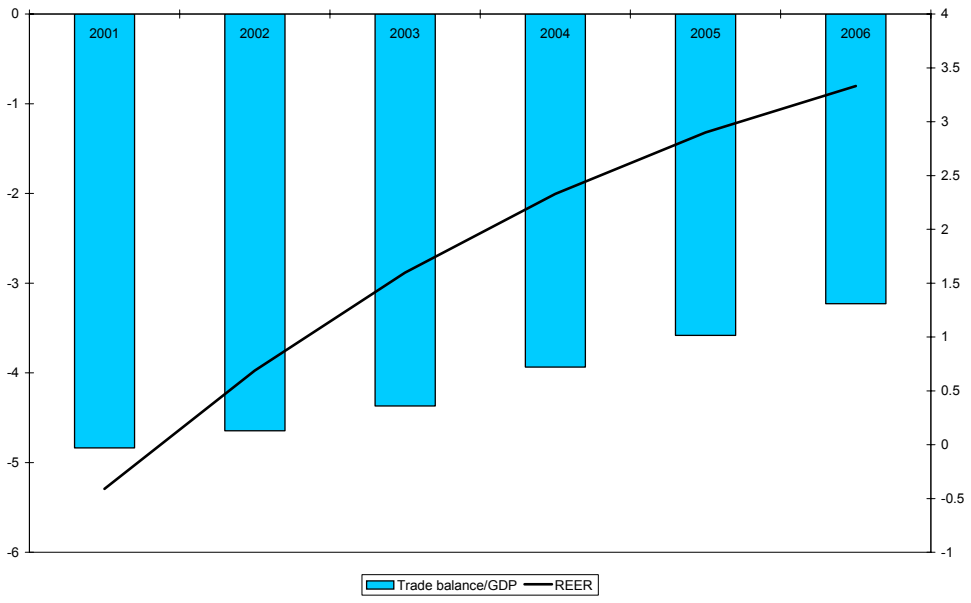
[9] Its theoretical structure and basic properties are illustrated at large in CEPII-CEPREMAP (2001) .

[10] Especially, a unexpected permanent productivity shock is supposed to occur in the first year, increasing total factor productivity (TFP) by 1%. A second shock of the same nature and size, occured in the second year, and so on for the following two years. A the end of the fourth year, TFP has permanently increased by 4%.

The combination of these two shocks proved to reproduce quite well the dynamics of the US macroeconomic variables. The positive productivity shock led to a huge increase of investment until the end of 2000 as production factors became relatively less expensive. Insofar as households expected a permanent increase in their level of income and wealth, they started to consume more. The rise in the domestic demand, reflected in a sustained GDP growth, boosted US imports and so deteriorated the US current account. This volume effect is furthermore amplified by a price effect, arising from the real appreciation of the dollar, which follows the nominal one. The depreciation of the euro and the yen is the direct result of the reduction of the risk premium on the US assets. This entails huge inflows of capital towards the US. Indeed, any US portfolio investment becomes more attractive by its relative higher return.

In 2001, the productivity growth stopped. Firms, having accumulated too much capital, revise downwards their investment plans. This moderates permanently GDP growth and thereby imports, which stop the deterioration of the trade balance afterwards.

Figure 5.6: Effects on the US trade balance and real exchange rate



From 2002 onwards, such a scenario foresees investment growing slowly due to past over-accumulation. The reversion of expectations about the risk of the US economy entails a sizeable nominal depreciation of the dollar. Even if the dollar depreciates in real terms, it remains appreciated with respect to its baseline value. The overall effect on the trade balance is a continuous, but slow reduction of the deficit.

The spillover on the Euro area GDP is significant during the first years of the shock (roughly until 2002), due to the increased demand stemming from the United States and from the pro competitive effects of the Euro's real depreciation. This also contributes to the improvement of the trade balance. These effects dampen over time. When the effects of the productivity shocks are over and the nominal appreciation of the US dollar due to the inflows of capital ends, the euro experiences a marked real appreciation, with a negative impact on the trade balance and growth. Several studies on the relationship between exchange rate and trade have shown that the impact of exchange rate volatility on export varies a lot across industries and destination markets. For a very recent

contribution see Péridy (2002) which studies G-7 exports, showing that exchange rate variability affect negatively crude export products, but may help manufactured exports.

Such a small spillover should not be surprising. As pointed out by IMF (2001b) the output correlations generated by trade linkages in econometric models alone are normally much weaker than those found in data.

Table 5.1: Spillover on the Euro area

	2000	2001	2002	2003	2004	2005	2006
Trade balance/GDP	0.246	0.823	0.760	0.644	0.497	0.341	0.190
GDP	0.328	0.143	0.081	0.014	-0.046	-0.095	-0.133
RER	4.836	-0.043	-1.074	-1.917	-2.581	-3.086	-3.452

Note : The bilateral real exchange rate of the euro against the dollar (RER) and the GDP projected path are percentage deviations from the baseline. The trade balance to GDP ratio is expressed in absolute deviation from the baseline.

Table 5.2: Exports extra Euro area as percentage of Total export and GDP

	Total export	GDP
Ireland	37	38.4
Belgium	26	20.8
Finland	44	21.2
Netherlands	21	14.2
Austria	39	19.5
Germany	44	14.7
Italy	45	13.7
France	39	11.3
Greece	57	14.3
Spain	30	9.2
Portugal	20	7
Luxembourg	16	22.9
Eurozone	37	14.1

Source, EUROSTAT, CEPII Calculations

Going beyond the models' the simulations, we can assess the effect of an abrupt fall in the value of the US dollar on the European countries considering their pattern of specialisation. The impact of depreciation on the external trade is the combined effect on exports and imports.

Export competitiveness depends essentially on the share of external trade in total GDP and on the sector specialisation of the exchanges. As Tables 5.2 and 5.3 show, these two variables differ widely across the Euro area countries. Extra Euro area trade represents 38.4% of Ireland's GDP, and only 7.0% of Portugal's. Concerning trade specialisation, we observe that, for example France and Germany's exports are mainly concentrated in the machinery and manufacturing sectors, whereas Ireland and Netherlands are more specialised in chemicals and electronics.

Table 5.3: Export openness

	EU-11	FR	GER	IT	IRE	SP	PORT	NL	B&L	FI	AU
Food, Beverages and Tobacco	14.5	33.3	10.6	21.7	25.6	9.4	13	42.1	17.5	20.6	11.9
Textile and textile products	33.6	39	56	52.5	15.9	14.3	15.9	23.2	28.9	52.6	40.9
Leather and Leather Products	32.2	43	51	48.4	20	21.9	10.7	15.3	9.1	49.2	21.8
Wood and Wood Products	12.6	12.8	9.4	43	7.6	8.8	13.1	13.5	8.1	23.6	14.9
Pulp, paper and Printing	10.8	9.8	15.8	10.6	7	7.9	7.7	17.2	9.7	24.3	29.2
Energy Products	4.4	2.7	2.7	5.3	0.8	17.2	6.8	12.3	8.7	23	7
Chemical products	38.5	41.9	52.1	51.5	68.1	21.7	16.5	69.5	64.4	74.3	75.4
Rubber	10.6	10.9	13.2	12.4	9.5	13.5	2.7	17.4	8.6	23.2	17.2
Non metallic Mineral Products	20.1	28.9	50.3	60.4	25.6	71.4	17.2	15.9	16.2	37.8	44.3
Basic metals and fabricated prc	30.6	35.9	41.8	44.6	27.9	19.2	16.7	45.8	41.9	46.4	45.9
Machinery and Equipement	44.4	44.3	71.5	53.9	55.1	27.1	16.1	60.8	50.8	76.3	39.8
Electrical and Optical Equipme	59.2	59.5	81.5	73.8	94.1	64.1	32.3	109.3	64.1	117.1	101.7
Transport Equipment	32.9	69.6	34.8	38.5	36.6	28.2	18.7	41.3	25.9	72	33.1

Source OECD, STAN Database

On the import side, the important variable is the rate of penetration, defined as the share of goods imported from outside the Euro area in total production. This obviously depends on openness and demand specialisation. Once again we find a lot of variability among Euro area countries (see tables 5.4 and 5.5). Moreover, as Table 1.8 in Chapter 1 shows, trade elasticities varies widely across sectors. Fouquin et al. (2001) have developed a measure of sector exchange rate elasticity, reported in Table 5.6[11]. We use these measures to construct a country elasticity by weighting sector elasticities by the share of each sector in total trade, derived from the Eurostat statistics, assuming that outside the Euro area all the prices are fixed in dollars.[12] Moreover, multiplying this elasticity by the share of extra Euro area trade in GDP, we get the sensitivity of GDP to dollar fluctuations, assuming that prices outside the Euro area are denominated in dollar.

The overall effect on the Euro area is a loss of around 2.2 points, but we notice a remarkable heterogeneity across country. For example, Portugal, quite a closed economy, specialised in sector protected from external competition, the effect is less than 1 % whereas a very open economy such as Ireland would loose more than four and a half points. We can then rank the Euro area economies according to their sensitivity to US dollar fluctuations, as a result of their pattern of specialization and trade openness towards extra Euro area countries. Relatively close country specialized in sectors with weak extra Euro area trade such as Portugal won't be influenced much by swings in the Euro-dollar exchange rate. Conversely countries which are very open (like Ireland) or specialized in sectors highly exposed to global competition (Netherlands, for example) would suffer much more[13].

[11] Using a somehow similar approach Ilzkowitz and Dierx (1999) identify the industrial sectors whose performance both in the European and in the world market is likely to be more influenced by the introduction of the euro . For example they show that sector already exposed to global competition, such as aerospace, will not affected very much On the contrary, sectors like transport equipment, where the level of intra community trade is high, the Single currency is likely to exert a strong pressure towards price harmonisation across countries.

[12] Let ε_i be country i's average elasticity. It is computes as $\varepsilon_i = \Sigma_k \eta_k p_{ik}$ where η_k is the sectoral elasticity and p_{ik} is the share of sector k in country i's extra Euro zone trade.

[13] Among the several simplifying assumptions made in this analysis one of the most relevant is the neglect of any reference to pass through. Several studies find that pricing to market behaviour, leading to incomplete exchange rate pass through, is a common practice. For example European Commission (1995), investigating the effects of the wide instability in European exchange rates during the first half of the 90s. It shows that in the manufacturing sector the strong depreciation of currencies such as the Italian lira and the Spanish peseta led to an increase in domestic currency prices while prices in ecus remained

Table 5.4: Imports extra Euro area as percentage of Total import and GDP

	Total import	GDP
Ireland	38	31.6
Belgium	31	23.1
Finland	38	13.4
Netherlands	48.9	30.4
Austria	31	15.4
Germany	45	14.2
Italy	43.2	12.4
France	35.3	9.6
Greece	44	13.9
Spain	33.6	10.9
Portugal	25	11.5
Luxembourg	17	17.4
Eurozone	39.8	14.3

Source, EUROSTAT, CEPII Calculations

Table 5.5: Import penetration

	EU-11	FR	GER	IT	IRE	SP	PORT	NL	B&L	FI	AU
Food, Beverages and Tobacco	7.7	8.2	8.3	6.5	6.3	9.3	7.4	25.9	38	20.4	4.6
Textile and textile products	43.2	51.5	74.4	41.6	26.2	20.7	8.4	62	46.8	50.1	42.9
Leather and Leather Products	30.8	35.4	44.9	53.6	24.1	16.2	11.4	36	30.6	37.4	20.9
Wood and Wood Products	10.9	11.6	17.6	16.1	14.8	2.8	1.8	30	14.7	8.8	11.6
Pulp, paper and Printing	5.7	6	8.9	9.2	6.4	3.6	3.2	13.6	8.9	1.8	11.8
Energy Products	4.3	4	2.8	6.8	4.7	7.8	5.3	22	3.4	25.3	9.8
Chemical products	22	23.6	27.2	33.5	51.9	17.2	17.3	53.1	42.3	32.1	35.7
Rubber	7.8	7.3	9.9	9.6	15.3	6.5	8.3	15.9	10.2	10.3	8.3
Non metallic Mineral Products	7.3	7.7	27	18.6	11.7	9.5	2.6	19	8.5	14.3	13.4
Basic metals and fabricated products	25.4	25.8	35.3	34.7	32.4	13.1	16.6	51	37.2	26.1	30.7
Machinery and Equipement	31.1	37.9	55.3	24.4	50.5	27.9	17.1	51.8	36.5	37.8	18.5
Electrical and Optical Equipment	64.1	60.1	102.8	52.2	136	66.3	43.6	125.6	59.2	79.1	68.7
Transport Equipment	17.9	30.4	24.9	18.6	78.6	19.4	19.7	52.5	40.5	57.9	37.7

Source OECD, STAN Database

Table 5.6: Elasticities by sector

	Import Elasticity	Export Elasticity	GDP sensitivity to $
Ireland	0.285	-0.178	VH
Belgium	0.177	-0.148	Very High
Finland	0.086	-0.129	High
Netherlands	0.227	-0.088	Very High
Austria	0.112	-0.149	High
Germany	0.105	-0.086	High
Italy	0.069	-0.115	High
France	0.064	-0.042	Low
Greece	0.072	-0.042	Low
Spain	0.057	-0.074	Low
Portugal	0.065	-0.029	Low
Luxembourg	0.163	-0.011	High
Eurozone	**0.098**	**-0.118**	**High**

constants. Spanish and Italian exporters took advantage of the depreciation to increase their profit margins, as they did not pass into lower international prices the reduction in their production costs.

5.5. Conclusions

Summing up what previous studies[14] say and our contribution, we think that a sudden reversal of the US current account deficit followed by a sharp depreciation of the dollar is unlikely. Although the US current account deficit has reached very high levels, which should be considered worrying for other (especially developing) countries, a crisis is unlikely for the following reasons.

1) Average high growth rate: over the last two decades average GDP growth in the United States has been higher than in other industrialised countries. This should help sustainability in two ways. First of all, it should give more guarantees about the possibility of paying back the debt, assuming that such a concept is meaningful for the US. Secondly, excluding an abrupt change in international investors' mentality, this could preserve the reputation of the country as a safe place to invest, ensuring therefore the flow of foreign investment needed to finance the deficit.
2) Source of the deficit: according to the empirical literature and our VAR simulations, most of the deficit is due to differences in the business cycles with the rest of the world. This should be a transitory phenomenon, and therefore the part of the deficit should be reabsorbed in a less painful way. The structural part of the deficit, on the contrary, looks quite reasonable.
3) Deficit financing: Despite the composition, in which hot money prevails, it seems that investors regard the US as a place for quite long term investments. Therefore, a massive outflow of capital, like the one occurred in Asian countries in 1997 looks very unlikely, if any because it is not clear which market constitute nowadays an alternative to the US for international investors. However, if we believe to the implication of the model proposed by Ventura (2001) a stock market crash could bring the current account back to equilibrium. However such an event is by its nature unpredictable.
4) Role of the dollar in international transactions: currently there is no other currency with the status of reserve currency. Therefore, even in the event of a sudden reversal, it is very unlikely that it will crash, destabilising the world financial system.

However, these arguments are not at all the same as those invoked by the followers of the so-called "Lawson doctrine" (for a recent and well-documented review of this theory see European Commission (2000b)). According to this point of view, the current account is nothing but that the reflection of decentralized optimal decision by the private sector, and therefore the government should neither worry nor interfere in it. The current situation is the manifestation of a deep imbalance looming in the US economy, namely the mounting debt in the private sector. This debt could then trigger sometime a widespread cut in consumption and investment demand (the latter already visible), with the risk of the US exporting a recession with possibly deflation, whose by-product would be a return of the current account to equilibrium.

[14] In its last World Economic Outlook the IMF (IMF (2000), p. 65-81) analyses the causes and consequences of current account imbalances, focusing not only on the US but in general to high deficit and high surplus countries. Its main conclusion is that imbalances do matter and should urge governments to adopt prudent fiscal policy, aimed at reducing the deficit or create a small surplus in the medium run. At the same time efforts should be made to promote private savings, a good starting point could be fair reaching structural reform in accounting rules and enforcement procedures, aimed at restoring investors' confidence.

To analyse the repercussions on the Euro area countries of a possible reversal of the US current account deficit and an ensuing depreciation of the US dollar, two approaches have been used. The first one relies on a macro-econometric framework able to tackle issues of the international transmission of shocks. Simulations with the multi-country model MARMOTTE conclude to a weak impact on the GDP of the European countries, positive during 2002 and 2003 due to the temporary improvement of the trade balance, and slightly negative afterwards. Relative to a static trade framework resting on elasticities analysis, the simulated effects are generally quite smaller. This is the reason why we develop a second approach based on trade data. This analysis shows that a depreciation of the US dollar would have a much more sizeable impact. Moreover, the effects on single Euro area countries are fairly asymmetric, these effects being more important for small open countries.

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