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The Causes of Euro Instability

by

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THE PUZZLE OF EURO DECLINE

Contrary to the predictions of its proponents the euro has declined in value by over 25% against the dollar (see Figure 1), 30% against the yen and 13% against pound sterling since its inception in January 1999. It declined by 20% on the (narrow) ECB measure of its effective rate (ECB, 2000). Several possible explanations are reviewed and found wanting below. Before we embark upon them, we ask the question of whether the euro is in fact 'undervalued'.

Is the Euro 'Undervalued'?

We begin by asking whether the euro is indeed undervalued, and to do so we have to have notion of the 'right' value of the euro. We suggest two types of benchmark are appropriate, namely the value of the currency which would correspond to a trade balance, and a purchasing power parity level.

The Eurozone maintains a trade surplus (in 2000, quarter 1, the surplus of exports over imports, as a percentage of GDP, was 2.1%). On the face of it this would suggest that the euro is undervalued relative to the exchange rate which would generate a balance of trade. Chinn (2000), Coppel et. al. (2000) and Deutsche Bank Research (2000) provide some of the most recent attempt attempts to gauge the 'real' value of the euro. Chinn (2000) estimates an econometric 'monetary model', augmented by the relative price of non-tradeables, using the value of the synthetic euro; Coppel et. al. (2000) prefer more direct indexes of the real 'long-run' or 'equilibrium' effective exchange rates, such as relative unit labour costs, manufacturing prices, and consumer prices and indicate that there has been a divergence between such indices and the movement of the exchange rate. Both papers also survey recent attempts to estimate the equilibrium exchange rate (see also the review of Pricewaterhouse Coopers, 2000, chapter 3). The striking feature of their own, and other such, estimates is that the current level of the euro is, with few exceptions, found to be way below its supposed 'real' level, by a magnitude of 15% or more, no matter what method is employed. Thus Deutsche Bank Research (2000) show that the euro moved more than 15% away from their PPP measure of the real exchange rate in late 1999 onwards. Consequently, Duisenberg's comments, on announcing recent increases in euroland interest rates, that the euro is clearly undervalued,¹ are well supported by the relevant empirical work. It would seem then that the current value of the euro cannot be explained by appeal to any notion of its 'fundamental' value, whether that value is deemed to be purchasing power parity, fundamental equilibrium exchange rate or similar.

We now proceed to discuss a number of explanations of the fall in the value of the euro.

Just Bad Luck?

It is widely recognised that a host of contingencies affect the short run movements of the exchange rate, not least the vagaries of market sentiment. Thus it can be argued strongly that the fall in the value of the euro is simply 'bad luck' with little underlying significance. This point of view can be coupled with the argument that, in historical perspective, the decline is not dramatic and the current level is not unusually low (Buiter 1999b, Coppel et. al. 2000, Corsetti and Pesenti 2000). It can start from the observation that the decline in the euro (say during the year of 1999) is not unprecedented. We have reported elsewhere (Arestis and Sawyer, 1996) that over the period 1980 to 1995 the average ratio of the maximum level of sterling relative to the mark to the minimum level during a year was 1.13, and the corresponding figure for the dollar relative to the yen was 1.17 (with a figure of 1.28 in 1985 and 1.30 in 1986). The pound, for example, fell by around 25% from 1984 to 1985 and by roughly the same percentage in the winter 1992-1993; similar or greater volatility is displayed by other comparable exchange rate series. This lends some weight to the view of Favero et. al. (2000) that 'lamenting a weak euro is patently unjustified.' This can be further supported by the idea that the value of the euro was relatively high on its introduction. Hence a decline from a relatively high level may have been anticipated.²

The interesting question, though, is how should this fall, even if there are precedents for the extent of its fall, be interpreted. A first possibility is that this decline is indeed 'bad luck'. We may bet on the toss of a coin, and let us say that tails represents a loss and heads a win. A string of tails arising from repeated tossing of a coin may represent 'bad luck' for us as the gambler but may not be unprecedented. If we regard the movement of the exchange rate as a 'random' event, then there will be 'runs' of generally negative movements in the exchange rate. A related possibility is that these declines in the value of the euro could be seen as an example of a self-perpetuating 'bubble' in financial markets in which expectations of price rises (falls) fuel those price rises (falls). Two remarks can be made here. First, although the decline in the euro is by no means unprecedented, many of the large movements in exchange rates do appear to have some underlying cause. For example, the rise and then fall of the dollar during the 1980s can be ascribed to tight monetary policies and then the impact of the Plaza agreement. Second, treating the decline of the euro as a 'bubble' may still raise the question of the cause of the start of the 'bubble' even if there are mechanisms by which the 'bubble' is perpetuated.

We would argue that the 'bad luck' argument captures an important but partial truth. The bulk of the literature is right to eschew the straightforward argument that the falling euro, *per se*, undermines the case of the euro's proponents. However, it is also correct to stress that, if the proximate causes of exchange rate movements are the beliefs of market participants, and such beliefs have a random component, then, equally, beliefs are not *purely* contingent. Neither pure truth, nor pure whimsy, market beliefs do have some connection with economic reality. Thus, the historical and comparative precedents for the fall in the euro were not always a matter of 'luck'. On the contrary, in many cases, they have an underlying economic logic. It is significant that proponents of the euro had predicted that its value would *rise* from January 1999 (Buiter 1999b admits that he was one such proponent). Such predictions stemmed, not only from the relatively buoyant economic outlook at that time, but also from the view that the inception of the euro would *contribute* to the rosy economic future of the euro area. It is in this context that the decline in the value of the euro should be appraised. Whilst it is true that the decline provides *prima facie* evidence against proponents of the euro, it is the underlying causes of the decline that provide the critical evidence for any assessment of the exchange rate debate. If the decline in value is most plausibly attributed to a change in the economic conjuncture that is external to euro's inception, then the decline does not, after all, count against the euro. If, on the other hand, such external causes are not sufficient to explain the decline, then the spotlight must fall on factors endogenous to the euro and its accompanying institutions such as the European System of Central Banks (ESCB) and the Stability and Growth Pact. Two of the obvious candidates for being external causes of the decline are considered next.

Real Interest Rate Differentials

The effects of interest rate differentials on the exchange rate appear at first sight paradoxical. A general presumption would be that raising the (domestic) interest rate would raise the exchange rate. The mechanism is quite simple: the higher interest rate makes acquiring financial assets in that currency more attractive, and wealth holders acquire the currency in order to be able to acquire the financial assets. But uncovered interest rate parity indicates that the nominal interest rate differential is equal to the expected decline in the exchange rate. Thus a high interest rate differential foretells a declining exchange rate. These two ideas can be reconciled with an argument which is reminiscent of the 'overshooting' theories. The immediate impact of an (unexpected) increase in the domestic interest rate is a sharp rise in the exchange rate, and the persistence of the interest rate differential is associated with a declining exchange rate. The extent of the initial rise in the exchange rate could be seen to depend on the expectations of the time period for which the interest rate differential persists. An interest rate differential of say 2 per cent expected to persist for five years would signify a cumulative decline in the exchange rate over those five years of (just over) 10 per cent.

The measure of interest rate differential depends, not surprisingly, on the interest rate chosen for the comparison, and it cannot be assumed that the different interest rate differentials tell the same story. In terms of short-term interest rates, the differential between the US and the Eurozone has been positive fluctuating around 1.5 percentage points: the month by month movements in this differential are given in Figure 2a. But the differential in terms of long-term interest rates has generally been negative, particularly over the past 12 months, as shown in Figure 2b. Consequently, the picture over the sign and size of the interest rate differential between the US and the Eurozone is a confused one. But the size of the differential is clearly not large enough to explain the rate of change of the value of the euro over this time period in terms of uncovered interest rate differentials.

With US interest rates moving roughly in parallel with euro rates, and inflation rates likewise moving in rough parallel there has been little change in the real interest rate differential between the USA and the Eurozone, since January 1999. This is true of both short term (Figure 2a) and long term real interest rates (Figure 2b). Thus, Gros et. al. (2000) report that the clear negative correlation between long term interest rates and exchange rate movements, empirically robust in the past (as confirmed also by Coppel et. al., 2000), has broken down from mid-1999. In the case of Japan, the real long-term interest rate differential was at the same level in April 2000 as it was in January 1999, with a 'hump shape' in between. Real short-term interest rates do drift against the Eurozone during 1999 (from 2% to below 0.5%), but they drift in the opposite direction during 2000 (moving back up above 1%), with no reversal in the exchange rate decline (ECB, 2000). Clearly, interest rate differentials do not explain the decline in the value of the euro.

U.S. STRENGTH

There has been much focus on the euro:dollar exchange rate in general and in this paper also. Clearly from that perspective the weakness of the euro can be treated as the other side of the coin of a strong dollar. The euro, however, has also declined against sterling and against the yen (reaching its lowest level in early September 2000). In the case of sterling, the decline of the value of the euro has been less pronounced. It is also the case that many of the arguments which have been applied to explaining the weakness of the euro against the dollar can be carried over to explaining the weakness of the euro against sterling. The UK economy has experienced relatively strong growth and interest rates have been similar to American rates. It is of note that by early September, 2000, sterling has been falling with respect to the dollar but strengthening against the euro. Turning to the yen, its strength against the euro is more difficult to fit in with the explanations of the euro:dollar rate. The Japanese economy has experienced sluggish growth (and zero in the second half of 1999) and interest rates have been low – in fact zero for most of the period under scrutiny. Although the explanation of the relationship between the euro and the yen is not the focus of this paper, these observations are relevant to the arguments advanced below. In this section we concentrate on explanations for the weakness of the euro by looking at the strength of the dollar and in turn we look at the perceived strengths of the US economy.

Expected and Actual Growth Rate Differentials

Eichengreen (2000), Buiter (1999b), Corsetti and Pesenti (1999, 2000), von Hagen (1999), Favero et. al. (2000) Coppel et. al. (2000), OECD (2000) and Deutsche Bank Research (2000) all point to the strong performance of the US (and the partial recovery of Japanese prospects) as being the fundamental cause of the decline in the value of euro. The continuing strength of the US in 1999 coincided with a rather slower growth than had been expected in the euro area during the first half of 1999. During the four quarters of 1999, US GDP growth rate was, expressed at an annual rate, 3.9%, 3.8%, 4.3% and 4.6%. The corresponding figures for the Eurozone are 1.8%, 2%, 2.5% and 3.1%. In addition to the actual GDP figures, these authors offer striking graphical evidence (a graph first presented by Corsetti and Pesenti, 1999) for the 'strong US' explanation. A very close fit obtains between the graph of the daily dollar:euro exchange rate and the graph of the difference between consensus 1999 GDP growth projections for the euro area and the US. As can be seen (Figure 3), the fit holds very well through 1999 (the results of a similar exercise for the yen are almost as striking). Thus, it is argued, the 'fundamentals', as expressed in actual and/or expected growth rate differentials, explain the decline in the value of the euro. However, difficulties remain in explaining the precise significance of the graph for the decline in value of the euro. So much so that Corsetti, the co-originator of the graph, remarked recently that 'to be honest, it is hard to find a convincing interpretation of the recent evolution of the euro' (Corsetti, 2000). The different interpretations will be scrutinised below.

Eichengreen (2000) interprets the differing expected, and actual, growth rate performance as follows: "With demand growing relatively slowly and excess capacity pervasive in Europe, a weak Euro was the market's way of pricing European goods into international markets. The same general explanation holds for the yen..." (p. 2). Yet, Eichengreen offers no explanation as to why international currency markets should behave in the way he postulates. If trade in international goods is the key, then the Eurozone's trade surplus would lead to an appreciation rather than a depreciation of the euro. Buiter (1999b) provides a different interpretation. According to him, growth differentials affect the exchange rate through (1) money demand and (2) the anticipated future path of short-term interest rates. On the first one, Buiter does not spell out the mechanism he has in mind, but we

would interpret it as follows. Given the amount of money in existence and the level of prices, an acceleration in the rate of growth causes an increase in the demand for money, which in turn causes interest rates to rise (so that interest rates in the US are expected to be higher than in the euroland). However, this view relies on the money supply being regarded as exogenously given. In the (to our mind) more realistic case of endogenous money, an increased demand for money would lead to an increase in its stock without interest rates necessarily rising.

On Buiter's second point, interest rates may be anticipated to be higher in the future, but how does that lead to a rising exchange rate? In so far as financial assets are held in the form of bonds, then the anticipation of higher future interest rates is an anticipation of lower bond prices. Hence the anticipation of higher US interest rates would make US bonds less attractive now (than otherwise) and tend to generate a capital outflow rather than inflow. But financial assets may be held in the form of interest bearing deposits. With low transactions costs, there is little reason to shift financial assets from one currency to another in this period for the prospects of higher future interest rates, but rather to shift when those higher interest rates materialise. Thus we are unconvinced that anticipated higher future interest rates can explain a rise in the value of the dollar (and hence decline in the value of the euro). In any case, and as noted above, it is clear that the *actual* interest rate differential has not moved substantially in favour of the US (see above, and figures 2a and 2b) at any time since the inception of the euro, nor is it currently expected to do so in the future (e.g. Deutsche Bank Research, 2000).

Coppel et. al. (2000) and Corsetti and Pesenti (1999) invoke the strong correlation of expected growth rate differentials and the dollar: euro exchange rate but they do not explain, in detail, just how the growth differential translates into a declining euro. Two explanations may be in order: (1) the vague notion of 'market confidence' whereby low growth prospects entails low 'confidence' and a movement of speculative capital to the strong US - a possible 'self-fulfilling prophecy'; (2) the view that a relatively stagnant Eurozone cannot match the prospective earnings potential of the buoyant US so that direct, and possibly portfolio, investment capital flows from the Eurozone to the US. Despite being vague, these explanations tied in well only with the situation in the second half of 1999, when the decline in value of the euro appeared as little more than a reversal of a previous rise and when the recent growth performance of the euro was disappointing, especially relative to US strength. They have the affect of 'absolving' the euro, and its accompanying institutional structure, from blame. For, they suggest that the decline in value is a purely *cyclical* phenomenon that will naturally reverse, in tandem with a future reversal of the relative cyclical positions of the US and the euro. Thus, by focussing upon the growth rate differential, it is possible to justify remaining sanguine about the fall in value of the euro. Recent developments have, however, served to cast doubt upon the cyclical explanation, and led to a search for a clearer articulation of the relation between the expected US-Eurozone growth rate differential and the exchange rate.

In fact, as noted above, the growth performance of the Eurozone started to pick up in the second half of 1999 and has continued on this upward path in the first quarter of 2000 (growing at 3.4% p.a.), and growth at over 3 per cent is forecast for the Eurozone in 2001 (OECD, *Economic Outlook*, June 2000). Yet the value of the euro has not risen in tandem with the growth acceleration. On the contrary, it continued to decline and only began its (minor and short-lived) recovery in mid-May, which has been followed by severe falls again. It remains 25% below its value at its inception. On the other hand, the US growth performance has matched the Eurozone quarterly increases (growing at 5.1% p.a. in 2000 quarter 1), so that the *actual* growth differential has remained relatively stable in the five quarters since the inception of the euro (Figure 4). The point we would stress is that the 'cyclical' explanation is more convincing when the Eurozone is clearly sluggish, as was apparent the first half of 1999. The subsequent pick up in the Eurozone should, *ceteris paribus*, have led to profitable investment opportunities. There is no reason to suppose that the parallel growth increase in the US indicates a parallel increase in the earnings potential of direct investment. Indeed the cheap euro should have provided the Eurozone with an advantage in this regard, now that the Eurozone recovery is well under way (Gros et. al., 2000). These considerations are all the more pertinent for the case of Japan, given its below zero growth in quarter 4 1999 (Figure 4). This may be one reason why, in the light of developments, Corsetti (2000) has considerably modified his explanation from that provided in Corsetti and Pesenti (1999). He now stresses that, "a growth-centered perspective of the euro-dollar exchange rate is far from being 'cyclical'" (p. 7). His more detailed explanations are considered next.

Corsetti (2000) shows that the consensus expected growth differential between the US and Eurozone in 2000 has shown a similar pattern to 1999 (Figure 3). The relationship with the yen has broken down in 2000, however, confirming that the expected or actual growth differential cannot be the main explanation of the euro's slide against the yen. If, given the argument of the above paragraph, Figure 3 cannot be interpreted to support a purely cyclical explanation of exchange rate decline, how, then, is it to be interpreted? Corsetti suggests that the high domestic US demand can explain the graph, and so the exchange rate movement. Because US domestic demand growth outstrips US output growth (US consumption demand grew by 7.5% in the first quarter of 2000), Corsetti argues that domestic US producers will export less product abroad, in order to satisfy domestic demand. For such a relative fall in exports to occur, the real price of US goods vis-à-vis foreign goods needs to rise, on this view (causing non-US consumers to substitute towards non-US products from US products). This is no more than to say that the real exchange rate must appreciate. At the same time the current account will move (further) into deficit. By definition such an appreciation can occur through nominal exchange rate appreciation or through higher US inflation, or both. Thus, this explanation focuses entirely upon the US side, irrespective of the situation in the Eurozone, and so, like the explanations considered above, it has the effect of 'absolving the euro from blame' (though the explanation may be complementary to, rather than excluding, explanations that focus on the Eurozone).

In itself, Corsetti's theoretical argument is highly questionable. It relies upon the idea that US output is determined fully on the supply side, and that it will be sold domestically, until domestic demand is saturated. We would argue, however, that aggregate demand is a spur to the growth of output. Clearly, such growth has not (yet) increased exports of goods and services to, over imports from, the Eurozone. It maybe that such demand has, instead, 'sucked in' foreign direct investment. This would provide one alternative explanation for Corsetti's (2000) graphs showing a strong and positive correlation between the exchange rate and both the expected US-Eurozone consumption demand differential and the expected investment demand differential (though the strong association between growth expectations and demand expectations may, in any case, be a sufficient explanation). This alternative is focussed upon below.

Investment Flows

Evidence on investment flows from the Eurozone highlights their potential importance in explaining the decline in value of the euro against the dollar (see Table 1).

**Table 1: Investments in the Eurozone and current account surplus
(billions of euro)**

	<i>Direct investments</i>	<i>Portfolio investments</i>	<i>Current account surplus</i>
1997	-48.1	-22.8	76.2
1998	-102.6	-85.3	63.4
1999	-147.3	-21.3	24.3
<i>Source</i> : ECB (2000)			

Table 1 provides evidence that one *proximate* cause of the decline in the value of the euro is an outflow of direct and portfolio investment far in excess of the current account surplus (a number of recent publications concur with this view: Gros. et. al., 2000; PricewaterhouseCoopers, 2000; ABN-AMRO Bank, 2000). But what explains the net outflow of investment? A widely discussed possibility is that the outflow is due to the strong US equity market. However, as both Corsetti (2000) and Gros et. al. (2000) note, the evidence from BIS (2000) is that "the appreciation of the dollar coincided with the sell off in the US equity market, defying the view that US stock prices drive the dollar" (cited in Gros et. al., 2000, p. 51). The negative correlation has continued to the present. Moreover, the interest rate influence on the stock market and on the exchange rate provides the economic logic for such a correlation (an actual or expected interest rate increase could depress the stock market and raise the exchange rate simultaneously). Gros et. al. (2000) note also that the net capital outflow cannot be explained by the selling of euro denominated equity by investors outside of the Eurozone. The figures show that Eurozone investors purchased (around 60 billion euros) more foreign denominated equity than euro denominated equity in 1999. Gros et. al. (2000) suggest, therefore, that the outflow of capital might stem from a structural (the outflow started before the inception of the euro) economic imbalance of long term investment capital, rather than from more speculative sources. They suggest that the latter type of explanation may explain the portfolio investment outflow: the rise in the ECU prior to 1999 being attributed to a 'euphoria' that served to mask the underlying structural imbalance so that "many wrong-footed investors who overinvested in the euro at the beginning of 1999 have had to 'capitulate' since then, which may go a long way towards explaining the downward trend of the euro over the past fifteen months" (pp. 52-53).

Gros et al (2000) thus provide, in our view, a more convincing argument than Corsetti (2000) as to just *why* relative US strength, as expressed in actual and expected growth differentials, should contribute to the decline in value of the euro. However, in this case, US strength can be only half the story. A buoyant US economy will only attract foreign direct investment from the Eurozone, if equally profitable opportunities for investment in the Eurozone are perceived to be unavailable. As argued above, the *actual* growth pick up of the Eurozone would, *ceteris paribus*, suggest suitable investment opportunities in the Eurozone are growing. It is true that the continual slide in the *expected* growth differential might be taken to suggest a growing lack of investor confidence in the Eurozone, but why should investors perceive the Eurozone to be weak? The import of this latter question is suggested also by a very different consideration: the validity of strong US growth figures have been the subject of significant doubt. Gordon's (1999) widely discussed analysis suggests that (1) strong US productivity growth is largely confined to just the IT sector; and (2) in that sector changes in the statistical estimation of price declines, and quality improvements, serve to inflate greatly the true productivity growth. Finally, for the case of the decline in the euro against other currencies, such as the yen, US strength is clearly irrelevant and, as has been illustrated for the case of Japan, similar growth differentials do not obtain.

In conclusion, if Gros et. al. (2000) are right, then the next important question to ask in order to get to the bottom of the decline in value of the euro, is why has the Eurozone been perceived by investors to be weak? The timing of the investment outflow, which began about a year before the inception of the euro, is clearly consonant with the view that the inception of the euro itself has played a significant role in harming investor perceptions of the Eurozone. Indeed, this view is plausible even if a more cautious stance towards the interpretation of Gros et. al. (2000) is adopted, so not taking the net outflow of direct investment as necessarily fundamental. For, it remains pertinent to ask just what market and speculative perceptions of the Eurozone have, for nearly a year and a half, helped to force down the euro, despite statistical doubts concerning US strength, and given that the euro has declined against a range of currencies other than the US dollar. The extent of Eurozone weakness and the possible links of such weakness to the inception of the euro are discussed in the next section.

Euro and Eurozone Weakness

One does not have to go far in order to find the argument that the structural weakness of the Eurozone has caused the decline in value of the euro. George (2000), Dornbusch (2000), PricewaterhouseCoopers (2000) and (invoking high German labour costs) Gros et. al. (2000) all point the finger at structural market rigidities, and in particular labour market rigidity. Others such as Feldstein (2000) argue against the introduction of the euro because of the perceived presence and effect of such 'rigidities'. Of course, the vague notion of 'labour market inflexibility' underlying 'eurosclerosis' has been around for 20-30 years. Therefore, even if the notion were to be accepted, it would require further specification in order to provide an explanation of the decline in value of the euro. In any case, we do not accept, either on theoretical or empirical grounds, the notion, widespread through the entire literature, that 'labour market inflexibility' is the cause of poor European economic performance – a point to which we will return below (see also Arestis and Sawyer, forthcoming a). However, it is by no means necessary to accept the 'labour market rigidity' thesis, in order to recognise that the economic and institutional arrangements accompanying the euro itself (their monetarist bias), along with the divergent state of the Eurozone, lead to Eurozone weakness. A weakness that could plausibly cause outflows of both long term and 'post-euphoric' speculative capital, and that might, therefore, go some way to explaining the decline in the euro value (in conjunction with the considerations above regarding US strength).

The euro has, of course, ushered in a single monetary policy. At the same time it has constrained national fiscal policy (via the Stability and Growth Pact) and it has made exchange rate revaluation impossible for the individual EMU countries. It is widely recognised that this arrangement requires a high degree of convergence of the patently very diverse economies of the Eurozone. Without such convergence, it will enforce inappropriate economic policies on its member states, constrain automatic and discretionary fiscal stabilisation, and negate room for manoeuvre in the face of economic asymmetries. In addition, a heavy burden of co-ordination is placed upon the European Central Bank (ECB) and the Eurosystem, through the need to pursue a coherent monetary policy, and to be perceived as so doing. The question of the performance of the Eurosystem and the ECB will first be addressed below, then the issue of convergence will be taken up.

The ECB and the Eurosystem

It can be noted that the credibility of the Eurosystem was set back, at the outset, by the 'fudging' of the Maastricht criteria. As we have demonstrated in detail elsewhere (Arestis and Sawyer, forthcoming b), various member states of EMU resorted to accounting 'tricks' and the like in order to meet the criteria for entry into the single currency. This must have raised market concerns and also begs the question, to be explored below, of the extent to which divergence has taken place since the inception of the euro. Furthermore, the performance of the ECB, in terms of its presentation and the transparency of its decision making, has been widely condemned. Additional problems include: important ECB policy decisions have been leaked prior to official announcement; the speeches of different ECB bankers have given different signals regarding ECB policy; the ECB does not publish minutes, nor divulge information on its econometric models and forecasts; the 4.5% target for M3, which is one pillar of the 'two pillar' monetary strategy has not been met at all (Figure 5), and yet it has been largely ignored (Arestis and Sawyer, forthcoming b, elaborate on all these problems).

The ECB itself and sympathetic commentators, such as the OECD (2000) or Favero et. al. (2000), argue, in defence of this performance, that the ECB and the Eurosystem are very new and lack the historical time series and the relative stability that only time can bring. More significantly, for the question of the exchange rate decline, much of the academic literature plays down the significance of the problematic nature of the ECB and other relevant institutional arrangements for the exchange rate fall, focussing, instead, upon US strength. In the light of the foregoing arguments, we would agree that ECB weakness is by no means the whole, or even the main story. However, as argued above, US strength is not sufficient to explain the exchange rate decline. The weakness of the ECB reflects the problems associated with trying to implement a single currency on as diverse an economic area as the Eurozone. It is one aspect of Eurozone weakness that is specific to the euro itself, and therefore accords with the timing of the euro's decline in value. It could have contributed to the 'post-euphoric' speculative outflows and to long term fears regarding the ability of the euro to cope with Eurozone divergence. Thus, we would argue that it is more important than the academic literature is willing to recognise. The issue of divergence is examined next.

The Euro and the Divergent Eurozone

Table 2 provides the current respective growth, inflation, unemployment, budget deficit, government debt and output gap figures for the Eurozone (Luxembourg is included in the table but ignored in the descriptive analysis in view of its small level of relative importance). There is a relatively low growth camp consisting solely of Germany (2.3%). There is also a high growth camp of Spain (4.2%), Belgium (5.1%) and, spectacularly, Ireland (11%!). Inflation rates show Ireland to be way above the rest, once again, on 5.4%, with Spain on 3.5%, and at the other end of the scale, France on 1.9% and Germany on 2%. Unemployment rates vary greatly from 14.3% in Spain to 3% in the Netherlands. The budget deficit and output gap figures confirm the differing fiscal and cyclical positions of the EMU members, with Ireland's deficit at +2%, and output gap at +2.6%, whereas the respective figures for Italy are -1.9% and -2.5%. Portugal and Austria also have relatively large deficits of -2%. Finally, both Italy and Belgium record debt levels of well over 100% of GDP. Thus there are large differences of economic performance - even though it is early days for the euro, there is no sign that it has contributed to any diminishing of these differences. Still, the proponents of the euro could argue that the evidence thus far provides only a snapshot of the Eurozone economy. It is necessary, then, to look at the Eurozone economic performance through time, if questions regarding convergence, or divergence, are to be answered. Firstly, the recent performance will be considered in its broad, historical context. Secondly, the most recent and detailed evidence on the impact of the euro will be examined.

Country	Growth Rate (SA) % p.a. 2000Q1	Inflation Rate (SA) % p.a. Jun-00	Unemployment Rate (SA) May-00	Budget Deficit 1999	Gross Nominal Consolidated Debt as % of GDP 1999	Output Gap 1999
Eurozone	3.4	2.4	9.2	-1.2	72.1	-1.1
Belgium	5.1	3	8.4	-0.9	114.4	-0.9
Germany	2.3	2	8.4	-1.2	61	-1.5
Spain	4.2	3.5	14.3	-1.1	63.5	-0.2
France	3.4	1.9	9.8	-1.8	58.6	-0.6
Ireland	11[Q3]	5.4	4.7	2	52.4	2.6
Italy	3	2.7	10.7[Apr]	-1.9	114.9	-2.5
Luxembourg	4.9 ⁺	4.4	2.2	2.4	6.2	N/A
Netherlands	3.9	2.5	3[Apr]	0.5	63.6	0.9
Austria	3.9	2.4	3.2	-2	64.5	0
Portugal	3 ⁺	2.8	4.5	-2	56.7	-0.3
Finland	5.1	3.1	9.5	2.3	47.1	-0.1

⁺ % increase of 1999 period over 1998 period
Source : Eurostat; OECD *Economic Outlook* ; ECB (2000)

The Recent Performance in Historical Context

The importance of the historical trends for divergence/convergence is recognised by the ECB as reflected in two recent ECB studies, ECB (1999) and Angeloni and Dedola (1999). These papers will be considered along with an examination of the annual series for GDP, the output gap, unemployment and inflation. As a preliminary it can be noted that the 'degree of convergence' is difficult to measure since the relative weighting to be accorded to

individual countries is difficult to decide upon. Both the spread (from highest value to lowest) and the standard deviation are, for example, dependent upon 'outliers', but, in fact, such outliers are, in some respects, of equal interest to countries of far greater size. Thus small countries, such as Ireland (which contributes less than 2% of Eurozone GDP), should, to some extent, be given a greater weighting in analysis than mere regions of comparable size such as London. But just to what extent is not clear. In this circumstance, plotting the evolution of each country, side by side on the same graph, is preferable to merely quoting summary statistics, since the shape of the Eurozone as a whole can be discerned.

Figure 6 plots the annual growth in GDP rates of the past 17 years. Looking over the period as a whole, we would stress that a *divergent state* of the Eurozone is the norm. Even excluding the smallest and most volatile countries (Ireland, Finland, Portugal and Luxembourg), the difference between the highest and the lowest GDP growth rate, for each given year, for the most part fluctuates between the 1.5% and 2.5% levels. The difference has never fallen below the 1.3% level and reaches a maximum of 4.2% (1987). The most recent figure is 2.3% in 1999. The inception of the euro has not, at this early stage, produced any outstanding change in the norm, but has maintained the Eurozone in a divergent state, with Ireland clearly threatening to overheat. Excluding the outliers of Ireland and Finland, then a process of divergence is visible, from the unusually convergent state of 1995, through to 1997; this higher level of divergence has been maintained, though not widened further, through 1998 and 1999.

Figure 7 plots the output gaps. The output gap is a measure of the difference between the actual and potential output of the country, here expressed as a percentage of the country's potential GDP. Thus it provides one indication of a country's cyclical position. The consistently wide spread between highest and lowest, and the many criss-crossing lines, suggest that the Eurozone is in a continually divergent cyclical *state*, over the period, consonant with the growth rate data. There is an indication of a recent *process* of cyclical divergence with Germany and Italy falling further from potential output, in 1999, whilst France, and most other countries, move towards potential (further above potential, in the case of the Netherlands). This evidence appears to contradict the suggestion of both ECB (1999) and Angeloni and Dedola (1999), that there has been a generally high level of *cyclical convergence* over the time period, with a significant recent increase in the level of convergence. Both papers base their view on the decomposition of key indicators (GDP growth, industrial production growth, employment growth and inflation) into trend and cycle components using the Hodrick-Prescott filter (ECB 1999) or fourth quarter difference in logs (Angeloni and Dedola 1999, who report that they achieve very similar results with the Hodrick-Prescott filter). For the period 1994-1998, ECB (1999) find divergence in the growth rate of GDP *trend* but a correlation of around 0.7 to 0.8 (10 year rolling average) for most country's *cyclical* GDP growth component with that of the Eurozone average; this compares with lower correlations (down to 0.4) in the early 1990s. Angeloni and Dedola's (1999) analysis confirms the ECB (1999) findings and suggests that German unification caused the divergence in the early 1990s (this is a point that the evidence on output gaps corroborates). For the early and mid-1980s, both papers find levels of cyclical convergence approaching the high levels of the mid-to-late-1990s.

What explains the apparent contradiction of divergent output gaps and high measures of 'cyclical' correlation over the period? This is an important question for an assessment of the prospects for the euro, as currently implemented. We would suggest that the divergent spread of output gaps and growth rates, and the many criss-crossing lines evident on both graphs, reveal that the 'cyclical' correlation coefficient of 0.7 to 0.8 should not be considered 'high' in any absolute sense. Rather, it simply picks up the fact that there is a broad common cycle in the Eurozone. Within this broad cycle, however, there is clearly much room for a great deal of divergence, of a 'cyclical' as well as 'trend' nature. In any case, such divergence is of obvious policy relevance whatever its nature. For, we reject the view that trend growth is a purely exogenous matter, of no concern to economic policy; on the contrary, the obvious quantitative significance of the 'trend' implies its policy significance. Overall, then, the GDP and output gap data reveal that the Eurozone remains in a divergent *state* with an evident recent *process* of divergence.

Figure 8 plots annual unemployment rates in the Eurozone from 1982 to the present. The outstanding feature is the continual divergent *state* of the Eurozone, with the diverse unemployment rates deviating relatively little in their ordering in terms of relative magnitude (Finland being a clear outlier, in this respect). In comparison with the previous graphs there are very few criss-crossing lines other than that of Finland. Spain is an outlier, remaining nearly 5 percentage points above the next highest country in 1999, at 15.9%, having peaked at 24.1% in 1994, when the rate was over 10 percentage points above the next country of substantial size, France.

Annual inflation rates, plotted on Figure 9a show strong convergence over the past two decades to the low magnitudes of around 1% in 1999. This provides a much better outlook for the institutional mandate of the Eurosystem in general and the ECB in particular (its prime goal being a low and steady Eurozone inflation rate), than would higher and more divergent rates. However, there are a number of downsides to this evidence. Wyplosz (1999) has pointed out that the Maastricht Treaty was conceived in the late 1980s, when neo-liberal monetarism held considerable sway over policy. Since then, however, the general lowering of inflation, evident on the graph, has downgraded the importance of inflation, certainly in the public perception. Wyplosz (1999) could also have pointed out that the sustained improvement in inflation performance across the Eurozone has coincided with a period of sustained sluggishness in terms of growth rates, as described above, and has also coincided with a general fall in the rates of inflation worldwide in industrialised economies. This provides some evidence that the prioritising of inflation is misguided. Finally, it should be noted that the Harmonised Index of Consumer Prices (computed by eurostat), only available for recent years, tells a slightly different story to the OECD measures for the period from 1998 to 1999. Whereas the non-standardised measure of the OECD shows some convergence for 1998 to 1999, the harmonised index shows divergence, with Ireland moving above the 2.5% level and Spain pushing well above 2%. This hints at the recent inflationary worries regarding Ireland and Spain, described in more detail below.

Before moving on to look at the impact of the euro on convergence in detail, it can be noted, finally, that 'Optimum Currency Area' (OCA) theory and the debate surrounding it (see Angeloni and Dedola, 1999) suggests that the observable variables reviewed above are not the whole story. Rather, it is 'non-observable' shocks, either to aggregate demand (e.g. a shift in tastes) or aggregate supply (e.g. a technology shift), that are ultimately of significance. This is because, essentially, OCA theory provides an assessment of the appropriateness of a single currency through a weighing up of the costs and benefits of its introduction. The benefits are reduced transactions costs and transparency of relative prices. The costs are the loss of exchange rate and national monetary policy as 'buffers' and adjustment mechanisms in the face of 'asymmetric shocks'. The important point is that these are *non-observable* shocks to aggregate demand, or to aggregate supply; the observable series reviewed above are only the outcomes of the unobservable demand and supply shocks.

Bayoumi and Eichengreen (1993) first attempted to identify and estimate the underlying shocks, concluding that their correlation for the Eurozone is, on average, smaller than that prevailing in the US. Angeloni and Dedola (1999) update this work. They find that the correlation of shocks in the Eurozone is very low, i.e. the Eurozone suffers from very asymmetric shocks. Corsetti and Pesenti (2000) have stressed the importance of this finding (in response to the ECB arguments regarding the observable cyclical convergence, discussed above). Our stance towards this evidence offers an opportunity to clarify our theoretical approach towards the evidence on convergence as a whole.

It is no secret that, as McCombie (1999) and, with gusto, Buiter (1999) point out, the theoretical and econometric assumptions made in order to try to identify non-observable shocks are severe. On top of the well known list of strong assumptions, we would add the following general point. The business cycle is not driven purely by economic 'shocks' to an otherwise smooth process towards general equilibrium, though, of course, exogenous shocks are very significant. Rather, the business cycle is an ongoing and endogenous economic process. On the financial side, Minsky (1975, 1978, 1982) has charted the inherent tendencies towards fragility of the unfettered capitalist economy. On the real side of the economy, Myrdal (1957) and Kaldor (1972, 1985) have analysed the processes of cumulative causation and uneven development generated by the operation of unfettered markets. It is such endogenous processes that are the fundamental context for the single currency. The potential for increased regional asymmetries

of demand and of resources unleashed by the single currency make it imperative that the current monetarist structure behind the euro is transformed fundamentally. The evidence presented thus far, showing on the whole a divergent *state* and recent *process* of further divergence, corroborates this perspective. A more detailed look at the recent impact of the euro is provided below.

The Impact of the Euro: Detailed Evidence

The impact of the inception of the euro on the evolution of most recent and frequent series for inflation, growth, unemployment and the budget deficit will be assessed in turn.

Figure 9b plots the evolution of inflation, in annual percentage terms, from January 1999. In terms of the issue of convergence, the outstanding feature of the graph is the exceptionally high inflation rate of Ireland. Ireland moves from 2% to 5.4%, which is 1.9 percentage points above the next highest rate. Not since 1985 has the Irish inflation rate reached such a level so this evidence may well indicate inflationary pressures building up. If Ireland is excluded, then the rest of the countries show, in fact, a slight convergence. Nevertheless, two display notable acceleration: Spanish inflation has remained high relative to other countries, reaching its highest level, of 3.5%, in the latest month (June). Belgium has jumped to fourth highest out of the Eurozone, from third lowest in November 1999.

Figure 10 plots the quarterly GDP growth performance over 1999 of the Eurozone countries (data for Portugal is unavailable). Here, once again, the outstanding feature is Ireland, which is way above the other countries, and which causes divergence of the countries as a whole. Again, if Ireland is taken out, there is slight convergence over 1999, as Germany and Italy slowly begin to recover, and Belgium spurts, but there is divergence in 2000 quarter 1, owing to Germany growing at a constant rate while Belgium continues to accelerate and Spain picks up again.

Figure 11 plots the evolution of unemployment. Essentially the spread is wide and static, though Spain's rate has continued to fall from its very high level. The general recovery in the Eurozone, evidenced in the previous two graphs, has not served to reduce unemployment any more than a percentage point since early 1999. Figure 12 plots the evolution of the budget deficits of the Eurozone from 1996. It shows the difficulties Italy has had in achieving the Maastricht criterion (-3% of GDP limit), starting from below -7% in 1996. The spread from 1998 to 1999 has shrunk slightly, as deficit countries have found that the recovery has eased them above the -3% level. The graph, in conjunction with the previous graphs, shows how the slow recovery of 1999, and loose monetary policy of 1999, has generally served EMU well, with Italy being the one country to experience fiscal difficulties.

Assessment

It is obviously early days for the euro and 18 months is not enough time to make clear cut assessments regarding the issue of divergence. Clearly, Ireland is an exceptional case within the Eurozone, causing some overall divergence on the graphs. Undoubtedly, the Irish inflation rate is a cause for concern, and may demonstrate the dangers of inflationary pressures as policy has been tailored to suit an average from which Ireland is an outlier. Spain and Belgium show some danger of inflationary pressures building up. But, the recovery, and the fact that it has been the larger countries, Germany and Italy, that have been at the bottom of their cycle suggest that the jury is still out on fears regarding the deficit levels and general deflationary bias of the single currency. It is hard to believe that, when the roles are reversed, and it is the more peripheral countries, such as Ireland, Finland, and countries such as Spain, that are at the bottom of their cycles, with Germany and Italy at the top of theirs, that monetary policy will be loose. That will be the real test for the Eurozone.

What is clear is that there remains a chronic problem of high unemployment, and also large asymmetries within the Eurozone; there has certainly been no significant trend towards convergence caused by the euro. Business cycles are by no means synchronised, though they do overlap. In terms of OCA theory, countries are likely to receive different shocks as well as being affected differently by shocks. The recent experience has shown that a truly *divergent* state of Eurozone economic cycles persists: few would argue that Germany actually requires the *same* monetary policy as Ireland! Growth has picked up, but there is no evidence that this is any more than a cyclical recovery around the low trend rate of growth. In terms of OCA theory then, it is very clear that the Eurozone is not an OCA, and the euro has not endogenously encouraged the necessary convergence for the Eurozone to become one. Nor has the euro overcome the long standing difficulties of the Eurozone. When the economic conjuncture shifts the euro may well prove to harm them.

CONCLUSION

The US economy has been growing faster than the Eurozone in the past few years, and the general perception of the strength of the US economy relative to the Eurozone economies is likely to have contributed to the strength of the dollar and the weakness of the euro. However, there is no consensus as to just how US strength causes the value of the euro to fall. US strength cannot, of course, explain euro weakness against other currencies such as the yen. We have suggested that the most plausible explanation concerns long term investment flows and (following Gros. et. al., 2000) shorter term post-'euphoria' flows of portfolio investment. This view stresses that the other side of the coin of US strength is Eurozone weakness. Reviewing the recent evidence, it seems clear that the inception of the euro itself, with its restrictive monetarist institutional structures, to an area which is in a divergent *state*, which has recently been widened by a *process* of divergence, is ample reason for long term investors, and, indeed, post-'euphoric', short term speculators, to regard the Eurozone as structurally weaker since January 1999. It is difficult to predict the future course of the euro; once portfolio investors have shifted fully back to their pre-'euphoria' level of holdings of euros, then any number of contingencies may come into play; not least, the possibility of the US bubble bursting. As it stands, the low trend performance of the Eurozone, and high unemployment, is set to continue.

From the perspective established, the evidence and its policy implications provide a very different picture to the majority of the literature. The prevalent stress on the need for 'structural reform' and the existence of asymmetries can be seen as an attempt to express the idea that asymmetries and structural factors undermine the neoliberal institutional structures associated with the euro, as currently implemented. But this attempted expression is hampered by the prejudice towards the efficacy of unfettered markets and so is, ultimately, a failure. The problem with the euro and its associated institutions is not that it diverts attention from, or otherwise hinders, the 'needed labour market reforms'; asymmetries are not merely short run, external 'shocks' to an otherwise smooth tendency towards a general equilibrium. Rather, policy must be enabled to play its vital role in overcoming aggregate demand asymmetries and uneven processes of cumulative causation through co-ordination of fiscal and monetary policy, within a transformed institutional setting. Thus we take the same phrase ('structural reform'), backed up by the same evidence (that is high and divergent unemployment and growth rates) to mean utterly different things with radically opposed policy implications. If the markets are right to see problems with asymmetries and the need for 'structural reform' then they are hopelessly wrong in equating 'structural reform' with something called 'labour market flexibility' (and the like). What is needed is an expanded institutional setting, allowing the co-ordination of fiscal and monetary policy and large-scale regional transfers, guided by an alternative to the stability and growth pact (see Arestis, McCauley and Sawyer, 2000).

REFERENCES

ABN-AMRO Bank. 2000. "Euro Suffers from Capital Outflows." *Euroland Economics Update*, Economics Department, April.

Angeloni, I., and L. Dedola. 1999. "From the ERM to the Euro: New Evidence on Economic and Policy Convergence among EU Countries." ECB Working Paper No. 4.

Arestis, P., K. McCauley, and M. Sawyer. 2000. "An Alternative to the Stability and Growth Pact." Jerome Levy Institute Working Paper No. 296 (revised version forthcoming in the *Cambridge Journal of Economics*).

Arestis, P., and M. Sawyer. 1996. "The Tobin Financial Transactions Tax: Its Potential and Feasibility." *International Papers in Political Economy* 3, no. 3.

Arestis, P., and M. Sawyer. (forthcoming a). *The Euro: Evolution and Prospects*. Aldershot: Edward Elgar Publishing.

Arestis, P., and M. Sawyer. (forthcoming b). "Conditions Surrounding the Launch of the Euro." In Arestis, P., and M. Sawyer (forthcoming a).

Bayoumi, T., and B. Eichengreen. 1993. "Shocking Aspects of European Monetary Unification." In Torres, F., and F. Giavazzi, eds. *Adjustment and Growth in the European Monetary Union*. Cambridge: Cambridge University Press.

Bank for International Settlement. 2000. *International Banking and Financial Market Developments*, (February).

Buiter, W. H. 1999a. "Optimal Currency Areas: Why Does the Exchange Rate Regime Matter?" Sixth Royal Bank of Scotland/Scottish Economic Society Lecture, Royal College of Physicians, Edinburgh, 26 October.

Buiter, W. H. 1999b. "Six Months in the Life of the Euro: What Have We Learnt?" Remarks prepared for a seminar on monetary and budgetary policy in the Economic and Monetary Union, Rabobank, 25 June.

Chinn, M. D. 2000. "The Empirical Determinants of the Euro: Short and Long Run Perspectives." Paper prepared for the Deutsche Bundesbank conference, "Equilibrium Exchange Rates of the Euro", 27-28 March.

Coppel, J., M. Durand, and I. Visco. 2000. "EMU, the Euro and the European Policy Mix." OECD Economics Department Working Papers No. 232.

Corsetti, G. 2000. "A Perspective on the Euro." CESifo forum, Summer.

Corsetti, G., and P. Pesenti. 1999. "Stability, Asymmetry and Discontinuity: The Outset of European Monetary Union." *Brookings Papers on Economic Activity*, December.

Corsetti, G. and P. Pesenti. 2000. "The (Past and) Future of European Currencies." *Cuadernos de Economía*, April.

Deutsche Bank Research. 2000. *Economic and Financial Outlook*, May 15.

Dornbusch, R. 2000. "Euro Troubles." *Euro Homepage*, www.econ.yale.edu/~corsetti/euro/Euroit.htm.

Duisenberg, W. 2000. "ECB Press Conference, Question and Answer Session." Frankfurt am Main, 8 June.

Eichengreen, B. 2000. "The Euro One Year On." *The Journal of Policy Modelling* (forthcoming).

European Central Bank. 1999. "Longer Term Developments and Cyclical Variations in Key Economic Indicators Across Euro Area Countries." *Monthly Bulletin* (July): 33-54.

European Central Bank. 2000. *Monthly Bulletin*, various issues, augmented by data available on the ECB website, <http://www.ecb.int>.

Eurostat: <http://europa.eu.int/eurostat.html>

Favero, C., X. Freixas, T. Persson, and C. Wyplosz. 2000. "One Money, Many Countries." *Monitoring the European Central Bank Volume 2*. London: CEPR.

Feldstein, M. 2000a. "Europe Can't Handle the Euro." *The Wall Street Journal*, 8 Feb.

Feldstein, M. 2000b. "The European Central Bank and the Euro: The First Year." NBER Working Paper no. W7517.

George, E. 2000. "Speech delivered to the Leeds and Bradford Chartered Institute of Bankers and Bradford Chamber of Commerce," 11 April.

Gordon, R. J. 1999. "Has the 'New Economy' Rendered the Productivity Slowdown Obsolete?" <http://faculty-web.at.nwu/economics/gordon/334.pdf>.

Gros, D., O. Davanne, M. Emerson, T. Mayer, G. Tabellini, and N. Thygesen. 2000. "Quo Vadis Euro? The Cost of Muddling Through." Centre for European Policy Studies Macroeconomic Policy Group, Second Report.

Kaldor, N. 1972. "The Irrelevance of Equilibrium Economics." *Economic Journal* 82.

Kaldor, N. 1985. *Economics Without Equilibrium*. Cardiff: University College Cardiff Press.

McCombie, J. S. L. 1999. "Economic Integration, the EMU and European Regional Growth." In Davidson, P., and J. Kregel, eds. *Full Employment and Price Stability in a Global Economy*. Cheltenham, Northampton, Mass.: Edward Elgar Publishing.

Minsky, H. P. 1975. *John Maynard Keynes*. New York: Columbia University Press.

Minsky, H. P. 1978. "The Financial Instability Hypothesis: A Restatement." *Thames Papers in Political Economy*, Autumn.

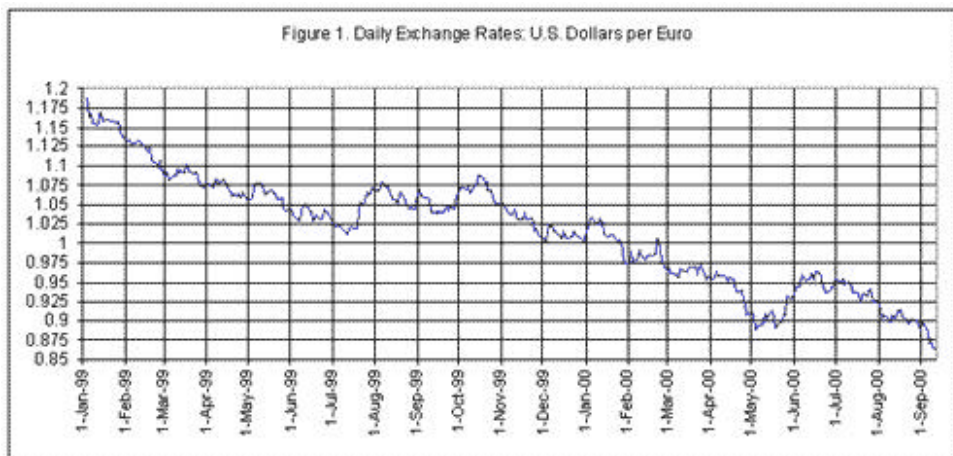
Minsky, H. P. 1982. *Can 'It' Happen Again*. New York: M.E. Sharpe.

Myrdal, G. 1957. *Economic Theory and Underdeveloped Regions*. London: Duckworth.

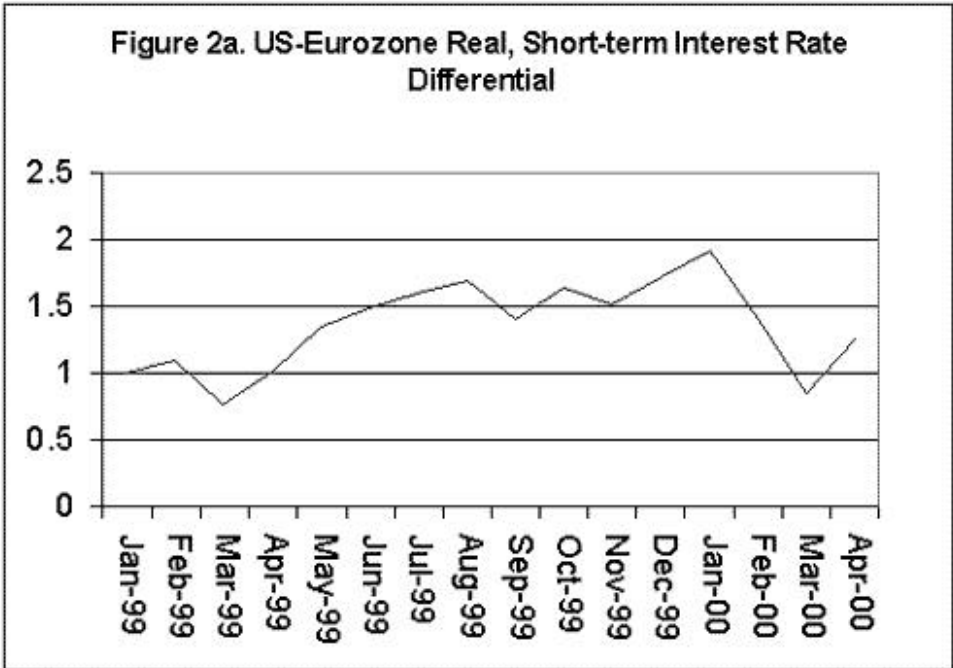
OECD. 2000. *EMU One Year On*. Paris: OECD.

PricewaterhouseCoopers. 2000. *European Economic Outlook*, May.

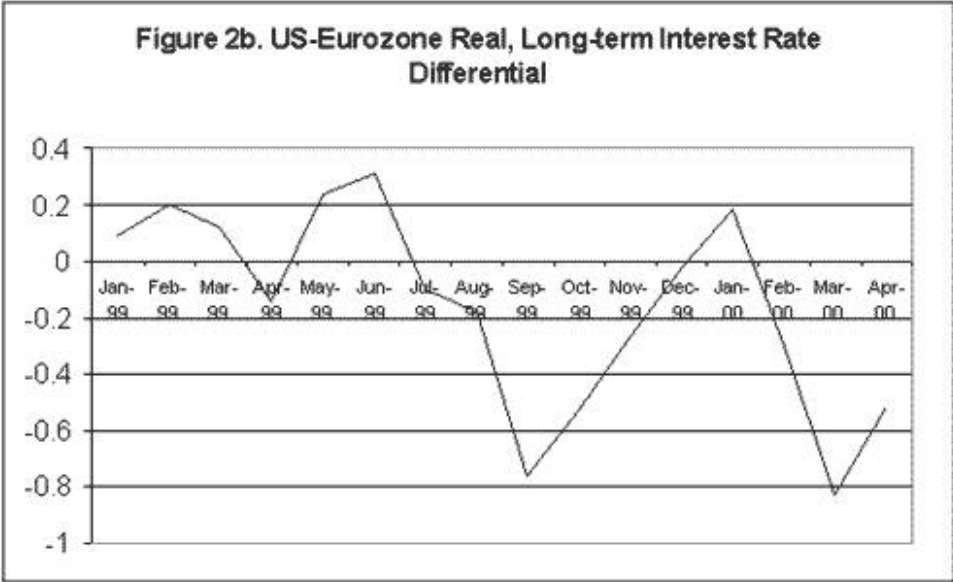
von Hagen, J. 1999. "The First Year of EMU." Mimeo, Centre for European Integration Studies, University of Bonn.



Source: Pacific Exchange Rate Service © 2000 Prof. Werner Antweiler. Time period: 4 Jan 1999-11 Sept 2000.



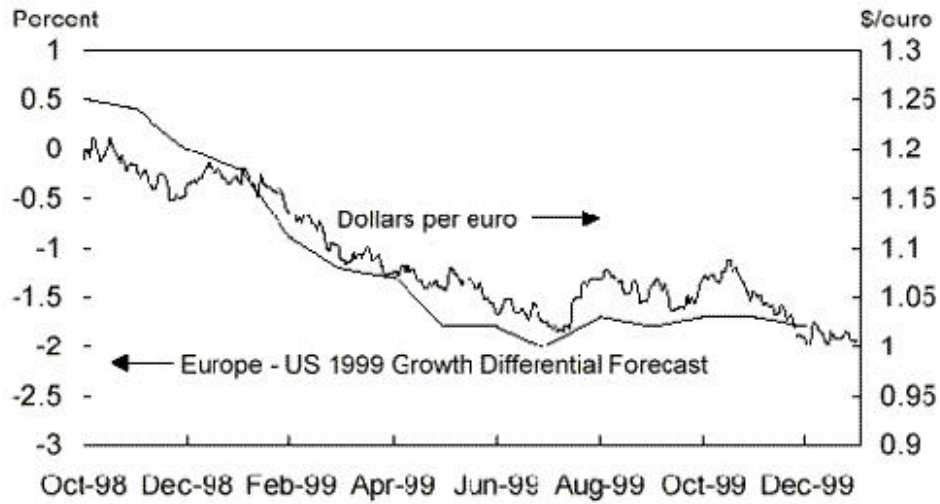
US-Eurozone Real 3-Month Money Market Rate Differential
 Source : ECB (2000)



US-Eurozone Real 10 Year Bond Yield Differential.
 Source : ECB (2000)

Figure 3

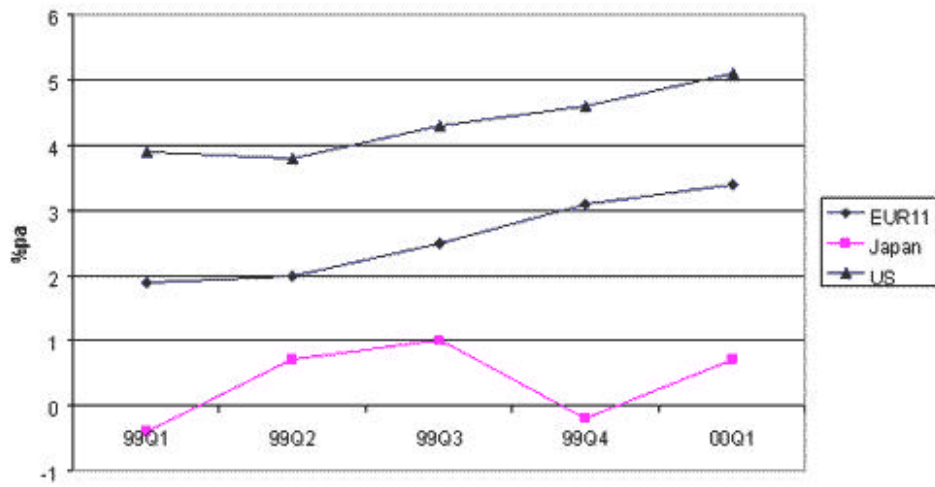
\$/Euro Exchange Rate and Revisions to GDP Growth Forecasts



Data Source: Consensus Economics, European Central Bank.

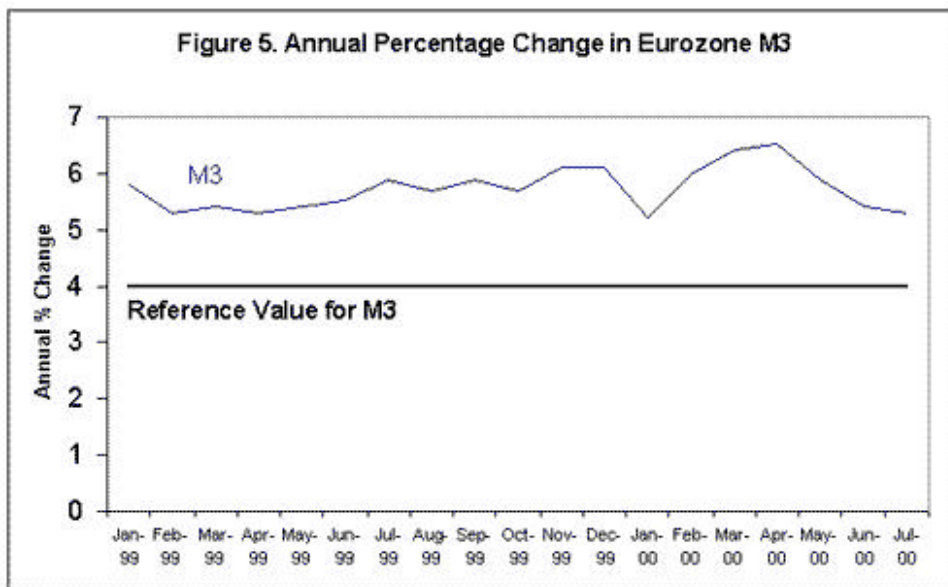
(Reproduced, with permission, from Corsetti, 2000).

Figure 4. Eurozone, US and Japan Growth Rates



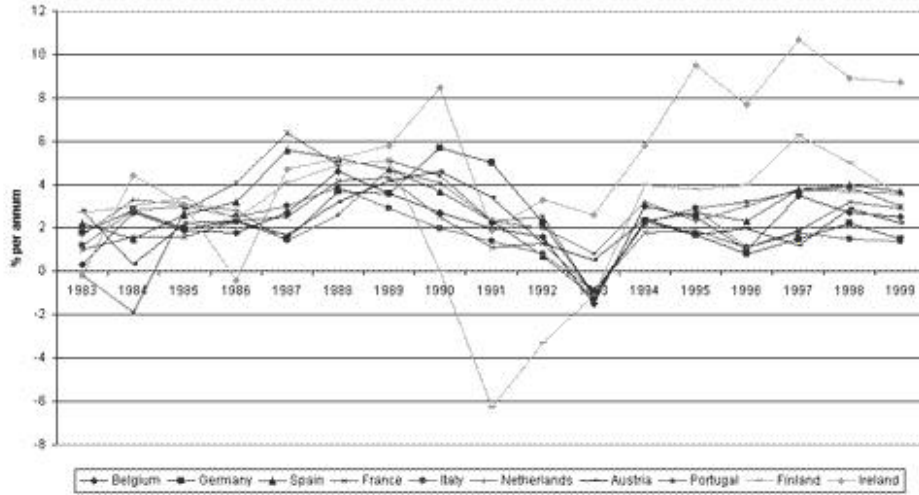
Source : Eurostat

Figure 5. Annual Percentage Change in Eurozone M3



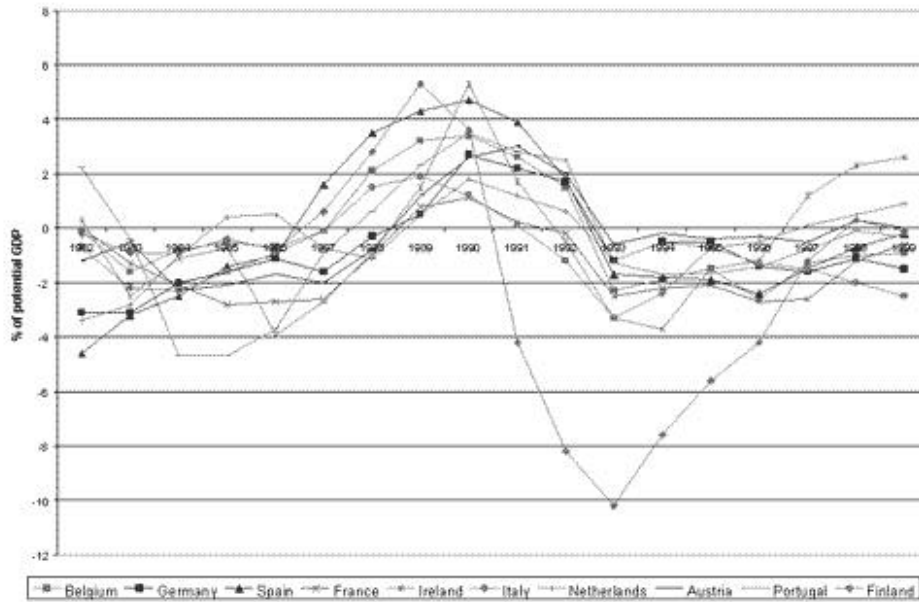
Source : ECB, 2000

Figure 6. Eurozone Annual Growth Rates of GDP



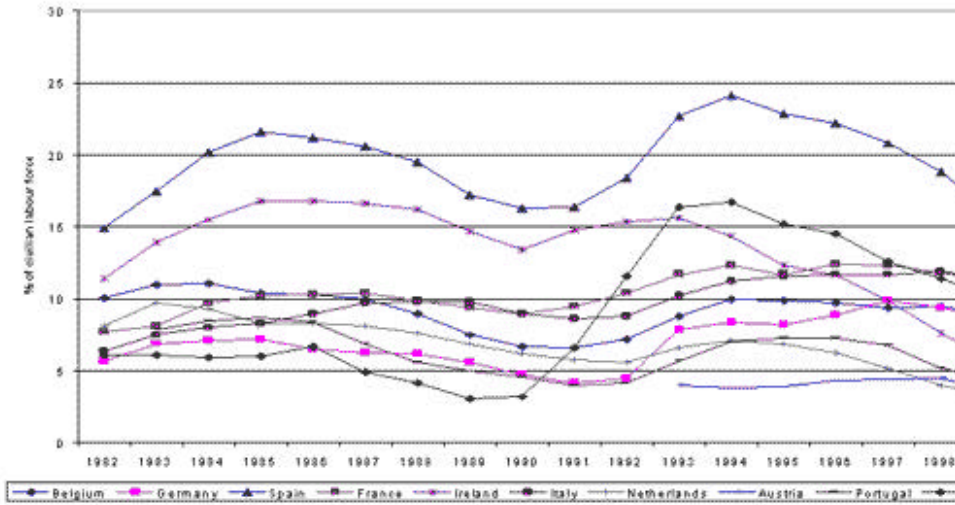
Source : OECD *Economic Outlook* , June 2000.

Figure 7. Eurozone Output Gaps



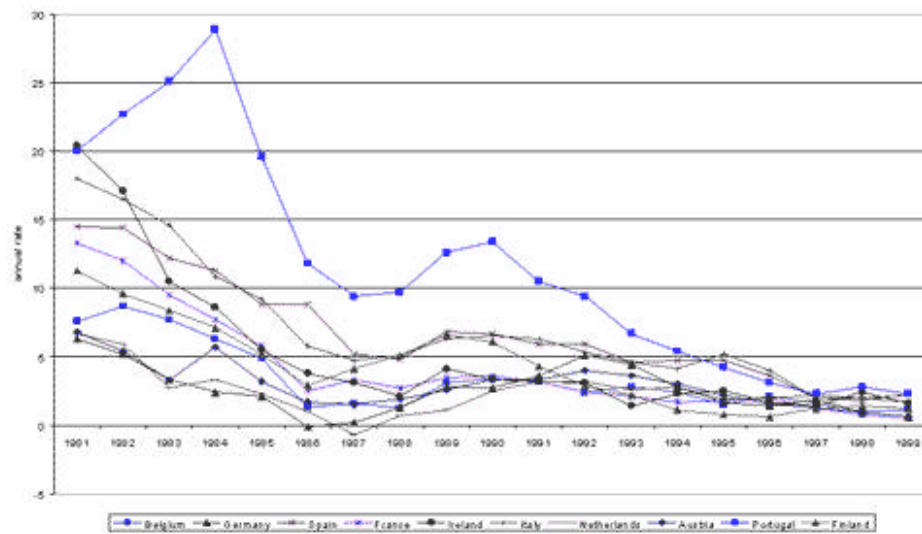
Source : OECD, *Economic Outlook* , June 2000.

Figure 8. Eurozone Unemployment



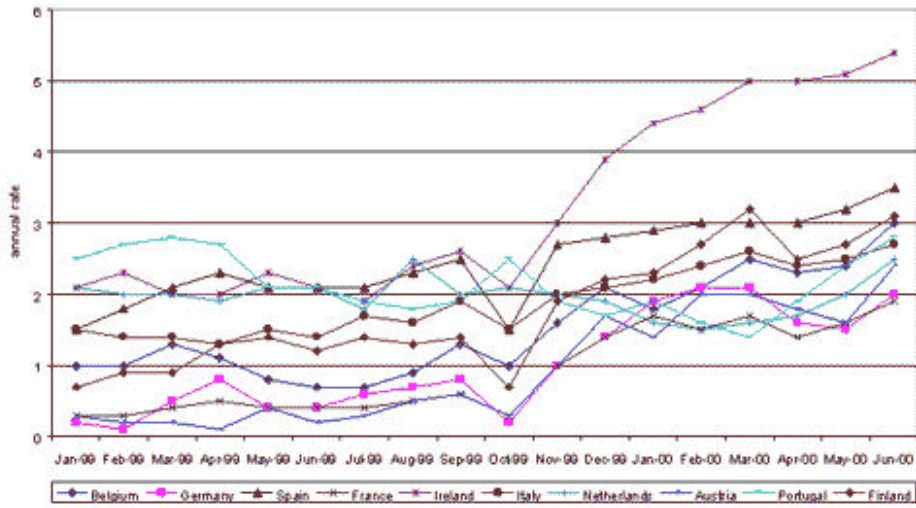
Source : OECD, *Economic Outlook* , June 2000

Figure 9. Eurozone Annual Inflation



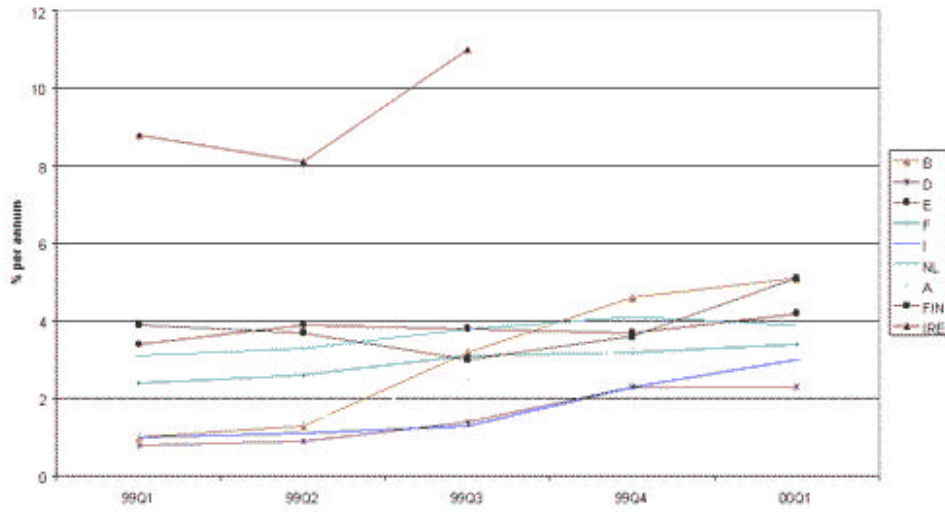
Source : OECD, *Economic Outlook* , June 2000

Figure 9b. Eurozone inflation rates - measured by HICPs



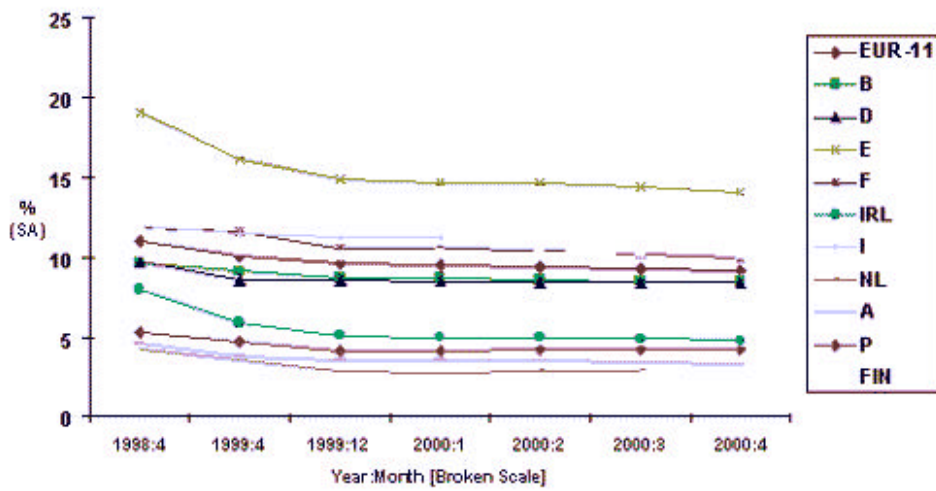
Source : Eurostat

Figure 10. Eurozone GDP Growth



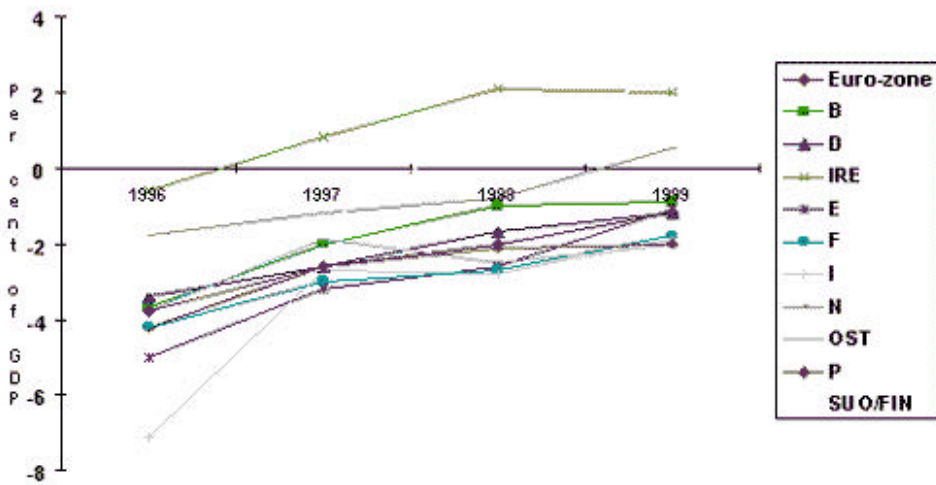
Source : Eurostat; Bank of Ireland

Figure 11. Eurozone unemployment rates



Source : Eurostat

Figure 12. Euro-zone budget surplus/deficit (in national currencies)



Source : Eurostat