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**The Future of the Euro: A Public Choice  
Perspective**

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THE FUTURE OF THE EURO:  
A PUBLIC CHOICE PERSPECTIVE<sup>1</sup>

"The Maastricht Treaty ... has strengthened the Bundesbank's determination to reduce German inflation to very low levels" (1993b).<sup>2</sup>

"A qualified majority of the Council will decide that a qualified majority of the member-countries is fit to enter the third stage. This implies that European Monetary Union will not begin with a hard core of hard currencies" (1993b).<sup>3</sup>

"Any German government which, in early 1998, agreed to join the third stage of EMU according to the currently envisaged timetable, would be committing electoral suicide ..." (1996).<sup>4</sup>

### 1. Introduction and overview

Public choice analysis can be helpful in predicting the course of European monetary integration and policy. The median (or decisive) voter theorem, the theory of the political business cycle and the economic theory of bureaucracy are all applicable. The purpose of this paper is to explain and predict the behaviour of the European Central Bank (ECB) and the Council of Ministers on the basis of the available empirical evidence.

Section 2 relies on the median voter theorem to derive predictions for the inflation rate of the euro. It shows that inflation rates have to be explained by the voters' sensitivity to inflation rather than the independence of central bankers and that the French members of the ECB Council hold the median position in terms of past inflation, voters' sensitivity to inflation and predicted or simulated preferred inflation. However, if the historical real exchange rate change is extrapolated and if failure to agree on an Executive Board is considered a possibility, the Belgian member of the ECB Council is the inflation median.

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<sup>1</sup> Computational assistance from Ingrid Eitel, Bernhard Reichert and, most of all, Christian Teubner is gratefully acknowledged.

<sup>2</sup> Vaubel (1993b, p. 108).

<sup>3</sup> Vaubel (1993b, p. 111).

<sup>4</sup> Vaubel (1996, p. 18). However, I have to admit that I have always, as in this case, regarded political suicide as unlikely. It is an anomaly but it does occur.

Section 3 shows that there is a high probability of a political business cycle occurring between May 2002 and June 2004, probably with a peak in May 2003 or December 2002.

Section 4 argues that the euro's long-run effect on employment is ambiguous and cannot be predicted. However, European Monetary Union (EMU) is likely to have the largest negative, or smallest positive, effect on employment in Finland, Spain and Italy.

Section 5 presents evidence on whether an exchange rate policy for the euro is needed. It shows that, between the euro-zone and the U.S. dollar, nominal exchange rate trends are increasingly in line with the required real exchange rate adjustments. In the more recent past, exchange rate flexibility has outperformed the Bretton Woods system in this respect.

Section 6 considers the possibility of enlarging the European Monetary Union by the current members of the European Union (EU) and by Eastern European countries. The evidence presented indicates that, of all 15 EU members, Britain is the least suitable EMU member in terms of real exchange rate adjustment and that British entry could induce the ECB to raise the cost of reserve requirements. Since any qualified majority in the European Council must include the country which holds the median position in the ECB Council, any enlargement shifting the ECB median would require some form of compensation. If France occupies the ECB median, it is not interested in admitting the U.K. Most of the Eastern European countries are shown to require very large real exchange rate adjustments. For them, the cost of joining EMU would be very large. Only Hungary has the predicted exchange rate regime.

The last section derives the size and composition of EMU central bank staff from a labour demand equation estimated for 21 industrial countries. It shows that the European System of Central Banks (ESCB), notably the French, Belgian, and Italian central banks, are highly overstaffed by international standards. Estimates of the required staff of the ESCB and the ECB are derived from international comparisons.

## 2. Inflation

Monetary policy for the euro is determined by a simple majority of the Governing Council of the European Central Bank. Thus, the inflation rate of the euro will reflect the preference of the median ECB Council member (unless logrolling plays an important role.)

To determine the median, the (relative) inflation preferences of the various ECB Council members have to be known.<sup>5</sup>

## 2.1. Quantitative analysis

The simplest and crudest method of predicting relative inflation preferences is to extrapolate past inflation rates. This method is justified if the following assumptions apply:

- (i) Central bankers are appointed or proposed by the government of their home country because they share the long-run inflation preference of that government.
- (ii) The governments of the member states are elected because they share the long-run inflation preference of the median voter of their country.
- (iii) The long-run inflation rate preferred by the median voter in each country has not changed.

Various stability tests (Collins, Giavazzi 1993; Hayo 1998a) show that, up to 1993, the third assumption cannot be rejected for any of the participating countries.<sup>6</sup> Even if inflation preferences have changed since 1993, the following analysis might be indicative of the relative positions of the national representatives. Alternatively, it could be interpreted not as a prediction but as an illustrative simulation of what would have happened if EMU had been introduced after the breakdown of the Bretton Woods system.

Table 1 reports the national compound average inflation rates since 1976. 1976 is the initial year because the Bretton Woods system finally collapsed in 1973 and because monetary policy affects inflation with a lag of about two years. Since monetary expansion may have been biased downwards by the need to meet the inflation criterion of the Maastricht Treaty

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<sup>5</sup> See also the median-voter simulation of de Grauwe, Dewachter and Aksoy (1999). They derive desired values for the monetary instrument from hypothetical Keynesian loss functions, estimated trade-offs between the target variables (output, inflation and instrument smoothing) and historical output shock structures (1979-94). They report that, if both output shocks and preferences differ among the participating countries and if each member of the ECB Governing Council represents the interests of her home country, the transition to a common monetary policy creates the largest discrepancies between the decided and the desired value of the monetary instrument for Italy, Portugal, Ireland and Finland, i.e., the peripheral member states (Table 10).

<sup>6</sup> In both studies, opinion poll data about the evaluation of economic or, more precisely, inflation performance are regressed on inflation. There is not a single country for which all four tests indicate a significant structural break (let alone, at the same moment in time). The results of Collins and Giavazzi for the period 1974-90 show that, at conventional levels, the aversion to inflation increased significantly in the U.K. and Denmark but not in the EMU countries (e.g., France, Italy, Belgium, the Netherlands and Ireland) and that it significantly decreased in Germany (in 1986). Hayo's three tests for 1976-93 (Table 2.14) show a significant increase of the sensitivity to inflation in the Netherlands and Luxembourg whose inflation rates are far below the ECB median anyway. However, according to Hayo's recursive regressions, there seems to have been some (insignificant) increase of the sensitivity to inflation in seven EMU countries - least of all in France.

(December 1991)<sup>7</sup>, the base period used for prediction should probably not extend beyond 1993.

The first column indicates the current distribution of ECB votes. Each member of the Executive Board is assumed to share and represent the inflation preferences of the government which has proposed her. The two small countries which have representatives on the Executive Board are unlikely to keep these seats but, as we shall see, this is unlikely to affect the median.

Table 1 shows that, regardless of whether the base period ends in 1993 or 1998, the French inflation rate occupies the median position in the ECB Council. In 1976-93, it amounted to 6.7 per cent per annum which is somewhat less than the ECB-weighted average (7.0 per cent). The French ECB members also hold the median if, for the other participating countries, the French inflation rate is adjusted by their historical real exchange rate change vis-à-vis France. Eight representatives have experienced (preferred) a higher inflation rate, and seven a lower inflation rate, than monetary union with a French median would have implied. The highest national inflation rate would have been 7.8 per cent (in Spain and Ireland), the lowest 5.5 per cent (in Finland).

The underlying assumption that the historical long-run inflation rates have actually been preferred by the national electorates, might as well be tested. The voters' sensitivity to inflation has been estimated by Hayo (1998a, b) for the twelve member states of 1993. It is indicated by the regression coefficient with which the current inflation rate affects the rank of price stability among four objectives.<sup>8</sup> Table 2, column 1, reports the sensitivity to inflation for nine of the eleven EMU countries. For Austria and Finland, survey data are not available before 1995 - the year in which they joined the European Union. Among the nine countries, once more, France holds the median position in the ECB Council. The same is true if, on the basis of past inflation (Table 1), the French sensitivity to inflation is assumed to be higher than the Finnish but lower than the Austrian.

Alternatively, the inflation aversion of monetary policy makers (the weight of the price stability target in the loss function) has been estimated from policy reaction functions by Lippi

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<sup>7</sup> At least, this is the impression conveyed by fiscal policy in 1998. As the International Monetary Fund, the European Commission and the European Central Bank have noted, fiscal consolidation in the euro-zone has virtually come to an end despite the temporary economic upswing in 1998.

<sup>8</sup> The other objectives are public order, democracy and freedom of speech. The survey results are regularly reported by Eurobarometer (so-called Ingleheart index). The dependent variable is set at 1 if price stability is ranked first or second. Otherwise it is zero. The regression has been run over the period 1976-93 for each country except Greece (1980-93), Portugal and Spain (1985-93). I use Hayo's OLS estimates ( $\beta_{12}$  in Table 4 of Hayo, 1998b) because his RALS and SURE estimates show these coefficients to be robust. In the unlikely event that exogenous changes in the rank of price stability negatively affected the actual rate of inflation within the same year (reverse causation), Hayo's regression coefficient would be biased downwards.

and Swank (1999, Ch. 8, notably Table 8.2). Their estimates for 1965-92 (Table 2, column 2) confirm the view that France occupies the median position in the ECB Council. The correlation between Hayo's estimate of the voters' sensitivity to inflation and the inflation aversion of policy makers as estimated by Lippi and Swank is positive and significant at the 1 per cent level ( $r=0.91$ ,  $n=9$ ).

To what extent does the voters' sensitivity to inflation explain the historical inflation experience? Table 3 reports a cross-section regression of actual inflation (1976-93) on Hayo's estimate of the voters' sensitivity to inflation. The best fit is provided by a constant elasticity specification. As expected, the regression coefficient is negative and significant at the 1 per cent level. The national sensitivity to inflation explains 85 per cent of the cross-sectional inflation variance. Table 2, column 3, reports the predicted inflation rates. Among nine countries, the inflation rate predicted for France (5.8 per cent) is the median in the ECB Council (without the Austrian and Finnish members). The same is true if, for Austria and Finland, the actual inflation rates are inserted. Equation 1 can be used to infer the Austrian and Finnish sensitivity to inflation from their historical inflation rates (see Table 2, column 1, in parentheses).

So far the analysis has assumed, for the sake of simplicity, that inflation depends only on the voters' sensitivity to inflation or that all other influences are randomly distributed. It has totally ignored the impressive body of evidence that inflation is also (negatively) affected by central bank independence (I). However, central bank independence may merely reflect the voters' sensitivity to inflation. Regressing central bank independence (an average of seven indices<sup>9</sup>) on the sensitivity to inflation,<sup>10</sup> we obtain the following estimate:

$$\ln I = -0.008 + 0.473 \ln S \quad R^2 = 0.74$$

$$(-0.08) \quad (5.06^*) \quad n = 11$$

As expected, the two variables are closely correlated. The sensitivity to inflation retains its significant regression coefficient ( $t=3.52^*$ ), if it is combined with a dummy for universal banking, the interest group variable used by Posen (1993a, b).<sup>11</sup> If the sensitivity to inflation is not in turn affected by the independence of the central bank, we can use the above equation to

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<sup>9</sup> The average has been computed by Masciandaro and Spinelli (1993) from the indices of Banaian, Laney, Willett (1983), Bade, Parkin (1985), Alesina, Summers (1990), Burdekin, Willett (1990), Grilli, Masciandaro, Tabellini (1991), Cukierman (1991) and Eijffinger, Schaling (1992). To facilitate the calculation, this average of indices has been rebased so that its value for Germany is equal to e. See Table 2, column 4.

<sup>10</sup> Since the Irish Punt, before being linked to the D-Mark in 1979, was pegged to the Pound Sterling, the Irish inflation rate has not been affected by the independence of the Bank of Ireland. In this sample and in equations 5-10 (Table 3), therefore, the Bank of Ireland is replaced by the Bank of England.

explain and predict central bank independence (Table 2, column 5). It turns out that, in the U.K. and Finland, the central bank is much more independent than we should expect from the sensitivity to inflation and that, in Luxembourg and Spain, the opposite is the case.

While central bank independence can be explained by the sensitivity to inflation, the latter seems to largely determined by the experience of hyperinflation in the past:

$$S_{i,t} = 1.57 + 0.069 \pi_{i,t-n} \quad R^2 = 0.66$$

(4.55\*)    (4.22\*)            n = 11

where  $\pi_{t-n}$  is the (compound) annual average rate of inflation between 1900 and 1940 (Maddison 1991, Mitchell 1992).

Table 3 demonstrates that central bank independence has a less significant (negative) effect on inflation than the sensitivity to inflation does (equations 1 and 2)<sup>12</sup> and that, if both are used as regressors, the coefficient of central bank independence is no longer significant (equation 4).

However, the conventional approach of explaining inflation by central bank independence is conceptually flawed anyway. Central bank independence can hardly affect the long-term inflation rate if the government has fixed the exchange rate vis-à-vis a dominant currency. Thus, to explain inflation in a European cross-section analysis, central bank independence (or its unexplained component<sup>13</sup>) has to be weighted by the proportion of time during which the currency was not pegged to the D-Mark (1-f). The proportion of time during which the currency was pegged (f) is reported in Table 2, column 6.

Table 3, equation 5, shows that central bank independence under a regime of flexible exchange rates does not have a significant effect on inflation if it is combined with the sensitivity to inflation. The coefficient of the independence variable does not even take the predicted sign.

However, equation 5 is still incomplete because it does not account for the effect of exchange-rate pegging (f) itself. Pegging may be regarded as a proxy for the competitive or disciplinary pressure from the Bundesbank which now has disappeared. Since the independence of the Bundesbank is normalised to e,  $\ln e^f = f$  can be interpreted as the natural

<sup>11</sup> The dummy for universal banking takes a positive but insignificant coefficient. The same is true for Posen's measure of political instability. Posen's results are also questioned by de Haan, van't Hag (1995).

<sup>12</sup> Hayo (1998b, Table 7) obtains the same result by computing rank correlation coefficients. His Spearman rank correlation coefficient is -0.91 for the sensitivity to inflation but only -.72 for the best-fitting index of central bank independence. In line with the conventional approach, equations 2-4 in Table 3 explain Irish inflation by Irish central bank independence.

<sup>13</sup> In this context, simultaneous equation estimation might be considered but it is not required for our purpose, which is forecasting.

logarithm of the independence index of the Bundesbank exponentially weighted with the proportion of time during which the country pegged to the D-Mark. Thus, apart from the effect of the sensitivity to inflation, inflation is explained by a combination of central bank independence at home and in Germany, with  $1-f$  and  $f$  serving as exponential weights. Table 3, equation 6, reveals that neither central bank independence at home nor pegging to the D-Mark has a significant effect on inflation if the sensitivity to inflation is included as a regressor.<sup>14</sup>

Central bank independence and pegging also fail to explain inflation if, in addition, the ratio of imports to GDP is included (equations 8-10). The theoretical justification for including this variable is that, with a higher import / GDP ratio, an unanticipated monetary expansion or devaluation has a faster effect on the price level because a larger share of the consumer basket is affected by the depreciation of the currency. As a result, voters are more likely to understand the monetary causes of inflation and object to an inflationary monetary policy (H.G. Johnson 1970, p. 105; D. Romer 1993). Equations 8-10 in Table 3 reveal that the import / GDP ratio does indeed reduce inflation significantly.<sup>15</sup> The members of the ECB Council are confronted with a less open currency area than the national central banks have been. Insofar, they are likely to tolerate a higher rate of inflation.

It is now possible to simulate the long-term inflation rates which the various members of the ECB Council would have preferred, if they had been as independent as the Bundesbank and if their currency had not been pegged to a currency like the D-Mark. The preferred long-term inflation rates are computed from equations 6 and 8, setting  $f=0$  and  $\ln I^{1-f} = \ln e^1 = 1$ . As columns 7 and 8 of Table 2 show, the French members keep their median position in the ECB Council regardless of the equation used if monetary union is assumed to imply that the participating states share a common inflation rate. If the historical real exchange rate change is extrapolated, the Spanish members of the ECB Council hold the median, and the simulated inflation rates rise (Table 2, columns 9 and 10). However, the simulated Spanish inflation rates (7.1 and 10.0 per cent, respectively) are still lower than the actual Spanish inflation rate

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<sup>14</sup> The insignificant effect of  $f$  is not due to significant collinearity with the sensitivity to inflation:  $r(f, \ln S) = 0.30$ .

<sup>15</sup> This result is also obtained by Campillo, Miron (1998) and Iversen (1999).

If we distinguish fixed and flexible exchange rate regimes as we have done in the case of central bank independence, the import / GDP ratio can be shown to have a larger effect under flexible exchange rates but the regression coefficients are merely significant at the 10 per cent level and  $R^2$  adj. is virtually unchanged. Simulation with this equation would yield higher inflation rates than equations 6 or 8 do.

Some further control variables (the budget deficit / GDP ratio, the unemployment rate, union density ) have been tried as suggested by Oatley (1999) but they did not have a significant effect on inflation or the regression coefficients of the other explanatory variables.



in this period. The weighted average of the preferred inflation rates falls if equation 6 is used, and it rises if equation 8 is used. Thus, with regard to inflation preferences, the increase in central bank independence outweighs the loss of disciplinary pressure from the Bundesbank<sup>16</sup> but the fact that the import / GDP ratio is smaller for the EMU than for the individual participating states shifts the balance towards higher preferred inflation.

## 2.2. Complications

In simulating the inflation rate of the euro, we have made a number of simplifying assumptions which have to be discussed.

First of all, is the European Central Bank as independent as the Bundesbank has been? On the one hand, the ECB is more independent because amendments of the EC Treaty require the assent of 15 parliaments (each voting by simple majority) while the Bundesbank Law may be amended by a single parliament (also with a simple majority). On the other hand, the individual members of the ECB Governing Council enjoy less personal independence. The members of the German Central Bank Council have always been reappointed (after eight years) if they wished so and if their age permitted. This is not prescribed by the Bundesbank Law but a tradition which has evolved over the years. By contrast, as Table 4 shows, eight of the eleven national Governors in the ECB Council depend on their government for reappointment (usually after five or six years). At least six of the current Governors are young enough to be reappointable.<sup>17</sup>

The members of the Executive Board, it is true, may not be reappointed but they may need career assistance from their government when their term is over and they return to their home country. As Table 4 demonstrates, the French and Spanish members of the Executive Board will not have reached the retirement age when their term of office ends.

Moreover, the European Central Bank would enjoy less policy autonomy than the Bundesbank has, if the Council of Ministers adopted an exchange rate target for the euro. In 1979, the Bundesbank obtained permission to abandon interventions in the exchange market whenever it might see a threat to price-level stability. It made use of this right in August 1993. The ECB does not seem to be entitled to take such a decision.

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<sup>16</sup> This result was also reached by Vaubel (1994) in a different analysis.

<sup>17</sup> These are the Governors from Belgium, Finland, France, Luxembourg, the Netherlands and Portugal. The Italian Governor is appointed "for life" (i.e., up to the retirement age). The Spanish Governor may not be reappointed.

Even if the overall independence of the ECB were considered comparable to the former independence of the Bundesbank, the sources of central bank (in)dependence would have changed. Graph 1 shows how this affects the objective function of central bankers. Central bankers follow their own judgement, public opinion or the government (or a combination thereof). Popularity serves to maintain the central bank's policy autonomy and secure reappointment or career assistance. Autonomy is a means for attaining macroeconomic targets, political aims or the utility of personal power and prestige.

Relative to the Bundesbank, the policy autonomy of the European Central Bank is less threatened by amendments of its legal statute. Thus, it is less likely to seek the support of public opinion - the more so as a European public opinion does not exist. The main threat to the policy autonomy of the ECB is the possibility of an exchange rate target vis-à-vis the dollar. However, the introduction of a parity system requires a unanimous decision by the Council of Ministers (Art. 111 (1)). This means that the European Central Bank can focus on public opinion in one or a few participating countries which have a tradition of distrusting any pegging to the dollar (Germany, the U.K. etc.). Thus, the threat to policy autonomy and the cost of preserving it will be smaller for the European Central Bank than for the Bundesbank.

Since the members of the ECB Council enjoy more security of policy autonomy but less security of tenure, government objectives will matter more, and public opinion less, in European than in German monetary policy. To this extent, the individual members of the ECB Council will pay more attention to the ideology of their government<sup>18</sup> and to the election cycle at home. Political business cycles are likely to raise the long run average rate of inflation.<sup>19</sup>

As for government ideology, seven of the eleven participating states have socialist-led governments but no more than six of the seventeen members of the ECB Council may be associated with socialist parties (Table 4). Among the governors, the reasons for this discrepancy differ from country to country. But why are five of the six executive directors conservatives even though the Executive Board had to be appointed unanimously?<sup>20</sup> Have the governments tried to offset a time inconsistency bias by appointing conservative central bankers as Rogoff (1985) has proposed?

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<sup>18</sup> Note that the prediction of the long-run rate of inflation has ignored ideological or partisan effects. This is innocuous if the partisan composition of governments in 1974-93 can be regarded as representative for the future.

<sup>19</sup> According to Posen (1998), this effect is positive but not statistically significant at conventional levels.

<sup>20</sup> They are political conservatives, not necessarily monetary conservatives. Another interesting feature is the assignment of functions to the individual members of the Executive Board. While the German government claimed the Directorates for Economics and Research, the French member obtained control over Administration,

There is an alternative explanation. If the European Council had been unable to agree on the members of the Executive Board, there would have been no monetary union.<sup>21</sup> The government which had most to lose (or least to gain) from EMU had a strong bargaining position. This was the German government, a conservative-liberal coalition government. It had most to lose because the German central bank had played a leading role under the previous regime, German inflation preferences are most deviant from the median (Table 2, column 1), Germany would be the main loser of seigniorage (Table 4), monetary union was rejected by an overwhelming majority of German voters, and a national election was imminent.

Future German governments will not have a strong bargaining position when new members of the Executive Board are selected. EMU will not break up if the Executive Board is incomplete or has ceased to exist. If there is no Executive Board, a simple majority of the national Governors will decide about monetary policy for the euro. With this fallback position, the government which (most nearly) shares the preferences of the median Governor will dominate the selection of new executive directors (if any). The other governments will concur if they prefer to have an Executive Board for reputational reasons. If the preferred long-run inflation rate is all that matters, we should expect that, in the future, all newly appointed members of the Executive Board share the inflation preference of the median Governor or that they are selected two or more at a time and in such a way that the median is not affected. For example, even though small countries like Finland and the Netherlands will not have permanent seats on the Executive Board, the inflation preferences of the executive directors from small countries are likely to deviate in opposite directions from the median inflation preference among the Governors.<sup>22</sup> This calculus has also important implications for the admission of new member countries to the monetary union (section 6).

Tables 1 and 2 reveal that the French Governor occupies the median position among the eleven Governors in terms of inflation (1976-93 and 1976-98), voters' sensitivity to inflation and predicted or simulated preferred inflation regardless of whether equation 1, 6 or 8 is

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Personnel and Legal Services. While Germans believe in the power of ideas and craftsmanship, the French approach puts more emphasis on personal relationships (networks) and the strategic use of legal procedures.

<sup>21</sup> It is hard to believe that the Governing Council could have operated without an ECB President and Executive Board. But even if so, the dissatisfied governments (Germany?) could have vetoed all later decisions, e.g., on the conversion rates, without which monetary union could not have started.

Berthold et al. (1998) even suggest that EMU is still fragile as long as the national currencies continue to circulate.

<sup>22</sup> If the Executive Board gradually shrinks, the median Governor and the government agreeing with her, may temporarily lose the median position. The vetoing government has to discount this temporary loss.

used.<sup>23</sup> However, after adjustment for real exchange rate change, the Belgian Governor is the median among the Governors (Table 2, column 11).

Germany's strong bargaining position in 1998 may also explain that, in November 1998, the ECB Council decided to postpone the redistribution of seigniorage for three years even though Italy, which occupies the ECB median in this respect, will benefit from the redistribution of seigniorage wealth (see Table 4 which is calculated from Sinn, Feist 1997).

To conclude the analysis of this section, a reminder seems to be in order. The predicted level of inflation is merely the mid-point of a confidence interval (which could easily be computed). Moreover, if inflation preferences in the median country had changed since 1993 or if they changed in the future under the influence of an independent ECB, inflation in the next 15-20 years could be much lower than predicted. However, the current overture to the game is probably not a good guide to the future.

How soon will the ECB Council be tested? We turn from the long to the short run.

### 3. An electoral monetary policy cycle?

In the short run, monetary policy for the euro may be affected by the national electoral cycles of the participating states. To the extent to which the election dates differ, electoral monetary-policy cycles are less likely for the European Central Bank than they have been for the national central banks.<sup>24</sup> However, since the ECB Council pays less attention to public opinion and more to the demands of governments (section 2), there is an offsetting effect.

Electoral monetary-policy cycles have been observed in many countries, including those which are generally considered to have independent central banks (e.g., Soh 1986, Table 5). This is to be expected when central bankers have partisan preferences. They may be independent but, nevertheless, loyal to the politicians who have appointed them and whose partisan preferences they share. The "party loyalty hypothesis" has successfully been tested for both Germany and the United States (Vaubel 1993a, 1997a, b; McGregor 1996). Of course, the hypothesis predicts a monetary acceleration before elections only if the government commands a partisan majority in the central bank council.

To apply the party loyalty hypothesis to the European Central Bank, it is necessary to examine the temporal distribution of the national election dates, the party composition of the

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<sup>23</sup> This may not be true for the present Governor of the Banque de France who is considered a monetary hardliner. However, his appointment in 1993 may have been part of the initial bargaining game.

<sup>24</sup> Williamson (1975) was probably the first to point this out.

incumbent governments and the partisan leanings of the ECB Council members. Usually, the partisan orientation, if any, of central bankers can be inferred from information about who appointed them. Table 5 contains all the relevant information.<sup>25</sup> It shows that, with the exception of the Irish, the Dutch and the Spanish Governor, the German executive director and possibly the Finnish executive director and the two French members, all ECB Council members are likely to support the incumbent politicians at home when the date of the next national election approaches.<sup>26</sup>

Table 6 reveals a clustering of election dates in 2002-04: in ten of the eleven participating states, national elections are due between May 2002 and June 2004. In most of these states, it is true, early elections may be called<sup>27</sup> but, in view of this cluster, they are not likely to be called before May 2002 - with the possible exception of the French parliamentary elections which may be advanced by the French President.

Will the ten governments command a majority in the ECB Council? The answer depends on the outcome of some elections in 1999 and on EMU membership. The following illustrative analysis is based on the following modest "stationarity" assumptions:

- (i) The Socialist government in Portugal will be reelected in October 1999.
- (ii) The Conservative (People's) Party will remain in the Austrian government coalition after December 1999.
- (iii) EMU membership will not change very soon<sup>28</sup>

Table 6 shows the size and composition of the minimum coalitions in the ECB Council one year ahead of the elections, the weighted average of the regular election dates in their countries and the weighted standard deviation around this mean. The countries' supporting votes in the ECB Council serve as weights proxying their bargaining power. As expected, the ECB coalition which minimises the dispersion of election dates up to 2006 consists of central bankers whose governments stand for re-election between May 2002 and June 2004: the Netherlands, Ireland, Germany, Finland, Belgium, Portugal, Austria, Spain and

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<sup>25</sup> The governments and central bankers are coded as social democratic or socialist (S), Christian democratic or conservative (C) or liberal (L). If parties of the same code are in government (g) and in opposition (o), subscripts are used to distinguish them. In the case of coalition governments or cohabitation, the first letter indicates the party of the prime minister.

<sup>26</sup> In France, the next parliamentary and presidential elections are both due in May 2002. If there is an early parliamentary election before that date and if the "bourgeois" parties win, the two French members are likely to favour a monetary acceleration in 2001. If not, their behaviour depends on whether the government or the President is more likely to be credited with a boom.

There may be doubts about the "loyalty" of the Italian central bank governor but they do not affect the results.  
<sup>27</sup> Early elections have been the rule rather than the exception in Belgium, Ireland, Italy, Portugal and Spain, and they have been frequent in the Netherlands (Vaubel 1994).

<sup>28</sup> The outcome of the analysis presupposes that membership does not change before May 2002.

Luxembourg.<sup>29</sup> The weighted average of the election dates preferred by the coalition is May 2003, i.e., the 53<sup>rd</sup> month of the monetary union. This is also true if the Spanish government is re-elected in April 2000 and appoints a supportive Governor in June 2000 so that Luxembourg is no longer needed for the coalition. Of course, the later election dates may be advanced towards this date, thereby shifting the average to an earlier date. Alternatively, if France joins the coalition, Spain and Luxembourg are redundant, and the peak shifts forward to December 2002. In any case, it is very likely that the ten governments standing for re-election between May 2002 and June 2004 will command a majority in the ECB Council between May 2001 and June 2003.

If, for some unforeseen reason, an electoral monetary policy cycle does not materialise, the incumbent governments are likely to resort to expansionary fiscal policies. The German government has already threatened to do so. According to the "Pact for Stability and Growth", the imposition of sanctions requires a qualified majority decision of the Council of Ministers (excluding the government under consideration). Thus, it may be even easier to assemble a minority coalition blocking a verdict and sanctions in the Council of Ministers than to form a majority coalition in the ECB Council.<sup>30</sup> However, the incumbent governments are likely to prefer a monetary stimulus to a fiscal stimulus because the monetary stimulus would not implicate them directly. In any case, there is a high probability that the participating states will experience a boom between May 2002 and June 2004.

#### 4. Unemployment

Some authors have suggested that the euro will reduce unemployment. However, there are several effects which partly offset each other:

- (i) During the transition (in 1999-2001), additional manpower is required to adapt computer software, vending machines, price lists etc.

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<sup>29</sup> These incumbent governments will be supported by the central bank governors of Ireland (newly appointed in May 2001), Germany (newly appointed in September 1999), Finland, Belgium, Portugal, Austria, Luxembourg and the Executive Board members from the Netherlands and Spain.

Note that the last coalition in Table 5 does not include a Dutch member of the ECB Council because the present supportive Dutch member has effectively announced his resignation for 2002 (as a condition for being appointed). As several legal scholars have pointed out, this was in breach of Art. 50 of the ECB Statute which states that "the President of the Executive Board shall be appointed for eight years".

<sup>30</sup> The process of coalition building in the Council of Ministers could be analyzed on similar lines. But it is not obvious that the composition of these blocking coalitions would mainly depend on the sequence of election dates. Logrolling would be likely to occur.

- (ii) Banks and other firms will reduce staff in their foreign-exchange departments. Instead of these services, other products will be demanded by consumers and industry. But these products are likely to be less labour-intensive than the banking services which they substitute. To that extent, the demand for labour will decrease.
- (iii) As the cost of money changing, exchange-rate information, exchange-rate risk and exchange-control risk disappear among the participating countries, competition and the demand for output and labour tend to increase. For most transactions, however, these costs seem to be very small (probably less than 1 per cent<sup>31</sup>).
- (iv) The European Central Bank does not and cannot have the same reputation as the Bundesbank. Notably at times of pressure, the expected inflation rate will be higher for the euro than it would have been for the D-Mark and the currencies traditionally linked to it. If the ECB tries to establish a reputation, the actual inflation rate will have to be lower than the expected inflation rate, prices, wages and interest rates will be too high, and unemployment will be larger than otherwise. At the same time, the high level of unemployment undermines the credibility of the ECB.

This list is, of course, not exhaustive. Monetary union may also affect employment in indirect ways, for example, by inducing changes in wage setting behaviour or fiscal policy.<sup>32</sup> But there can be no doubt that EMU will affect unemployment in several, largely offsetting ways and that the net effect cannot be predicted - not even its sign.

It is easier to forecast how monetary union will affect the (relative) distribution of unemployment among the participating countries. In a monetary union, the relative prices and wages among the participating countries can no longer be adjusted through nominal exchange rate changes. Adjustment will be more costly and take more time. Past real exchange rate trends give some indication of future long run adjustment needs. Table 1 reveals that, since

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<sup>31</sup> For bank transfers between EU currencies, the deviation of the buying or selling rate from the mid rate has been about one quarter of one per cent. The cost of forward cover is in the order of 0.05 per cent. The cost of exchange-rate information is minute. Restrictions of capital movements have been generally prohibited since 1996 (Art. 72E of the Maastricht Treaty and Art. 56 of the Amsterdam Treaty). In the euro-zone, "measures to protect the balance of payments" are outlawed as well (Art. 120 Amsterdam Treaty). If such measures were introduced by non-participating EU members, they could be suspended by the EMU members (i.e., a qualified majority of the Council).

<sup>32</sup> Some authors believe that (inflation-averse) national trade unions will aim at larger real wage increases because, in the monetary union, the effects on the price level will largely be externalised and be smaller for each of them. Others emphasize that wage moderation and labour market deregulation are less likely in a monetary union because the beneficial effects on central bank credibility are now largely externalised. Still another group believes that real wages in the low-wage countries will catch up with the rest because monetary union facilitates international wage comparisons.

As for fiscal policy, some authors expect national governments to reduce their budget deficits, thereby increasing investment and employment. Others fear that the "Pact for Stability and Growth" will not be effective and that EMU will lead to more government spending.

1976, Ireland, Italy, Spain and Austria have experienced the largest real appreciation vis-à-vis the median, while Finland and Luxembourg have suffered the largest real depreciation. More recently, after the opening of Eastern Europe (1990), the Benelux countries have switched from real depreciation to real appreciation, while Spain, Italy, Finland and Ireland have moved in the opposite direction. As their production is especially labour- and land-intensive, these four countries are severely affected by the supply shock from Eastern Europe. This is where monetary union is likely to have the largest negative, or the smallest positive, effect on employment. Spain and Italy do already have the highest unemployment rates in the European Union, and their labour markets are among the least flexible in the euro-zone, as is the Finnish.<sup>33</sup>

### 5. Exchange rate policy

Exchange rate policy for the euro has been a matter of lively debate. German, French and Japanese ministers of finance have called for exchange rate targets between the euro, the U.S. dollar and the Japanese yen, while the President and the Vice-President of the European Central Bank, the Chairman of the Federal Reserve Board and a U.S. Secretary of the Treasury (Rubin) have opposed the idea. (Central bankers tend to dislike exchange rate fixing because it constrains their room of manoeuvre, and, shortly before elections, incumbent politicians may need their support.) They have stressed the well-known instability of adjustable peg systems. But the theory of optimum currency areas is also relevant.

Ultimately, the theoretical criteria for optimum currency areas can be reduced to two: the openness of the economy and the need for real exchange rate adjustment (Vaubel 1978, 1988). The first indicates the benefits and the second the cost of freezing nominal exchange rates.

The euro-zone as a whole is much less open than the participating countries. Its external trade (the average of exports and imports) relative to GDP is only eleven per cent (compared with 20 per cent for Germany). The corresponding figures for the U.S. and Japan are nine and eight per cent, respectively (Neumann 1998). As [Table 7](#) shows, each area's trade with the other two is even much smaller: 2.5 per cent for the euro-zone, 2.6 per cent for the U.S. and

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<sup>33</sup> See Grubb, Wells (1993) and Dohse, Krieger-Boden (1998, Tab. 12).

We have assumed that international relative prices and wages have to be adjusted in the same direction. This is true in the case of demand shocks and most supply shocks. It is not true in the case of shocks to the supply of capital. But if the real depreciation of Finland, Italy and Spain had been due to an increasing supply of capital, their unemployment rates should have fallen in the 1990s.



3.3 per cent for Japan.<sup>34</sup> Thus, the benefits of exchange rate targets among the three currencies would be very limited.<sup>35</sup>

As for the costs of abandoning the exchange rate instrument, I have suggested that, ideally, nominal exchange rate adjustment should equal the required real exchange rate adjustment because this is the only way in which all currency areas could enjoy price level stability at the same time and because nominal exchange rate adjustment is the most efficient way of adjusting relative prices and wages between currency areas (Vaubel 1978). If  $E$  is the nominal exchange rate (say, euros per dollar),  $P_{EMU}$  and  $P_{US}$  the price level in the euro-zone and the United States, respectively, and  $Q$  the real exchange rate between the two currency areas, the following identity must hold:

$$E \equiv \frac{P_{EMU}}{P_{US}} \cdot Q$$

or, in rates of change,

$$\Delta e \equiv \pi_{EMU} - \pi_{US} + \Delta q$$

Clearly, if both currency areas are to enjoy price level stability ( $\pi_{EMU} = 0$ ,  $\pi_{US} = 0$ ),  $\Delta e$  has to equal  $\Delta q$ . I suggest, therefore, that the absolute difference between  $\Delta e$  and  $\Delta q$  is a useful criterion for appraising the performance of exchange rate regimes (apart from exchange rate volatility and the average inflation rate). To what extent has the nominal dollar exchange rate satisfied this criterion?

Graph 2 depicts the logarithm of the nominal and the real exchange rate between the D-Mark and the dollar, using consumer prices (IMF). Unfortunately, the observed real exchange rate changes are not independent of the nominal exchange rate changes. As the prices of goods and services adjust with a lag, short-run real exchange rate changes are mainly caused by nominal exchange rate changes. But in the longer run, once prices have adjusted, the real exchange rate is essentially independent of the nominal exchange rate.<sup>36</sup> Thus, the longer-run real exchange rate trends reflect the real causes of equilibrium real exchange rate change.<sup>37</sup>

<sup>34</sup> A more precise indicator would include those countries which have irrevocably fixed their exchange rate vis-à-vis one, or a basket, of these currencies.

<sup>35</sup> This could mean that the exchange rate between the dollar and Europe will become more variable (e.g. Cohen 1997, Neumann 1998). However, the contrary conclusion is reached by those who believe that the DM / dollar exchange rate has been used strategically (Martin 1997) or that the Bundesbank has reacted to shifts of demand between Germany and other ERM members (Bénassy-Quéré, Mojon 1998).

<sup>36</sup> Recent panel studies indicate that such deviations have a "half-life" of two years (e.g., Meier 1997; Bayoumi, MacDonald 1998).

<sup>37</sup> Ideally, we would want to know all equilibrium real exchange rate changes that would have taken place in the absence of nominal exchange rate changes, regardless of whether they are permanent or transitory. However, empirical research has not been very successful in explaining real exchange rate variations (i.e., outperforming the random walk model), let alone, in separating the effects of nominal and real factors. The main exogenous real

In Graph 2, we can identify four periods with significant stable real exchange rate trends (1949-59, 1959-69, 1973-80, 1987-96). Within each period, the exchange rate regime is constant. Table 8 reports the estimated real and nominal exchange rate trends and the differences between the two. As can be seen, the difference between the real and the nominal trend increased dramatically in the 1970s: the nominal depreciation of the dollar increased much more than the required real depreciation. However, in 1987-96, the difference between the real and the nominal exchange rate trend was quite small, indeed slightly smaller than before 1969 under the Bretton Woods system. Thus, flexible exchange rates can actually do better than the adjustable peg system as far as international adjustment is concerned. The Bundesbank and the Federal Reserve System seem to have learned to live with exchange rate flexibility, or the real shocks of the 1970s have been unusual (or both).

Graph 3 and Table 9 repeat the analysis for the real and nominal exchange rate between the euro-zone and the U.S. dollar.<sup>38</sup> Once more, we observe a strong increase of the difference between the real and the nominal exchange rate trend in the 1970s but this increase is much smaller than the increase for the D-Mark. In 1987-96, the difference has dropped to a very low level - much lower than under the Bretton Woods system. However, this real exchange rate trend has been harder to predict - it is not significant at conventional levels ( $t=1.57$ ).

To sum up, long-term nominal exchange rate changes are increasingly doing what they are supposed to do. This is not to say that real exchange rate trends have been fully predictable. However, judging ex post and ignoring exchange rate volatility and the average inflation rate, flexible exchange rates have recently performed better than any other exchange rate regime since the war. The evidence does not support the multiplying calls for a return to fixed exchange rate targets between Europe and America.

## 6. EMU enlargement

### 6.1. Enlargement by present EU members

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factor seems to be the difference in productivity growth (e.g., MacDonald 1998: 28-30) which tends to follow a time trend. This could be the well-known "Balassa effect". Assuming reversion to trend after monetary shocks, i.e., long-run neutrality of money, the following analysis is confined to trend comparisons. It expressly ignores volatility and variance but it is likely to yield robust results. The decomposition of real exchange rate changes into a component due to monetary causes (not just money supply shocks!) and a component due to real causes is reserved for future research.

<sup>38</sup> Using consumer price indices, the exchange rate indices for the eleven euro-zone countries have been weighted by private consumption. Owing to data gaps, the series do not start before 1954. Thus, the first period (1954-59) is too short to yield a significant real exchange rate trend ( $t = 1.85$ ).

Britain, Sweden, Denmark and Greece are considering EMU membership by 2002. What are the benefits and costs? The costs of money changing, exchange-rate information, exchange-rate risk and exchange-control risk, which would be eliminated, depend on the openness of their economies vis-à-vis the eleven EMU countries. As Table 10, column 2, shows, trade with the euro-zone (the average of exports and imports) amounts to 8-14 per cent of GDP for the potential entrants. Except for Greece, the potential entrants are more open than France. As for the cost of joining, Table 10, column 7, reveals that, in 1976-98, long-run real exchange rate adjustment vis-à-vis France, the inflation median, has been small for Denmark and Greece but larger for Sweden (-1.0%) and much larger for the U.K. (+1.6%). In fact, the British real exchange rate change is the largest in the European Union.

Graph 4 and Table 11 show the real and nominal exchange rate trends between the U.K. and the euro-zone in the past. The differential between the nominal and the real exchange rate trend increased dramatically in the 1970s and dropped considerably thereafter (Table 10). But it never fell below the Bretton Woods level. The British differential in the 1990s was also larger than the corresponding differential for the dollar/D-Mark and the simulated dollar / euro exchange rates (cf. Tables 6 and 7). In other words, exchange rate flexibility for the Pound has hardly been used to bring about the equilibrium real exchange rate adjustment vis-à-vis the EMU-11 countries.

The relatively large discrepancy between nominal and real exchange rate trends under flexible exchange rates may seem to suggest that, in terms of real exchange-rate adjustment, the opportunity cost of joining EMU would be relatively small. However, since prices adjust with a lag of about two years, the real-nominal differential in 1993-97 must have been significantly affected by the ill-fated experiment of ERM membership in 1990-92. Without it, the Pound might have done better.

The cost of British entry is, of course, not confined to the loss of the exchange rate instrument. Another cost is the weakening of competition among central banks. Competition among the suppliers of money tends to reduce inflation (Hayek 1976, Vaubel 1990), especially in open economies (section 2). It is true that British inflation has been above the ECB median and average most of the time (Tables 1 and 10). But there have also been times when the Bank of England was a forceful competitor. In 1981-84, for example, British inflation was below the ECB median and average each year.

If Britain joined EMU, regulatory competition would suffer as well. Financial regulation of the City of London is known to be liberal - more liberal than regulation on the continent.

Up to now, the regulation of banks has remained in the hands of the national institutions. But, in May 1999, the President of the ECB has called for the centralisation of banking regulation in the hands of the ECB.<sup>39</sup> According to Art. 105 (6) of the Treaty, any Council decision to "confer upon the ECB specific tasks ... relating to the prudential supervision of credit institutions and other financial institutions" would have to be taken unanimously. But the ECB Council decides about the level and remuneration of minimum reserves by simple majority (Art. 19.1 of the ECB Statute). If Britain joined EMU, reserve requirements could easily become more stringent.

In July 1998, the ECB Council decided to impose a minimum reserve ratio of 1.5 - 2.5 per cent and pay an "adequate" remuneration on these reserves. Thus, the opportunity cost to the banks should be very small. However, as Table 12 shows, the ECB median of the national reserve ratios had been 2 per cent without remuneration.<sup>40</sup> In this case, therefore, the decision has not been biased towards Germany but towards Britain. This may be due to the competitive threat from the City of London. If so, British membership of EMU would probably encourage the ECB Council to raise the cost of reserve requirements. This would impair the City's competitiveness vis-à-vis New York, Tokyo, Zurich and other major financial centres outside EMU.

To join or not to join is evidently not just a question of monetary regime. Monetary union is apt to pave the way for the centralisation of budgetary policy, taxation, social regulation and wage bargaining (or for the levelling of differences and the cartelisation of policies in these fields). Moreover, there is a political dimension. After all, the euro is meant to be the stepping-stone for European Political Union and, ultimately, a European State.

Quite apart from the costs and benefits to the potential entrants and the Union as a whole, there are political obstacles to enlargement. As in Germany, many bankers and industrialists in Britain are attracted by the prospect of eliminating currency-related risks and transaction costs while the majority of voters is skeptical. But unlike the German government, the British government will hold a referendum. The British Prime Minister has declared that membership in the European Monetary System Mark II is out of the question and not a

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<sup>39</sup> Interview with *Wirtschaftswoche* (27 May 1999). Before him, the International Monetary Fund (1998) as an international organisation, the EC-financed Centre for Economic Policy Research (CEPR 1998), and Tommaso Padoa-Schioppa (*Financial Times*, 25 February 1999), another member of the ECB Executive Board, have made the same proposal.

<sup>40</sup> At the recommendation of the Commission, the Council of Ministers could have reduced the reserve ratio by imposing a ceiling in January 1999 (Art. 19.2 and 42 of the ECB Statute) but as Table 11 also shows, the required qualified majority would have been unattainable. In the future, unanimity and the assent of the European Parliament would be required (Art. 19.1 and 41).

precondition for EMU entry (Financial Times, 02/25/99) whereas the European Commission (notably the French Commissioner in charge of monetary affairs) and the ECB insist that Britain has to shadow the euro for at least two years if it wants to join EMU (Financial Times 03/25/98, 09/12-13/98).

There is another political obstacle. Table 9 demonstrates that, except for Denmark, the potential entrants experienced a higher inflation rate, and are less sensitive to inflation, than France which, as we have seen (section 2), is the ECB median in these respects. Allowing for the historical real exchange rate change, France would not even be interested in admitting a pair including Denmark.<sup>41</sup> However, provided that there is an Executive Board, France would keep its median position in the ECB Council if only one country joined and if this country did not claim a seat on the Executive Board.<sup>42</sup> This may create a problem for the U.K.<sup>43</sup>

According to the Treaty (Art. 121, 122), the admission of new members to the monetary union is a matter to be decided by the European Council rather than the European Central Bank and the decision requires a qualified majority (62 out of 87 votes) rather than a simple majority. If the four potential entrants combined, they would command 22 votes. If their entry raised the expected inflation rate of the euro, support would be forthcoming from those euro-zone members which prefer a higher inflation rate than the ECB median. However, as Table 1 shows, such a coalition (51 votes) would fall short of a qualified majority. To be winning, the coalition would have to include France and Belgium as well. But France and Belgium may not be interested. They may insist on a very strict interpretation of the convergence criteria. As we have seen in 1998, these criteria leave enough room for interpretation to justify almost any decision that is desired for political reasons.<sup>44</sup>

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<sup>41</sup> Since Denmark experiences a long-run real depreciation vis-à-vis France (-0.8 per cent), the historical Danish inflation rate of 5.8 per cent implies a French inflation rate of 6.7 per cent which is more than the historical French inflation rate of 6.3 per cent.

<sup>42</sup> This is because in a draw, the Governor of the ECB, a Dutchman, could exercise his casting vote in favour of a low inflation rate.

<sup>43</sup> For instance, if the U.K. joined in 2002 and claimed the first vacant seat on the Executive Board from the Netherlands (Trichet succeeding Duisenberg, Noyer succeeding Trichet, and a Briton succeeding Noyer), France would lose the median position to the U.K. This is also true if Denmark, Sweden and Greece, or a combination thereof, joined as well. If all four countries were admitted, Britain would occupy the median position even if it did not receive a seat on the Executive Board or obtained it from Finland in 2003 rather than the Netherlands in 2002.

<sup>44</sup> Without "creative accounting" and once-and-for-all measures (which the Treaty excludes), France, Germany and Italy would have exceeded the 3 per cent limit of the deficit criterion (German Council of Economic Advisors, Annual Report 1997/98. para. 403f., Deutsches Institut für Wirtschaftsforschung, Wochenbericht 25/98, p. 450f.). Moreover, Austria, Germany, Italy and Spain have violated the debt criterion because their debt / GDP ratio exceeded 60 per cent in 1997 and had risen since 1991 when the Maastricht Treaty was concluded. Finally, during the two years prior to the decision about EMU membership, the currencies of Finland, Ireland, Italy and Portugal had not stayed within the margins that were normal in 1991.

This is not to say that EMU enlargement is politically impossible. To some extent, the cost of losing the median position is offset by a reduction of currency-related transaction costs and risks vis-à-vis these countries. But at least two of them, notably Britain, would probably have to pay a price.

If, instead of historical inflation or the sensitivity to inflation, the preferred inflation rates predicted by equation 10 (Table 3, n = 15) were taken as a guide, Spain as the median of the full ECB Council and Belgium as the fallback median (among the national central bank governors) could afford to admit all four potential entrants (Table 9).

## 6.2. Eastern enlargement of EMU

If Eastern European states are admitted to the European Union, they may sooner or later wish to join EMU as well. Most of them have already linked their currencies to the euro in one way or another. What are the costs and benefits? Which Eastern European states are the most likely candidates?

As before, the benefits are related to the degree of openness vis-à-vis the euro-zone. As Table 13 shows, trade with the euro-zone (the average of exports and imports) is large relative to GDP for many of these countries, notably Estonia, Slovenia, Hungary and the Czech Republic. This is because most of these economies are relatively small. Adding Poland, we obtain the group of countries which the European Union considers eligible for membership. Negotiations have started in November 1998 and are to be completed by 2002.

But Table 13 demonstrates that the costs of joining EMU will be very large as well. Except for Hungary and Slovenia, all countries exhibit a very high trend rate of real appreciation vis-à-vis the euro-zone - some even in the double-digit range (Lithuania, Ukraine, Estonia, Latvia).

Since the available data are limited to a short period<sup>45</sup>, the measured trends may still be affected by temporary problems of transition - notably the need for macroeconomic stabilisation. It is well known that disinflationary monetary policy and increasing budget deficits (relative to the other countries) tend to cause a temporary real appreciation of the currency. In 1993-98, fiscal consolidation in the EMU countries may also have been a contributing cause. To allow for such transition effects, the logarithm of the EMU-related real

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<sup>45</sup> For some of these countries, the IMF International Financial Statistics do not contain the Consumer Price Index in 1992. Moreover, 1992 was still a year of considerable real exchange rate turbulence for the Baltic states. The data for 1998 are partly estimates. Bulgaria is not included because of large gaps in the data.

exchange rates of these countries ( $q_{it}$ ) has been regressed on  $\mu_{it}$ , a measure of the change of the money supply (relative to EMU),  $\delta_{it}$ , a measure of the reduction of the budget deficit (relative to EMU),  $t_i$ , national time trends, and  $C_i$ , a battery of country dummies, in a pooled time-series cross-section analysis.<sup>46</sup> The following estimate was obtained:

$$q_{it} = -10.98 + 0.024 \mu_{it} + 0.41 \delta_{it} - b_i t_i + c_i C_i$$

(-99.65\*) (0.77) (1.32)

$$R^2 = 0.9999, \quad R^2 \text{ adj.} = 0.9998$$

As an increase in  $q$  indicates a real depreciation (section 3), the estimated regression coefficients of  $\mu$  and  $\delta$  take the expected signs. But they are not significant. The country dummies are not reported. The national real exchange rate trends are listed in column 3 of Table 13. Except for Romania, they are very similar to the unadjusted (or unconditional) trends, i.e., very large.

Table 13, column 4, shows that all Eastern European countries experienced high inflation rates in 1993-98. However, owing to the real appreciation vis-à-vis the euro-zone, the inflation rates of the Czech Republic, Estonia, Latvia, Lithuania and the Slovak Republic are compatible with an average euro inflation rate of less than eight per cent (Table 2, columns 8 or 11). These countries could be paired with the others so that the ECB median is not affected.

EMU membership is efficient only for those Eastern European countries which are very open, and do not need large real exchange rate changes, vis-à-vis the euro-zone. As Table 14 shows, only Slovenia and Hungary qualify on both counts (category A). But the admission of these two countries would probably raise the inflation median in the ECB Council. By contrast, the Ukraine, Poland, Latvia, Lithuania and Croatia fail on both counts (category D). They are better served by a policy of independent price level stabilisation, possibly with the help of a money supply rule. Estonia, the Czech and the Slovak Republic seem to be cases for a crawling peg system (category C). Romania is somewhere in between (category B).

$${}^{46} \mu_{i,t} = \ln \left| \frac{M_{i,t}}{M_{i,t-1}} \bigg/ \frac{M_{EMU,t}}{M_{EMU,t-1}} \right|$$

$$\delta_{i,t} = \ln \left| \frac{1 - D_{i,t}/Y_{i,t}}{1 - D_{i,t-1}/Y_{i,t-1}} \bigg/ \frac{1 - D_{EMU,t}/Y_{EMU,t}}{1 - D_{EMU,t-1}/Y_{EMU,t-1}} \right|$$

where  $M$  is the money supply (M1, Estonia: M2),  $D$  is the budget deficit and  $Y$  is GDP. The data for  $M_{EMU}$  and  $D_{EMU}$  have been taken from the February 1999 issue of the ECB Monthly Bulletin, i.e., they are aggregated at constant exchange rates (the conversion rates set in 1998). However, the results are almost the same if consumption-weighted rates of change are used.

A comparison of the predicted and the actual exchange rate regimes in the last columns of Table 13 reveals that only Hungary has chosen the predicted exchange rate regime.

### 7. Adjusting central bank staff

In the future, the personnel of the ECB Executive Board is likely to grow both absolutely and in relation to the central banks of the participating countries. Table 15a shows the size of central bank staff in the euro-zone.<sup>47</sup> To what extent do the total and its composition have to change?

To answer this question, we shall compare actual staff size with the personnel predicted by a labour demand function. This function has been estimated for the central banks of 21 industrial countries or currency areas in 1993.<sup>48</sup> The following estimate has been obtained:

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<sup>47</sup> The data for 1993 (or 1992) are taken from the Morgan Stanley Central Bank Directory which appeared in 1994. The current data have been supplied by the European Central Bank in May 1999. The ECB itself was projected to have 570 employees by the end of 1998 and about 800 by the end of 1999.

<sup>48</sup> The sample includes the following countries: Australia, Austria, Belgium / Luxembourg, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, U.K. and USA.



$$\begin{aligned} \ln L = & 4.39 + 0.965 \ln N + 0.476 \ln \text{PBN} + 0.602 \ln \text{QC} \\ & (4.50^*) \quad (10.84^*) \quad (1.81^0) \quad (2.41^+) \\ & + 0.665 \ln \text{DIS} + 0.362 \ln I - 0.064 \ln E - 0.098 \ln Y \\ & (0.67) \quad (0.45) \quad (-0.24) \quad (-0.32) \end{aligned}$$

$$R^2 = 0.91$$

where

L is central bank staff,

N is the number of inhabitants (as the best-fitting proxy for output demand<sup>49</sup>),

PBN is a dummy which is equal to one if the central bank prints the bank notes itself (and which is zero otherwise),

QC indicates the extent to which the central bank actively controls the quality of the currency in circulation,

DIS measures the extent to which the central bank discounts private bills of exchange and other commercial paper,

I is the degree of central bank independence,

E is a dummy for exchange rate pegging, and

Y is GNP (or GDP) per capita.

Thus, the demand for central bank staff is explained by the demand for central bank output, central bank technology and a proxy for the wage level. Labour supply to the central banks is assumed to be perfectly elastic in the relevant range. Since data on central bank equipment and land are not available, labour is the only factor of production. The data on PBN, QC and DIS have partly been supplied by a national central bank (which does not want to be quoted) and partly been collected with the help of a questionnaire. Variables and interactions allowing for other differences in the tasks of the various central bank (e.g., the responsibility for banking regulation) did not take plausible signs.<sup>50</sup> The log-linear functional form yielded the best fit.

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<sup>49</sup> Other proxies like money supply, number of banks, area etc. have been tried in addition but they take completely insignificant regression coefficients (see also Vaubel 1997a). In a time-series analysis for Germany, I successfully used an index of central bank transactions but these data are not available on an international cross-section basis.

<sup>50</sup> See also Vaubel (1997a). However, for a different sample which includes only very few EMU countries, the budgetary independence of the central bank was shown to have a significant positive effect on staff size.

In the above estimate, only the output proxies N and QC take fully significant regression coefficients. This may be due to the omission of other relevant variables, or it may indicate that the growth of bureaucracy is largely a matter of historical accident.

As a first step, the estimate is used to predict the staff size of the various national central banks in 1993 and 1998.<sup>51</sup> Table 15a reveals that, in 1998 as in 1993, the national central banks of the eleven EMU countries have been highly overstaffed by international standards. The most outstanding examples are Banque de France, Banque Nationale de Belgique and Banca d'Italia. From 1993 to 1998, total central bank staff in the EMU countries decreased by 8 per cent but, in 1998, the required staff reduction was still 15 per cent. If the "most efficient" central bank (Banco d'España) is taken as a guide, total staff in the EMU could even have been cut by 61 per cent.

With the advent of monetary union, the required staff size has to be calculated for the ESCB as a whole. If the ECB is considered to be as independent as the Bundesbank (i.e.,  $\ln I=1$ ), if the euro is not pegged to a dominant currency (i.e.,  $\ln E=0$ ) and if the ECB continues to refrain from discounting commercial paper ( $\ln DIS=0$ ),<sup>52</sup> the labour demand function predicts an ESCB staff of 47,052 for the beginning of 1999, i.e., a reduction by 6,520 persons or 12 per cent.

This estimate of required ESCB staff is somewhat larger than the sum of the national central bank staffs predicted for 1998 (45,018). The reason is that the increase in central bank independence and the termination of exchange rate pegging have raised the estimated staff size more than the abolition of discounting and some other minor changes have reduced it. If the staff component attributed to independence is not needed to defend the ECB's legal independence (which, as we have seen, is very secure), i.e., if it is simply a waste due to inadequate accountability, the required ESCB staff is, of course, much smaller. Thus, the above estimate is an upper limit.

How is the adjustment to be spread over the ECB and the particular national central banks? The ideal "weight" of the ECB can be determined in different ways.

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<sup>51</sup> In predicting staff size for 1998, average income per head in EMU-11 has been held constant at the 1993 level. Thus, changes in Y merely reflect changes in relative labour costs among the participating countries.

<sup>52</sup> The decision not to have a discount facility can also be explained by the median voter theorem. De facto, it has been taken by the EMI Council. Nine of the sixteen Council members represented countries which did not operate a discount facility (Denmark, Finland, France, Ireland, Luxembourg, Portugal, Spain, Sweden and the United Kingdom; EMI, Annual Report 1994). De lege, the decision had to be, and has been, confirmed by the ECB Council where Finland (2), France (2), Ireland (1), Luxembourg (1), Portugal (1) and Spain (2) commanded a majority of 9 out of 17.

The first is to take the Federal Reserve System as an example. In the U.S., the share of the Federal Reserve Board in total central bank staff has been 6 per cent (in 1994, the last year for which the Federal Reserve System has published these figures<sup>53</sup>). Table 15b shows that this implies an ECB staff of 2,823 if the component attributed to independence is not considered to be wasteful. The remaining staff is allocated to the national central banks using their predicted values as shares. The predicted values are computed by setting the logarithms of DIS, I and E equal to zero.

Another possible model is the Bundesbank. In Germany, the staff of the Direktorium accounts for 16 per cent of total Bundesbank staff. On the same assumptions, the German model would imply an ECB staff of 6,958.

If the staff component attributed to independence is regarded as pure waste, the U.S. model implies an ECB staff of 1,966 and the Bundesbank model a staff of 5,242. Depending on the assumed share of waste in the staff component attributed to independence, the appropriate ECB staff can easily be calculated.

Since the Governors of the national central banks have a majority in the Governing Council of the European Central Bank, the ESCB is more likely to adopt the U.S. Federal Reserve System as a model. The necessary reduction of the national central bank staff could be facilitated by requiring the ECB to draw on the national central banks for a considerable fraction of its hirings.

## 8. Conclusion

The analysis of this article - like most empirical research - is merely suggestive. The point estimates make forget that the future of the euro is highly uncertain. But they illustrate the mechanisms that will be at work.

There are other aspects of EMU central banking which might be explained or predicted by public-choice reasoning. Some explanations are straightforward. For example, it is not in the bureaucratic interest of a central bank council to publish its minutes shortly after the event. Nor was it to be expected that a majority of the ECB Governing Council would give priority to money supply targets. After all, only one of the eleven national central banks (the

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In predicting ESCB staff, ln PBN and ln QC are weighted averages of the national data. The weights are given by the predicted staffs of the national central banks, setting the logarithms of DIS, I and E equal to zero. Once more, average income per head in EMU-11 has been held constant at the 1993 level.

<sup>53</sup> According to Duizenberg, the Federal Reserve Board Currently employs 1,700 persons of which 200 are in charge of banking supervision (interview with Wirtschaftswoche, 27 May 1999).

Bundesbank) had done so in the recent past. Experience so far suggests that the Governing Council is prepared to lower interest rates even when monetary expansion exceeds the reference rate and the euro is weak in the exchange markets. Is fine-tuning back on the agenda?

It is easy to agree on an inflation target and leave open how it might be attained. If it is not attained, this might be attributed to factors other than monetary policy. After all, failure to attain the target will not be sanctioned.

Data sources

- Section 2: International Monetary Fund, International Financial Statistics; Eurostat; Hayo (1998 a, b); Lippi, Swank (1999); Maddison (1991); Masciandaro, Spinelli (1994); Mitchell (1992); Vaubel (1994).
- Section 3: Vaubel (1994); EMI (1997); newspaper reports.
- Sections 5 and 6.1: IMF, International Financial Statistics, Direction of Trade Statistics Yearbook 1998.
- Section 6.2: IMF, International Financial Statistics; WIIW Handbook of Statistics; KSH Statistical Yearbook of Hungary; OECD, Economic Outlook, Main Economic Indicators, Short Term Economic Indicators for the Transition Economies; UN Monthly Bulletin of Statistics.
- Section 7: Vaubel (1997a); European Central Bank; IMF, International Financial Statistics; OECD, Economic Outlook; Masciandaro, Spinelli (1994); national central banks (questionnaire).

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Table 1  
The inflation median in the Governing Council of the European Central Bank  
Consumer price index

country	ECB votes	1976-93			1976-98			1990-98	votes in the European Council
		actual inflation per annum	annual real exchange rate appreciation vis-à-vis median	median inflation adjusted for real exchange rate change	actual inflation per annum	annual real exchange rate appreciation vis-à-vis France	French inflation adjusted for real exchange rate change	annual real exchange rate appreciation vis-à-vis France	
Portugal	1	16.9	+0.4	7.1	13.7	+0.3	5.8	+1.5	5
Spain	2	10.8	+1.0	7.8	9.0	+0.6	6.1	- 1.6	8
Italy	2	10.4	+0.7	7.4	8.8	+0.7	6.2	- 1.5	10
Ireland	1	8.0	+1.0	7.8	6.6	+1.0	6.5	- 0.5	3
Finland	2	6.8	- 1.2	5.5	<u>5.4</u>	- 0.6	4.8	- 3.3	3
France	2	<u>6.7</u>	0	<u>6.7</u>	<u>5.4</u>	0	<u>5.4</u>	0	10
Belgium	1	4.5	- 0.4	6.3	3.9	- 0.3	5.1	+0.2	5
Luxembourg	1	4.4	- 0.5	6.2	3.7	- 0.5	4.9	+0.3	2
Austria	1	3.8	+0.9	7.7	3.4	+0.6	6.1	+0.5	4
Netherlands	2	3.2	- 0.2	6.5	3.0	- 0.2	5.2	+0.5	5
Germany	2	3.2	+0.2	6.9	2.9	+0.1	5.6	+0.7	10
weighted average		7.0		6.9	5.8		5.6		

Table 2  
Sensitivity to inflation, central bank independence, DM pegging and inflation in EMU-11, 1976-93

country (ECB members)	sensitivity to inflation (Hayo 1998)  (S)	inflation aversion (Lippy, Swank 1999) ( $\beta$ )	predicted inflation (equ.1, Table 3)	central bank independ- ence  (I)	predicted central bank independence	pegging to DM  (f)	preferred inflation predicted from equ. 6, Table 3	preferred inflation predicted from equ. 8, Table 3	median preferred inflation adjusted for real exchange rate change (equ. 8)	Spanish preferred inflation adjusted for real exchange rate change (equ. 8)	Belgian preferred inflation adjusted for real exchange rate change (equ. 8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Portugal (1)	0.33 <sup>a</sup>	0.68	18.8	0.63	0.59	0	14.9	23.0	8.2	9.3	8.6
Spain (2)	1.35 <sup>a</sup>	0.51	7.6	0.84	1.14	0.14	7.1	10.0	8.9	<u>10.0</u>	9.3
Italy (2)	1.28 <sup>*</sup>	0.39	7.9	1.08	1.12	0.71	7.3	10.3	8.5	9.7	9.0
Ireland (1)	0.92 <sup>*</sup>	0.11	9.7	UK: 1.93	UK: 1.31	0.71	8.7	12.5	8.9	10.0	9.3
Finland (2)	(1.60 <sup>b</sup> )	0.20	-	1.60	1.24	0	6.5	9.0	6.5	7.6	6.9
France (2)	<u>2.05<sup>*</sup></u>	<u>0.79</u>	<u>5.80</u>	1.22	1.39	0.80	<u>5.69</u>	<u>7.78</u>	7.78	8.9	8.2
Belgium (1)	2.06 <sup>*</sup>	1.56	5.78	1.25	1.40	1.00	5.67	7.76	7.3	8.5	<u>7.76</u>
Luxembourg (1)	2.84 <sup>*</sup>	1.56	4.7	1.25	1.63	1.00	4.8	6.4	7.2	8.4	7.7
Austria (1)	(3.95 <sup>b</sup> )	4.55	-	1.98	1.90	0.68	4.0	5.3	8.8	9.9	9.2
Netherlands (2)	3.59 <sup>*</sup>	1.23	4.0	1.69	1.82	1.00	4.2	5.6	7.6	8.7	8.0
Germany (2)	5.81 <sup>*</sup>	3.51	3.0	2.72	2.28	0	3.3	4.2	8.0	9.1	8.4
weighted average	2.44	1.28	6.83	1.49	1.46	0.51	6.25	8.2			

<sup>a</sup> - 1985 - 93

<sup>b</sup> - estimated from equation 1, Table 3

Table 3  
A cross-section analysis of inflation in the eleven EMU countries, ln, 1976-93

equation	intercept	sensitivity to inflation ln S	central bank independence ln I	independence without pegging ln I <sup>(1-f)</sup>	pegging ln e <sup>f</sup> = f	imports / GDP ln m	R <sup>2</sup> R <sup>2</sup> adj.	n
1	2.221 (22.95*)	-0.645 (-6.37*)					0.85 0.83	9
2	2.139 (15.92*)		-1.150 (-3.94*)				0.69 0.64	9
3	2.158 (17.59*)		-1.120 (-4.44*)				0.69 0.65	11
4	2.230 (27.18*)	-0.522 (-3.66*)	-0.297 (-1.07)				0.88 0.85	11
5	2.225 (25.14*)	-0.664 (-5.54*)		+0.063 (0.25)			0.87 0.83	11
6	2.337 (19.76*)	-0.527 (-3.45 <sup>+</sup> )		-0.220 (-0.69)	-0.300 (-1.35)		0.90 0.85	11
7	2.387 (18.16*)	-0.606 (-3.54 <sup>+</sup> )		-0.019 (-0.05)	-0.214 (-0.81)		0.81 0.76	15
8	3.422 (9.88*)	-0.593 (-5.80*)		-0.136 (-0.64)	-0.009 (-0.05)	-0.337 (-3.21 <sup>+</sup> )	0.96 0.94	11
9	3.427 (8.21*)	-0.591 (-4.45*)		-0.123 (-0.46)	-0.026 (-0.13)	-0.334 (-2.64 <sup>o</sup> )	0.96 0.92	9
10	3.680 (6.89*)	-0.698 (-4.77*)		+0.095 (0.33)	+0.105 (0.41)	-0.399 (-2.47 <sup>+</sup> )	0.88 0.83	15

\* - significant at 1 per cent level

+ - significant at 5 per cent level

o - significant at 10 per cent level

Table 4  
Seigniorage gains and losses in EMU-11

	ECB votes	Seigniorage wealth (billion euros) <sup>a</sup>	share in seigniorage wealth (per cent)	share in ECB capital (per cent) <sup>a</sup>	total gains (billion euros)	population (millions) <sup>a</sup>	gains per capita (euros)
Luxembourg	1	0.1	0.03	0.19	+ 0.49	0.4	+ 1,225
Finland	2	2.2	0.71	1.71	+ 3.08	5.1	+ 604
France	2	39.8	12.92	21.28	+ 25.75	57.9	+ 445
Portugal	1	4.3	1.40	2.41	+ 3.11	9.9	+ 314
Ireland	1	2.6	0.84	1.08	+ 0.74	3.6	+ 206
Italy	2	50.6	16.43	18.75	+ 7.15	57.2	+ 125
Belgium	1	10.8	3.51	3.67	+ 0.49	10.1	+ 49
Netherlands	2	17.6	5.71	5.51	+ - 0.62	15.4	- 40
Austria	1	10.5	3.41	3.04	- 1.14	8.0	- 143
Spain	2	46.2	15.00	11.02	- 12.26	39.1	- 314
Germany	2	123.3	40.03	31.35	- 26.73	81.4	- 328
total	17	308.0	≈100.00	≈ 100.00	≈ 0	288.1	-

<sup>a</sup> - Source: Sinn, Feist (1997), Table 3 (column 8), Table 1 (columns 3 and 5)

Table 5  
Governments and the central bank council in the European Monetary Union

	A	B	D	F	FI	I	IR	L	NL	P	SP
<u>Government</u>											
partisan code	S+C	L+S+	S+	S(+C)	S+C <sub>g</sub> +L+	S+C <sub>g</sub>	C	C+L	S+L	S	C
electoral term	4	4	4	5 (7)	4	5	5	5	4	4	4
next regular election	99:12	03:06	02:09	02:05	03:03	01:05	02:06	04:06	02:05	99:10	00:04
<u>Central bank governors</u>											
partisan code	C	S	S	C	C <sub>g</sub>	C <sub>g</sub>	?	C	C	S	S
age (in 1999)	60	53	57	57	53	63	62	49	56	44	65
date of last appointment	98:09	99:03	99:09	93:09	98:06	93:06	94:05	98:06	97:07	94:06	94:06
term of office	5	5	8	6	7	∞	7	6	7	5	1x6
appointed by incumbents	yes	yes	yes	(yes)	yes	yes	yes	yes	yes	yes	no
supporting incumbents	yes	yes	yes	?	yes	yes	01:05: yes (C)	yes	no	yes	no
Members of ECB Executive Board (appointed in June 1998)											
partisan code	-	-	C	C	C <sub>g</sub> ?	C <sub>g</sub>	-	-	S	-	C
age (in 1999)			63	48	60	59			64		54
term of office	-	-	8	4	5	7	-	-	8	-	6
proposed by incumbents	-	-	no	yes	yes	yes	-	-	yes	-	yes
supporting incumbents	-	-	no	?	?	yes	-	-	yes	-	yes

Sources: EMI (1997), ECB homepage and newspaper reports. Information as of July 1999.

Table 6  
Prospective election dates, ECB coalitions and political business cycles  
in the European Monetary Union 2000-2006

election date	country	month	coalition in the ECB Council (one year ahead of election)	votes	preferred election date (month)	standard deviation (months)
2000:03	SP	15	SP(1)+I(2)+NL(1)+D(1)+FI(1)+B(1)+P(1)+A(1)	9	42	15.6
2001:04	I	28	I(2)+NL(1)+D(1)+FI(1)+B(1)+P(1)+A(1)+SP(1)	9	48	13.1
2002:05	F	41	NL(1)+IR(1)+D(1)+FI(1)+B(1)+P(1)+A(1)+SP(1)+L(1)	9	53	9.2
2002:05	NL	41	NL(1)+IR(1)+D(1)+FI(1)+B(1)+P(1)+A(1)+SP(1)+L(1)	9	53	9.2
2002:06	IR	42	IR(1)+D(1)+FI(1)+B(1)+P(1)+A(1)+SP(1)+L(1)+I(2)	10	62	15.8
2002:09	D	45	D(1)+FI(1)+B(1)+P(1)+A(1)+SP(1)+L(1)+I(2)	9	64	15.2
2003:03	FI	51	FI(1)+B(1)+P(1)+A(1)+SP(1)+L(1)+I(2)+D(1)	9	69	16.4
2003:06	B	54				
2003:10	P	58				
2003:12	A	60				
2004:03	SP	63				
2004:06	L	66				
2006:04	I	88				
2006:05	NL	89				
2006:09	D	94				

Table 7  
Bilateral trade in per cent of GDP, 1997<sup>a</sup>

	EMU-11	United States	Japan
EMU-11	-	1.39	0.98
United States	1.83	-	2.32
Japan	0.67	1.21	-
Total	2.50	2.60	3.30

<sup>a</sup> - The column head indicates the currency area for which the ratio is calculated. Bilateral trade is defined as the average of exports and imports.

Sources: IMF, Direction of Trade Statistics Yearbook, 1998.



Table 8  
Real and nominal exchange rate trends  
DMark/US dollar, annual percentage rates of change

	real exchange rate	nominal	difference
1949-59	+0.43*	0	+0.43
1959-69	- 0.96*	- 0.49*	- 0.47
1973-80	- 2.19*	- 9.63*	+7.44
1987-96	- 1.87*	- 2.27*	+0.40
1987-98	- 0.39	- 0.81	+0.42

\* - significant at the one per cent level

Table 9  
Real and nominal exchange rate trends  
EMU-11/US dollar, annual percentage rates of change

	real exchange rate	nominal	difference
1954-59	+1.04	+2.72*	- 1.68
1959-69	- 1.38*	+0.35*	- 1.73
1973-80	- 2.63*	+0.26	- 2.89
1987-96	- 0.87	- 0.59	- 0.28
1987-98	+0.24	+0.50	- 0.26

\* - significant at the one per cent level

Table 10  
Enlargement of EMU by present EU members

		1997	1976 - 93			1976 - 98			1976 - 93				
country	prospec- tive ECB votes	openness vis-à-vis EMU-11 [(exports + imports)/ 2 GDP]	actual inflation per annum	annual real ex- change rate appre- ciation vis- à-vis France	French inflation adjusted for real exchange rate appre- ciation	actual inflation per annum	annual real ex- change rate appre- ciation vis-à-vis France	French inflation adjusted for real exchange rate appre- ciation	Sensiti- vity to inflation (Hayo 1998)	preferred inflation predicted from Table 3, equation 7 (n=15)	preferred inflation predicted from Table 3, equation 10 (n=15)	Belgian preferred inflation adjusted for real exchange rate change (equ. 10)	Spanish preferred inflation adjusted for real exchange rate change (equ. 10)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Greece	1	8.5	18.1	+0.4	7.1	15.6	+0.6	6.0	(0.90 <sup>e</sup> )	11.4	19.9	12.1	14.3
Sweden	1	13.8	7.9	- 1.2	5.4	6.3	- 1.0	4.3	(1.27 <sup>e</sup> )	9.2	15.6	10.3	12.5
UK	2	10.3	7.70	+0.9	7.66	6.6	+1.6	7.1	1.82	7.4	12.2	12.6	14.9
Spain	2	12.1	10.8	+1.0	7.8	9.0	+0.6	6.1	(1.35 <sup>e</sup> )	8.9	15.0	12.7	15.0
France	2	9.8	6.7	0	6.7	5.4	0	5.4	2.05	6.90	11.19	11.6	13.9
Belgium	1	36.6	4.5	- 0.4	6.3	3.9	- 0.3	5.1	2.06	6.88	11.16	11.16	13.4
Denmark	1	12.9	6.3	+0.9	7.7	5.3	+0.4	5.8	3.40	5.1	7.9	12.6	14.9

<sup>e</sup> - estimated from equation 1, Table 3

Table 11  
Real and nominal exchange rate trends  
EMU-11/Pound Sterling, annual percentage rates of change

	real exchange rate	nominal	difference
1959-71	- 1.18*	- 1.20*	- 0.02
1973-78	- 0.62	- 4.94*	- 4.32
1981-89	- 2.53*	- 0.71	- 1.82
1993-96	- 2.32*	- 1.73 <sup>o</sup>	- 0.59

\* - significant at the 1 per cent level

<sup>o</sup> - significant at the 10 per cent level

Table 12  
National minimum reserve requirements prior to EMU (end of 1994)  
Sight liabilities or money market cash reserve

country	votes in ECB Council	minimum reserve ratio	remuneration	opportunity cost of reserve requirements
Italy	2	15%	yes <sup>a</sup>	6.3%
Austria	1	9%	no	9%
Germany	2	5%	no	5%
Spain	2	2%	no	2%
Portugal	1	2%	no	2%
<u>Finland</u>	2	2%	no	2%
France	2	1%	no	1%
Ireland	1	3%	yes <sup>b</sup>	0.6%
Netherlands	2	variable	yes	<1%
Belgium	1	-	-	-
Luxembourg	1	-	-	-

Non-participating EU members:

Greece		9%	yes	≈4.5%
UK		0.35%	no	0.35%
Sweden		-	-	-
Denmark		-	-	-

<sup>a</sup> - at 5.5%, market rate 9,5%

<sup>b</sup> - at 80% of market rate

Source: European Monetary Institute, Annual Report 1994

Table 13  
Openness and real exchange rate trends of Eastern European countries vis-à-vis EMU 11

country	openness [(exports + imports)/ 2 GDP] 1997	trends of real exchange rate appreciation (1993-98)		inflation per annum (1993-98)	current exchange rate regime <sup>b</sup>	predicted exchange rate regime <sup>b,c</sup>
		unadjusted	adjusted			
	(1)	(2)	(3)	(4)		
Croatia	18.2	4.90*	4.16	16.5	MF (E)	F
Czech R.	24.0	5.41*	5.19*	7.9	F	P/E/C, P/B/C
Estonia	33.7	17.86*	19.99*	19.3	CB/E	P/E/C, P/B/C
Hungary	27.1	1.10	1.10	16.9	P/B/C/M	CB/E, P/E/C, P/B/C
Latvia	13.7	16.75*	-	14.7	P/B	F
Lithuania	16.6	24.10*	20.87*	22.9	CB/\$	F
Poland	13.5	5.64*	5.32*	17.6	P/B/C/M	F
Romania	12.7	6.34	1.27	61.8	MF (\$)	F, P/B/C
Slovak R.	23.1	4.60*	4.62 <sup>+</sup>	6.9	P/B/M	P/E/C, P/B/C
Slovenia	30.0	2.17*	1.73	9.8	F	CB/E, P/E/C, P/B/C
Ukraine	5.3	19.89* <sup>a</sup>	17.7* <sup>a</sup>	115.0	MF (\$)	F

\* - significant at the 1 per cent level

+ - significant at the 5 per cent level

<sup>a</sup> - 1993-97

<sup>b</sup> - The letters denote the following exchange rate regimes: CB: currency board linked to ..., P: pegging to ..., E: euro, B: basket of currencies, \$: US-dollar, C: crawling, M: margins of fluctuation, F: floating with inflation or money supply target, MF: managed float.

<sup>c</sup> - Cf. Table 13.

Table 14  
Optimal exchange rate arrangements for the Eastern European states  
A taxonomy

		openness	
		very open (>20%)	medium (5-20%)
need for real exchange rate	medium (0.5-2.0%)	A Slovenia Hungary (→ CB/E, P/E/C, P/B/C)	B Romania (→ F, P/B/C)
adjustment	large (>2.0%)	C Estonia Czech R. Slovak R. (→ P/E/C, P/B/C)	D Ukraine Poland Latvia Lithuania Croatia (→ F)

Table 15a  
Actual and predicted central bank staff prior to EMU

	1993/94			end of 1998			
	actual	predicted	percentage deviation from actual number	actual	predicted	predicted minus actual	percentage deviation from actual
Austria	1,251	2,013	+ 61	1,152	2,057	+ 905	+ 79
Belgium/L.	3,165	1,934	- 39	3,007	2,051	- 956	- 32
Finland	894 <sup>a</sup>	643 <sup>a</sup>	- 28	740	624	- 116	- 16
France	17,590 <sup>a</sup>	10,162 <sup>a</sup>	- 42	16,171 <sup>b</sup>	9,000	- 7,171	- 44
Germany	17,632	13,912	- 21	15,891	14,059	- 1,832	- 12
Ireland	626 <sup>a</sup>	736 <sup>a</sup>	+ 18	638	701	+ 63	+ 10
Italy	9,542 <sup>a</sup>	6,610 <sup>a</sup>	- 31	8,956 <sup>b</sup>	6,387	- 2,569	- 29
Netherlands	1,611	1,493	+ 7	1,597	1,521	- 76	- 5
Portugal	2,293 <sup>a</sup>	1,809 <sup>a</sup>	- 21	1,828	1,863	+ 35	+ 2
Spain	3,308	6,632	+ 100	3,100 <sup>b</sup>	6,755	+ 3,655	+ 118
total staff	57,912	45,944	- 21	53,080	45,018	- 8,062	- 15

<sup>a</sup> - end of 1992

<sup>b</sup> - end of 1997

Sources: Morgan Stanley Central Bank Directory (1994), Vaubel (1997a), European Central Bank

Table 15b  
Actual and predicted central bank staff in EMU 11

country	actual (1.1.99)	Federal Reserve model ( $N_{ECB}/N_E=6\%$ )			Bundesbank model ( $N_{ECB}/N_E=16\%$ )			predicted national staff weights under the euro regime
		predicted	predicted minus actual	percentage deviation from actual	predicted	predicted minus actual	percentage deviation from actual	
Austria	1,152	1,504	+ 352	+ 31	1,344	+ 192	+ 17	0.034
Belgium/L.	2,929 <sup>c</sup>	2,079	- 850	- 29	1,858	- 1,071	- 37	0.047
Finland	740	619	- 121	- 16	553	- 187	- 25	0.014
France	16,171 <sup>b</sup>	10,349	- 5,822	- 36	9,249	- 6,922	- 43	0.234
Germany	15,891	12,694	- 3,197	- 20	11,343	- 4,548	- 29	0.287
Ireland	638	708	+ 70	+ 11	632	- 6	- 1	0.016
Italy	8,956 <sup>b</sup>	6,413	- 2,543	- 28	5,731	- 3,225	- 36	0.145
Netherlands	1,597	1,106	- 491	- 31	988	- 609	- 38	0.025
Portugal	1,828	1,327	- 501	- 27	1,186	- 642	- 35	0.030 <sup>d</sup>
Spain	3,100 <sup>b</sup>	7,430	+ 4,330	+ 140	6,640	+ 3,540	+ 114	0.168
total	53,002	44,229	- 8,773	- 17	39,524	- 13,478	- 25	1.000
ECB	570	2,823	+ 2,253	+ 395	7,528	+ 6,958	+ 1221	-
ESCB	53,572	47,052	6,520	- 12	47,052	6,520	- 12	-

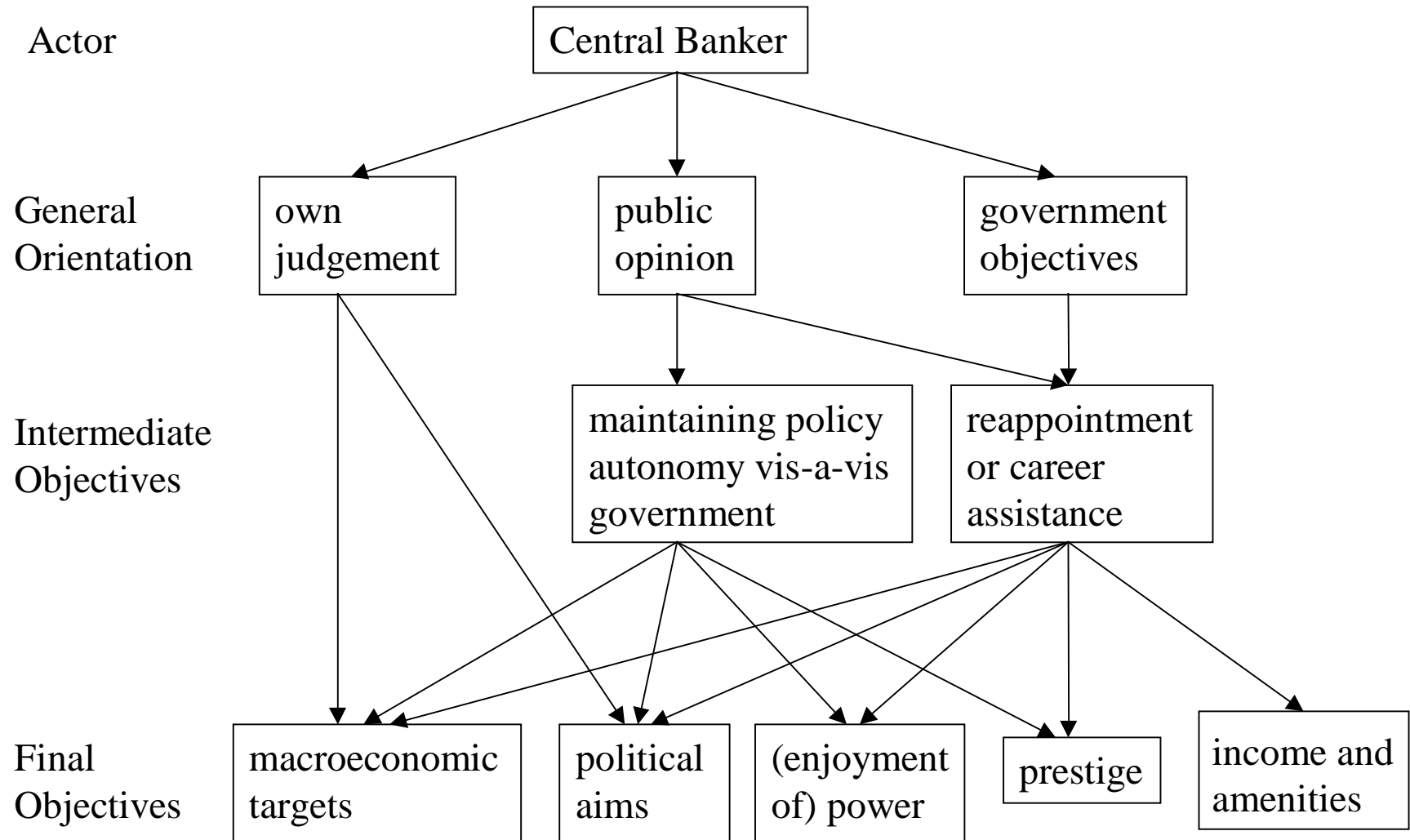
<sup>c</sup> - excluding Commission de Surveillance du Secteur Financier de Luxembourg which has been separated from the central bank

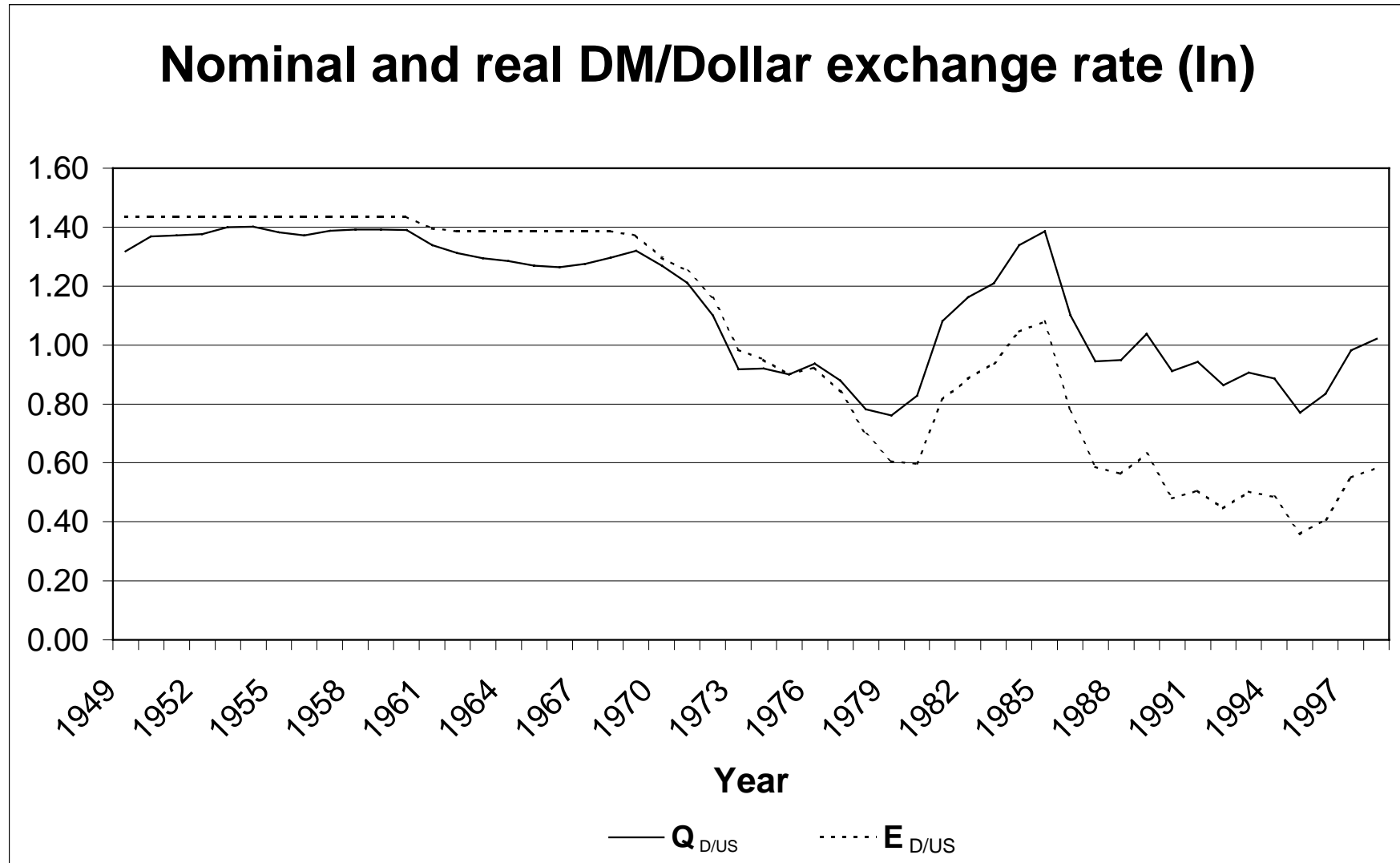
<sup>d</sup> - With the transition to the euro, Portuguese banknotes will no longer be printed by the Portuguese central bank.



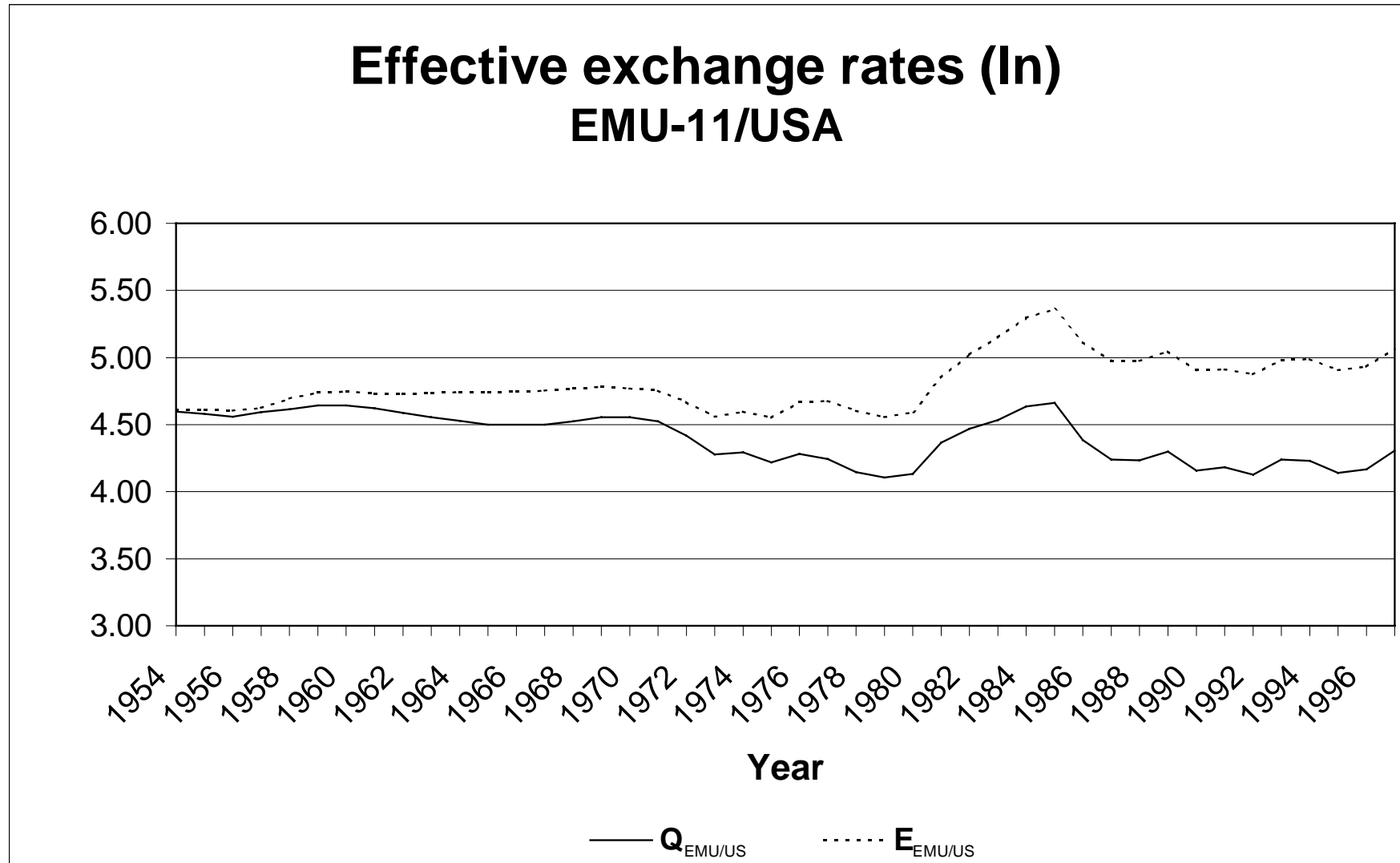
# Graph 1

## The Central Banker's Calculus



**Graph 2**

Graph 3



Graph 4

