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ABSTRACT

Is Europe an Optimum Currency Area?*

The debate on EMU has been very influenced by the traditional theory of optimum currency areas (OCAs). The paper shows that this theory is not an ideal yardstick for an assessment of EMU. Its assumptions are not very realistic and its focus on asymmetric real shocks is much too narrow. In addition, observed past real exchange rate changes are not a good predictor of future real shocks in the European Union (EU). In general, the OCA approach is heavily biased towards very small currency areas. Because of these shortcomings the paper develops a monetary approach to the theory of OCAs. In this concept the choice between a monetary union and independent national currency areas is analysed from the perspective of monetary policy efficiency. It can be shown that EMU is superior to national currency areas in terms of credibility, the response to asymmetric monetary shocks and the effectiveness of monetary targets and instruments.

JEL classification: F15, F33, F36, F41
Keywords: optimum currency areas, European monetary integration, European Monetary Union

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cuts. In addition, even with constant nominal wages, a significant degree of adjustment between countries would be possible. If one assumes, on average, productivity growth in the EU of 2–3% per year and an average inflation rate of about 2% per year, a constant nominal wage level in a country hit by an asymetric shock allows for a considerable improvement in its international competitiveness. The assumption of money illusion is also very questionable, especially as many EU countries have very open economies where the impact of a devaluation on the domestic CPI is very direct.

The most astonishing building block in the theory of OCA is its exchange rate theory. It implicitly assumes that an adjustable rate always compensates for asymmetric real shocks, which under a system like the old ERM, was not completely implausible. In systems with flexible rates, however, it is obvious that the supposed relationship between asymmetric real shocks and the exchange rate simply does not exist.

Empirical research based on the theory of OCA suffers not only from the flaws of this theory, but also from methodological problems. This applies above all to the attempt to take past real exchange rate variations as a predictor for future real exchange rates. This must lead to incorrect results as real exchange rate changes were at least partly caused by factors that will by removed by EMU: nominal exchange rates, which are a major determinant of real exchange rates would be invariably fixed. Divergent monetary policies, causing different inflation paths, would not be possible under EMU.

The narrow focus of the traditional theory has been acknowledged already by Mundell who pointed out that 'money is a convenience which restricts the number of optimum currency areas'. In the EMU debate attention was paid to the potential savings of transaction and information costs and of foreign exchange reserves, but the impact of EMU on monetary policies in Europe was completely neglected.

There is no doubt that a country like Greece would gain much in terms of monetary policy credibility by joining EMU. Even if it took some time for economic agents to fully appreciate the change of regime, disinflation would be less costly under the aegis of EMU than under the aegis of the national central bank. A credibility effect would also apply to the EU countries in general. By transferring responsibilities for monetary policy to the European Central Bank the influence of national politicians would be considerably reduced.

As with traditional OCA theory, it is also possible to identify negative macroeconomic effects of asymmetric shocks that could be avoided by an adequate design of the international monetary order in the monetary sphere. Clear evidence of such shocks is provided by the speculative attacks on France (and smaller EU countries with low inflation) since autumn 1992. Massive capital outflows forced these countries to maintain interest rates at levels that were

NON-TECHNICAL SUMMARY

The academic discussion on EMU has been very much shaped by the traditional theory of optimum currency areas (OCAs). This paper shows that this theoretical framework is not adequate for an analysis of an OCA in Europe: first, this theory is based on restrictive assumptions that have little in common with the economic reality of the European Union (EU); and second, its focus on real shocks is much too narrow and biased towards the corner solution of very small currency areas.

In order to provide a more adequate theoretical framework the paper develops a 'monetary approach' to the theory of OCA. It demonstrates that a monetary union can be superior to national currency areas not only in terms of transaction and information costs, but above all in terms of: the credibility of monetary policy, the response to asymmetric monetary shocks, and the efficiency of monetary targeting and of monetary policy instruments.

The starting point of the theory of OCA is an asymmetric real shock shifting demand from region A to region B. The result depends on the following assumptions: each region produces only one good, prices and wages are inflexible downwards, and labour is immobile between regions.

Under the arrangement of a *monetary union* the shock leads either to unemployment or to inflation. If exchange rates are *adjustable*, the shock can be managed without negative macroeconomic effects. In this case, the real wage of the country negatively affected by the shock can be reduced by a devaluation.

The policy implications of this reasoning are obvious: countries with economies that are prone to asymmetric real shocks should not form a common currency area. The only exception to this rule is a high degree of labour mobility between regions. The approach exhibits a clear bias in favour of small currency areas, which are less likely to be affected by idiosyncratic real shocks and also show a higher degree of labour mobility.

A major problem with this approach is its restrictive assumptions. The 'one country-one good' assumption allows for the nominal exchange rate to be seen as an instrument for changing relative prices. Among countries with diversified production structures, like all EU countries, however, the nominal exchange rate can only vary indirectly, and incompletely correct inadequate relative prices.

The dominant role that the nominal exchange rate plays as an adjustment instrument in the theory of OCA also depends on the assumptions of downward inflexible wages and money illusion. Otherwise the optimal reaction to an asymmetric shock could always be reached by a nominal wage reduction. Recent experience shows an increasing willingness of unions to accept nominal wage

clearly incompatible with their domestic economic situation, thus contributing to recession and unemployment. Whenever capital flows are out of line with macroeconomic fundamentals a system with absolutely fixed rates is clearly superior to national currency areas with adjustable rates: had the EMU already existed in 1992, France would have benefited substantially from the interest rate reductions in Germany since September 1992.

A major flaw of the traditional theory of OCA is that it cannot explain why a nation is a better currency area than regions or even cities of that nation. With monetary policy efficiency the answer is not difficult to find.

Within a nation state financial institutions can operate freely and residents can shift their assets without limit from one region to another. In currency areas that are smaller than such integrated financial areas the money demand function is necessarily less stable: intra-regional portfolio shifts affect the regional demand function but not the national. In addition, because of speculative capital movements intra-regional flows would in general be more volatile in separate currency areas forming an integrated financial area. In the EU financial market participants can operate as freely as if it were a nation state. This has the effect that money demand is more stable at the European than the national level. Thus EMU has the obvious advantage that it would improve the efficiency of a policy based on quantitative monetary targets. This also applies to monetary policy instruments. Within the integrated financial market the minimum reserve instrument can be easily circumvented and would thus be rendered increasingly ineffective.

1. Introduction

In the intensive debate on European Monetary Union (EMU) the theory of "optimum currency areas" has experienced a remarkable revival.[1] In spite of its strong Keynesian touch this approach has been widely used in the last few years. It seems to be almost generally accepted as the main touchstone of the advantages of EMU and as the theoretical basis for all empirical tests in this area.

However after reading Robert MUNDELL's seminal publication of 1961 carefully, it becomes clear that substantial aspects of his argument have been lost in the past thirty years. On the one hand this is especially true for his explicit assumption of money illusion and wage stickiness. On the other hand MUNDELL himself has made it very clear that because of its focus on asymmetric demand shocks, this approach does not allow for a comprehensive assessment of the size of optimum currency areas:

"(...) we have discussed only the stabilisation argument, to which end it is preferable to have many currency areas, and not the increasing costs which are likely to be associated with the maintenance of many currency areas." (MUNDELL 1961, p. 662)

[1] See for example BAYOUMI and EICHENGREEN (1992), ASCHINGER (1993), BINI SMAGHI and VORI (1993), VAUBEL (1993).

The following paper is divided into two main parts. The first deals with the traditional theory of optimum currency areas. It discusses the effects of real asymmetric shocks under a currency union and under a system with adjustable exchange rates. We will show that adjustable (flexible or fixed but adjustable) exchange rates are only superior to absolutely fixed exchange rates if very restricted and not very realistic assumptions are imposed. Another problem with this approach is that guidelines for the economic policy cannot be derived easily: variations of real exchange rates in the past do not provide a good indicator for the occurrence of asymmetric real shocks in a future European Monetary Union.

The second part of the paper will take a closer look at the reasons that might call for designing relatively large currency areas. All of them are based on the following central argument that can also be found in MUNDELL´s contribution (1961, p. 662):

"Money is a convenience and this restricts the optimum number of currencies".

In contrast to the present discussion the paper will not pay too much attention to the potential savings in transaction and information costs that are associated with a single currency. Instead it will focus on the efficiency of monetary policy under a currency union and under systems with adjustable exchange rates. This "monetary approach" to the theory of optimum currency areas leads to several new criteria for the delimitation of optimum currency areas:

- The credibility of monetary policy can be strengthened by the expansion of currency domains beyond the size of national states. The transfer of monetary policy

responsibilities to the supranational level reduces the influence of national policy makers.

- It will be shown that the problems of asymmetric monetary shocks - with which all systems with adjustable rates are confronted - do not arise under the arrangement of a currency union.

- In areas without internal borders for financial market activities a common currency area increases the efficiency of a policy of monetary targeting and of monetary policy instruments.

Introducing such monetary aspects into the discussion on optimum currency areas helps to overcome the one-dimensional view of the traditional approach with its narrow focus on real demand shocks. As a result it is possible to reduce the theoretical deficit in this field which is described by Paul KRUGMAN (1993, p. 3) as follows:

"What we do not have, however, is anything we can properly call a model of the benefits of fixed rates and common currencies."

In the context of the debate on EMU this extended approach has the effect of providing a much more balanced and thus also a more positive judgement on the advantages of a common currency area in Europe.

2. The traditional theory of optimum currency areas

For any discussion on optimum currency areas it is necessary to give a definition of the term "currency area". MUNDELL (1961, p. 657) defines it as "domain within which exchange rates are fixed". But reading his article carefully, it becomes clear that a "currency area" cannot be regarded as synonymous with a system of fixed exchange rates. What MUNDELL has in mind, is only the arrangement of **absolutely fixed** exchange rates and not systems with fixed, but adjustable rates like the Bretton Woods System or the European Monetary System (EMS). Therefore, the discussion on optimum currency areas is not identical with the debate on fixed versus flexible exchange rates. It only concerns the advantages and disadvantages of **monetary unions**. Determining monetary unions by the criterion of absolutely fixed exchange rates, MUNDELL's approach coincides with the widely accepted definition of the "WERNER-Report" (1970). This also applies to MUNDELL's understanding that not only a system of a single currency but also an arrangement of national currencies with absolutely fixed parities can be subsumed under the term of a monetary union.[2] Using the terms "monetary union" and "currency area" as synonyma - it is not surprising that the revival of the theory of optimum currency areas and the growing academic interest in EMU have occurred simultaneously.

The most important theoretical contribution of the classical papers of MUNDELL (1961) and McKINNON (1963) is clearly their analysis of asymmetric real shocks. Because of the simplifying assumption that each area only produces one good, this analysis allows to analyse allokative and macroeconomic aspects at the same time.

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[2]Difficult to reconcile with the discussion on EMU is MUNDELL's idea that a system of irreversibly fixed exchange rates can be achieved with independent national central banks. But also in the definition of the WERNER-Report the requirement of a common European Central Bank System is missing.

The starting point for MUNDELL´s analysis is an asymmetric shock on the demand side. This disturbance is characterised by a demand shift from the (only) good which is produced in region A to the (only) good which is produced in region B. The result of the adjustment process is mainly determined by the assumption that the price level and nominal wages are inflexible downward. Another important assumption is that labour is completely immobile between the regions A and B.

In a **currency union** such a demand shock has the main effect of causing unemployment in region A and inflation in region B. Depending on the existing institutional arrangements of the currency area the following policy reactions are possible:

- Under the arrangement of **absolutely fixed exchange rates,** but independent national central banks, the central bank of country B could try to reduce the price level to the initial level by pursuing a restrictive monetary policy. This would prevent a change in the terms of trade. As a result country A would have to bear the whole burden of adjustment: its levels of output and employment would be additionally depressed.

- Under the arrangement of a single currency and an integrated central bank system the common central bank could inflate the price level of the whole monetary union. With this policy it could decrease real wages in country A by the amount that is required to compensate for the demand shift. In this case, however, the inflation problem has not been solved; in country B it has become even more serious.

MUNDELL (1961, p. 659) comes, therefore, to the following conclusion:

"But a currency area of either type cannot prevent both employment and inflation among its members. The fault lies not with the type of currency area, but with the domain of the currency area. The optimum currency area is not the world."

This leads to the central result that a better response to asymmetric demand shocks is possible if the exchange rate between the currencies of the two regions can be adjusted. In this case the depreciation allows to reduce the real wage level of country A. Therefore, the demand shock can be absorbed without a negative employment effect in region A and without inflationary effects in region B.

As a consequence the likelihood of the occurrency of such shocks has become the central criterion for the demarcation of optimum currency areas.[3] The dominant role of this thinking in the present debate on EMU is obvious.[4]

In spite of its suggestive power this approach has several substantial flaws, especially if applied to the European Community:

- All EU countries are characterised by a high degree of diversification of their production structure. Therefore, MUNDELL's "one-country-one sector" model is a completely inadequate approximation of the reality in the EU.

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[3]MUNDELL has statet that his results depend on the assumption of labour mobility between the two regions. In regions characterised by high labour mobility this factor can compensate for insufficient flexibility of wages and exchange rates. Unemployment would be prevented in region A if workers move from region A to region B.

[4]See for example Roland VAUBEL (1993, p. 59): "In the current discussion only little attention has been paid to the fact that the next few years are extremely unsuitable for the transition towards a single European currency. The economic restructuring of Eastern Europe, German reunification and the completion of the EC internal market will generate a fundamental structural change which will require considerable changes in relative prices between the baskets of commodities in the different countries, in other words - real exchange rate changes.

- The adjustment mechanism is described by MUNDELL depends crucially on the assumptions of a downward inflexibility of prices and wages and of the existence of money illusion on the part of employees.

- It is assumed that in the case of an asymmetric shock adjustable exchange rates will react exactly as will be required to offset the negative effects on employment and output.

- Ex ante it is difficult to forecast whether and with which intensity real shocks will occur in the future.

2.1. Diversified production structure

It was pointed out already in 1969 by Peter KENEN (1969, p. 49) that the effects of an asymmetric demand shock depend very much on the degree of diversification of a country's production structure.

"(...) economic diversification, reflected in export diversification, serves, ex ante, to forestall the need for frequent changes in terms of trade and, therefore, for frequent changes in national exchange rates."

Industrial countries with a high degree of product diversification are therefore better candidates for a currency union than developing countries with a less diversified production structure. In the case of the EU-countries, empirical studies have shown that degree of production diversification is relatively high. According to calculations by BINI SMAGHI and VORI (1993) the divergencies in the structure of manufacturing of EU countries amount to only half the size of divergencies that can be observed for the twelve U.S. Federal Reserve Districts (Table 1). Therefore, it seems from the outset not

Table 1: Diversification of the production structure in the EC and the US

Areas / Sectors		EC		EC10		EC6		USA	
		Mean	Variance	Mean	Variance	Mean	Variance	Mean	Variance
Food, Beverages and Tobacco	1980	11.3	12.2	11.2	12.0	10.2	10.2	10.8	15.3
	1989	11.2	11.3	11.1	10.5	10.3	10.3	8.3	3.9
Textiles, Clothings and Leather	1980	10.0	30.3	9.6	26.2	9.4	27.4	6.5	30.0
	1989	8.1	25.9	7.7	21.8	7.5	24.6	4.8	15.9
Wood and Wood Products	1980	4.4	1.6	4.4	1.5	4.9	1.3	4.9	8.0
	1989	3.8	1.4	3.9	1.4	4.2	1.5	4.3	3.1
Paper and Paper Products	1980	6.7	6.1	6.7	6.2	5.5	3.3	9.8	10.8
	1989	7.4	5.9	7.4	6.0	6.3	3.1	8.8	8.6
Chemicals and Chemical Products	1980	15.7	2.5	15.7	2.6	15.7	3.4	14.2	28.3
	1989	17.0	5.8	16.9	5.6	16.9	7.8	17.1	33.9
Non-Metallic Mineral Products	1980	5.4	1.1	5.4	0.9	5.4	1.1	3.3	0.7
	1989	4.8	1.4	4.6	0.8	4.6	1.0	2.7	0.3
Basics Metals	1980	6.9	4.2	7.0	4.2	7.2	3.7	7.5	9.5
	1989	6.2	2.4	6.2	2.3	6.4	1.6	4.1	3.7
Metals Products, except Machinery and Equipment	1980	9.9	3.9	10.0	3.7	11.1	0.7	8.4	4.8
	1989	9.3	2.9	9.4	2.6	10.3	1.2	7.4	5.0
Machinery except Electrical	1980	9.3	12.9	9.5	12.0	9.8	11.2	13.5	20.3
	1989	10.1	12.9	10.3	11.4	10.6	10.9	19.8	27.2
Electrical Machinery	1980	9.2	5.3	9.3	4.7	9.8	3.9	9.9	6.3
	1989	10.5	8.6	10.6	7.8	10.8	9.6	10.3	9.6
Transport Equipment	1980	11.2	6.1	11.2	6.1	11.0	7.2	11.3	27.8
	1989	11.7	7.5	11.8	6.7	12.2	7.5	12.5	26.4
Average (1)	1980		8.39		7.72		7.07		16.71
	1989		8.38		7.51		7.85		17.97

Source: Bini Smaghi and Vori (1993, p. 28)

very likely that the member-countries of the EU could be affected by major idiosyncratic shocks. In the countries of Southern Europe where the agricultural sector still plays a major role, the EU's common agricultural policy would help to cushion the effects of major shocks affecting this sector.

In countries with diversified production structures, one has to ask whether exchange rate changes can still be regarded as the optimum instrument for adjustment. Assume that a good negatively affected by a demand shock is produced in only one EU country, but constitutes a minor fraction of the aggregate production of this country. Let us also assume that demand shifts from this good evenly to all other goods that are produced domestically and abroad. In order to over come such a shock without undesired effects on output and employment, it would be necessary that the relative price of this good decreases (incomparison with all other goods be they produced abroad or at home). Under these assumptions the exchange rate would obviously be an inappropriate adjustment instrument, because it can only shift the whole price level of one country vis-a-vis the price level of another country. In relation to foreign goods a depreciation would lead to the desired change in relative prices, however at the same time this would also change all other relative price relations between domestic and foreign goods. In addition, the required change in domestic relative prices would not take place. Thus, if economies are highly diversified, exchange rates changes have to be regarded as a therapy that is associated with very negative side effects.

This is even more true for the more realistic case of an asymmetric shock hitting several EU regions at the same time:

"Consider a shock that depresses the British midlands, Belgium, northern France and northern Germany. The shock is plainly asymmetric; but there is limited scope for doing anything about it by altering exchange rates within the EU." (MELITZ 1991, p. 13)

It becomes obvious that the thinking in the "one country-one sector"-model has led many economists to the misconception that the exchange rate could serve as a useful instrument for changing relative prices. Roland VAUBEL (1993, p. 59) stated for instance:

"Adherents of Keynesianism and proponents of neoclassic theory agree that the international adjustment of relative prices causes less economic costs if the exchange rate can be adjusted than if national price levels have to be adjusted.." [Original in German].

2.2. Price rigidities and money illusion

For MUNDELL's result especially important are the assumptions of a downward rigidity of wages and of money illusion. With perfectly flexible prices and wages an asymmetric demand shock could always be managed without frictions. Even in the case of a "one country-one sector"-model it would be irrelevant whether the required adjustment of the real exchange rate would be realised by a reduction of prices or wages or by a nominal exchange rate adjustment. Thus, the necessity of adjustable nominal exchange rates hinges only on this assumption. In addition, the superiority of adjustment mechanism also depends on the existence of money illusion. Again, all this can by found in MUNDELL´s paper, but it seems to have been forgotten in the last three decades:

"The thesis of those who favour flexible exchange rates is that the community in question is not willing to accept variations in its real income through adjustments in its money wage rate or price level, but that it is willing to accept virtually the same changes in its real income through variations in the rate of exchange. In other words it is assumed that the unions bargain for a money rather than a real wage, and adjust their wage demands to changes in the cost of living, if at all, only if the cost-of-living index excludes imports. Now as the currency area grows smaller and the proportion of imports

in total consumption grows, this assumption becomes increasingly unlikely." (MUNDELL 1961, p. 663)

It is in this context that McKINNON's (1963) criterion based on the "**openness**" of an economy becomes relevant. If a country with a high share of exports in GNP is affected by a negative asymmetric demand shock, a nominal depreciation would have strong effects on the domestic price level. Workers would immediately realise the reduction of their standard of living and ask for a compensation. As a result a depreciation would only increase the price level without removing the underlying disturbance. In the words of McKINNON:

"(...) if we move across the spectrum from closed to open economies, flexible rates become both less effective as a control device for external balance and more damaging to internal price stability." (McKINNON 1963, p. 719)

If one takes into account the decisive role of the assumption of money illusion in the traditional theory of optimum currency areas, it is astonishing how this approach could play such an important role in the discussion on EMU. On the one hand many EU countries are characterised by a high degree of economic openness (Table 2). On the other hand one can no longer assume a complete downward inflexibility of nominal wages. Especially in Germany, one can now observe an increasing willingness of workers and unions to accept considerable **nominal** wage reductions if this is required to secure employment. And even without outright nominal wage cuts a considerable adjustment of relative wages could already be achieved if nominal wage increases in a country suffering from an adverse demand shock are kept below the nominal wage increases of its main competitors. In the case of the EU this room for manoeuvre is quite impressive: If one assumes for the EU a medium-term productivity trend of 2-3 % per year and an annual inflation rate of 2 % (which the European Central Bank might

Table 2: Degree of Openness of EC Countries in 1991

(Share of (Imports + Exports)/2 in GDP)

Country	Degree of openesss (in %)
Belgium	68.3
Denmark	35.4.
Germany	34.8
France	22.5
Greece	27.9
Great Britain	23.9
Ireland	63.8
Italy	18.5
Luxembourg	72.4
Netherlands	51.6
Portugal	41.0
Spain	19.0

Source: IMF, International Financel Statistics.

regard as compatible with price stability), a constant nominal wage level in a county hit by an asymmetric shock allows for a considerable improvement of its international competitiveness.

2.3. The absorption of asymmetric real shocks by flexible exchange rates

Another major shortcoming of the theory of optimum currency areas is its totally underdeveloped theory of exchange rates. Like most authors in late 1960s and early 1970s, the present-day users of this theory implicitly assume that flexible exchange rates would mainly be determined by country-specific real shocks.

Under a system of fixed, but adjustable rates such an exchange rate response is not quite unrealistic. It requires that realignments will be carried out when fundamental disequilibria can be observed. The experience with the Bretton Woods System and the EMS has shown, however, that this is not always the case.

Under the arrangement of flexible exchange rates the supposed response of the exchange rate to asymmetric shocks seems even more unlikely. The intensive econometric research of the last twenty years has clearly shown that there is absolutely no stable relationship between any macroecomomic fundamental and the development of the exchange rate (MEESE, 1990; MEESE and ROGOFF, 1989). Therefore, the empirical evidence for a reliable reaction of flexible exchange rates to asymmetric real shocks is simply not existent. In sum, the exchange rate theory on which the theory of optimum currency areas is based has to regarded as a mere assertion.

For the evaluation of monetary unions this implies that the reference scenario - flexible exchange rates - has to be assessed much less positive than this has been the case so

far.[5] It is now obvious that real exchange rate fluctuations are mainly determined by nominal exchange rate fluctuations (see graph 1). Because the latter is generally independent of fundamental factors, it cannot be excluded that a country hit by a negative demand shock will simultaneously experience a nominal appreciation. In this case the exogenous demand disturbance would be intensified under flexible exchange rates. Thus, even within the narrow premises of the traditional theory (money illusion and "one country - one sector" model) a currency union would lead to better outcomes than adjustable rates.

2.4. Empirical tests based on the traditional theory

In sum, due to its specific premises the theory of optimum currency areas seems of little use in the actual discussion on EMU.[6] Considering the highly diversified production structures in the EU, the absence of money illusion, an increasing downward flexibility of nominal wages, and the erratic behaviour of flexible rates one could easily draw the conclusion that completely different criteria are required for a comprehensive assessment of EMU.

Nevertheless many authors based their judgement on EMU mainly on the probability of future asymmetric in the EU. This raised the empirical problem of how such disturbances could be accurately predicted. The limits of all such exercises are demonstrated by the largest idiosyncratic shock in the post-war period: German unification. If such events occur, all forecasts will fail.

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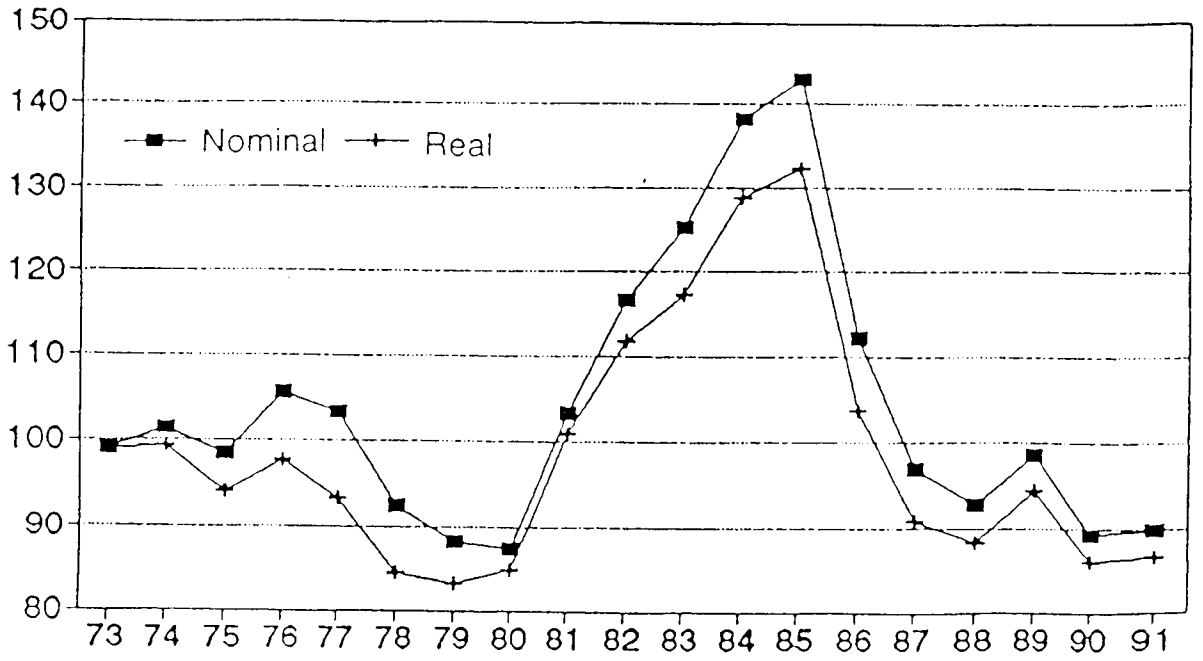
[5] This is also the main problem of all comparative analyses of fixed versus flexible exchange rates, where the assumption that flexible exchange rates are determined by macroeconomic factors, is generally made.

[6] ISHIYAMA (1975, p. 378) came up with a similar result: "From this follows the conclusion that the theory of optimum currency areas is primarily a scholastic discussion which contributes little to the practical problems of exchange rate policy and monetary reform."

Chart 1: Nominal and real exchange rate changes of the US-Dollar



Source: Paul Krugman (1993, p.)

A prediction method compatible with the theory of optimum currency areas has been developed by Roland VAUBEL (1978). He tries to identify suitable members for a common currency area on the criteria of past real exchange rate changes. This method has the advantage that it offers a clear-cut operational yardstick for policy decisions.[7] However, the approach is far from being ideal. The most obvious flaw is that a currency with large real exchange rate fluctuations in the past does not necessarily have to be exposed to similar fluctuations in the future - and vice versa.

For instance, the findings of unstable real exchange rates could be attributed to an asymmetric demand shock where trade unions have reacted very flexibly by reducing nominal wages. Thus, variable real exchange rates do not necessarily an disqualify a country as a member of EMU. If, on the other hand trade unions had refused to reduce their wages, the real exchange rate would have remained stable. Thus, VAUBEL's one-dimensional approach would at least have to be supplemented by indicators like the unemployment rate.

Another flaw of this method is that not all observed real exchange rate fluctuations are the result of asymmetric demand shifts. Real exchange variability can also be caused by one of the following factors:

Under systems of fixed but adjustable rates it is possible that different inflation paths were generated by diverging monetary policies. This leads to real exchange rate flexibility if such divergencies are not compensated for by timely realignments. Under a

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[7] See Jürgen VON HAGEN and Manfred NEUMANN (1992) as well as Barry EICHENGREEN (1990). The latter came to the conclusion that real exchange rates fluctuate in the EU much more than within the USA. Paul de GRAUWE and Wim VANHAVERBEKE (1991) show that the long-term real exchange rate fluctuations within the regions of single EU countries are much lower than the fluctuations of real exchange rates between these countries.

system of flexible exchange rates the nominal exchange rate often deviates strongly from the path determined by purchasing power parity. As already mentioned, in many cases, the size - and sometimes also the direction - of such misalignments is completely unrelated to fundamental factors.

With the entry into a monetary union the causes for such real exchange rate changes would be removed altogether. Thus, as far as observed past real exchange rate fluctuations were related to such factors, they cannot be used as an argument against a currency union.

Another important determinant of real exchange rates are divergent wage increases at the national level that are not compensated by exchange rate adjustments. It is an open question whether the entry into monetary union would have a strong impact on the wage bargaining process. With adjustable exchange rates trade unions always have the option of correcting excessive wage settlements by a devaluation. As a result of such a "trial and error" process, the real exchange rate fluctuates. With a common central bank and absolutely fixed exchange rates the correction mechanism of nominal exchange rate changes no longer exists; non-competitive wages could only be corrected by nominal wage reductions. Thus, some observers expect that under a monetary union wage moderation would be more pronounced than under a system of adjustable rates. If such a regime change would occur, the forecasting power of past real exchange rate changes would be additionally impaired.[8]

Not more convincing than the analysis of real exchange rate fluctuations are calculations that were made by BAYOUMI and EICHENGREEN (1992). The authors try to assess the likelihood of future asymmetric real shocks in the EU by comparing the

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[8]For a more detailed discussion see Olaf SIEVERT (1993).

correlation between demand and supply shocks within the EU and those in regions of the U.S. At first sight, it seems worthwhile to note that their estimates do not call against a closer monetary policy integration of the core EU countries:

"(...) if one compares the core EU countries with all 8 U.S. regions are the correlations of a similar magnitude (...)". (BAYOUMI and EICHENGREEN 1992, p. 29).

Nevertheless, one has to ask whether the authors use an appropriate method for the definition of an optimum currency area in Europe. Above all the system of reference for their analysis is completely arbitrary: The evidence of less correlated shocks in the whole EU than in the U.S. does not necessarily imply that EMU could not cope with such disturbances. In addition, one has to expect that the transition to EMU would lead to an enormous regime change in Europe which considerably reduces the predictive power of observed shocks in the past. This applies above all to monetary policy: A common monetary policy for the whole EU would certainly increase the correlation between the changes in the national GNPs. It also seems far from clear that all country specific fluctuations in national GNP growth rates have to be looked upon as asymmetric real shocks, which require real exchange rate changes. Finally the comparison method is problematic, as the paper compares all 12 EU countries with only eight and thus much larger U.S. regions.

2.5. The attractiveness of the theory of optimum currency areas

Taking into consideration the obvious flaws of this theory, it is surprising that it could experience such wide-spread revival in the early 1990s. From the political point of view the attractiveness of this approach can primarily be explained by its bias in favour of currency areas that are as small as possible. If one would apply this concept in a consequent way, the world would consist of a multitude of very small currency areas:

- either regions that are producing only one good, or

- regions with a more diversified production structure, but with a high internal mobility of labour so that asymmetric shocks could be always managed without major effects on employment.

MUNDELL was well aware of the problem associated with this approach:

"(...) this seems to imply that regions ought to be defined so narrowly as to count every minor pocket of unemployment arising from labour immobility as a separate region, each of which should apparently have a separate currency." (MUNDELL 1961, p. 662)

In contrast to MUNDELL, who did not cast any doubt that such arguments constitute only part of a more comprehensive judgement on the advantages of a monetary union,[9] most economists in the current discussions have concentrated almost exclusively on such allokative aspects. Therefore, it is not surprising that within the profession a mostly negative attitude towards EMU persists.

This one-sidedness is additionally enhanced by an argument put forward by KRUGMAN (1991). Considering that the regional specialisation in the United States is - as already mentioned - more pronounced than in the EU, KRUGMAN predicts that the regional variety in the production structure of the EU would increase after the creation of EMU. Thus, even if the EU would have an adequate specialisation structure for a currency union under current conditions, one could never exclude that this may not change in the future. If this argument was taken seriously, countries (or regions) could never form a

[9]MUNDELL (1961, p. 662)."The suggestion reflects the facts that we have, thus far, considered the reasons for keeping currency areas small, not the reasons for maintaining or increasing their size."

currency area. KRUGMAN himself makes it clear how questionable such considerations are:

"A side implication, of course, is that the United States is arguably less suitable for a single currency than Europe!"(KRUGMAN, 1991, p. 83).

In other words, even if EMU would lead to a less diversified production structure in Europe, the situation would not be worse than it is now in the United States.

3. Monetary criteria for the identification of optimum currency areas

There is no doubt that the traditional theory of optimum currency areas ignores important micro- and macroeconomic aspects. Already MUNDELL (1961, p. 662) has emphasised that "money is a convenience and this restricts the number of currencies". However, the different aspects of this "convenience" and their implications for the identification of optimum currency areas was only given very little attention in the current debate.

3.1. Transaction and information costs

After all a certain importance has been attached to the fact that an increasing number of currency areas is associated with additional transaction and information costs of cross-border transactions. The splitting-up of the former Soviet Union into an area with fifteen non-convertible currencies[10] is a warning example. Within the context of the discussion on EMU, the EU Commission (1990) has intensively analysed these aspects. The result

[10]Until now, de jure not all republics have their own currency. De facto the "roubles" which are used in the remaining republics of the "rouble-zone" are also independent currencies, as for instance rouble deposits held with banks in Kazachstan can only limitedly be used as a mean of payment for rouble liabilities in Russia: see BOFINGER (1993a).

was not overwhelming: the reduction of transaction costs associated with EMU was estimated to amount to only 0.3 % to 0.4 % of the EU-GDP. A clear advantage of absolutely fixed rates can likewise not be derived from empirical studies analysing the effects of exchange rate variability on trade. All available studies have come to the conclusion that unstable exchange rates have no negative effects on trade volumes.[11]

With the relatively weak evidence of the microeconomic advantages of EMU it is not surprising that such considerations did not play a major role in the overall assessment of the Maastricht Treaty by the majority of the economics profession.

3.2. The impact on the size of foreign exchange reserves

KAFKA (1969) observed that the aggregate reserve demand of a group of countries decreases if they form a monetary union. This argument, which is based on the diversification effect of reserve pooling, was also mentioned and specified in the report of the EU Commission (1990). With an aggregate stock of foreign exchange reserves of EU central banks amounting to 400 billion US-$ in 1988, the Commission calculated potential savings of reserves amounting to 200 to 230 billion US -$, which corresponds to 4 % of the EU-GDP.

This topic did also not very much influence the discussion on EMU. On the one hand the Commission had to admit that the actual savings would be amount lower the predicted, as the EU central banks have always invested their foreign exchange reserves in the form of interest-bearing bonds. On the other hand it is difficult to

[11] See IMF (1984) and the sources quoted by EC Commission. (1990). Looking at this research, one has to ask whether such studies can correctly describe the negative effects associated with exchange rate instability. As they only take into account trade volumes, they disregard the effects of exchange rate changes on the structure of the foreign trade. They also neglect the effects of currency uncertainty on the investment decisions of export oriented countries.

imagine that the EU central banks could sell large amounts of Dollar assets without provoking immense instability on the markets. This issue indicates the more basic problem that the relationship between EMU and third countries has not been settled yet.

3.3. The efficiency of monetary policy under alternative currency regimes

From the perspective of the 1990s the most serious flaw of the traditional literature on optimum currency areas (and all recent publications based on it) is the complete neglect of all effects that the choice between absolutely fixed and adjustable exchange rates implies for the conduct of monetary policy. Of course, it was realised already in the 1970s that the membership in a monetary union would be identical with the loss of monetary policy autonomy (ISHIYAMA 1975). The argumentation, however, was completely determined by a Phillips-curve trade-off: If countries have different optimum combinations of unemployment and inflation, the membership in a monetary union - requiring a common inflation rate - would lead to suboptimal values in the national social welfare functions.[12] While such considerations can be disregarded today[13], this does not mean that one can totally neglect the role of monetary policy in the discussion on optimum currency areas. The relevant issue was formulated most clearly by McCALLUM (1989, p. 296):

" (...) it becomes apparent that it is misleading to pose the policy issue in terms of 'fixed versus floating rates'. The actual issue is the choice of an appropriate rule for monetary policy."

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[12]This is the most important argument for flexible exchange rates put forward by JOHNSON (1972).
[13]This aspect could only become relevant if countries have to finance their expenditures to a high (and divergent) amount through seigniorage (OHR 1993). In the EC this form of financing is important only for Greece.(EU Commission 1990, p. 122).

Seen from this perspective a completely new dimension has to be added to the discussion on optimum currency areas and also which has important implications for the assessment of EMU. In the following the most important arguments constituting such a "monetary approach to the theory of optimum currency areas" will be discussed. They are related above all to three issues:

- the credibility of the monetary policy, which is mainly determined by the degree of political and economic independence of central banks,

- the effects of asymmetric **monetary** shocks on macroeconomic targets under different currency regimes, and

- the efficiency of monetary policy (stability of money demand, efficiency of monetary instruments) in areas with a very high degree of financial market integration.

3.4. Credibility of monetary policy

In the more recent literature on monetary policy the phenomenon of time inconsistency of optimal monetary policy strategies has been intensively analysed. Based on the seminal papers of BARRO and GORDON (1983), it became clear that the real sector costs of a monetary policy which aims at price stability are lower the higher the credibility of a central bank. "Credibility" in this context is defined as the conformity between the inflation rate expected by private market participants and the (low) inflation rate announced by a central bank. Thus, for central banks with a low credibility the output and employment costs of disinflation polices are relatively high. These costs could, however, be reduced if a central bank were able to improve its credibility by the

introduction of an adequate "**commitment technology**". In other words, it has to find a mechanism by which it can make its announcement of a low inflation rate more credible.

In this context the discussion on optimum currency areas obtains a completely new orientation as the membership in a currency union can be interpreted as a very strong commitment technology. The surrender of all national monetary policy responsibilities to a supranational central bank system is the most obvious signal that a country is no longer attempting to make use of surprise inflation. Of course, this requires that the central bank which in charge of the common currency has a higher credibility than the national central bank. Many years before the discovery of the phenomenon of time inconsistency Milton FRIEDMAN (1973) has strongly recommended such a monetary policy strategy for developing countries:

"The surest way to refrain from using inflation as a deliberate method of taxation is to unify the country's currency with the currency of some other country or countries. In this case, the country in question would not have a monetary policy of its own. It would, as it were, tie its monetary policy to kite of the monetary policy of another country, preferably a more developed, larger and relatively stable country. Hong Kong is an obvious example (...). While the use of a unified currency is today out of fashion, it has many advantages for development (...).Indeed I suspect that the great bulk, although not all, of such success stories of development have occurred with such a monetary policy or absence of monetary policy."

In the debate on EMU this aspect has been ignored almost totally.[14] The integration process decided upon in the Maastricht Treaty shows this very clearly: The convergence criteria force countries with higher inflation rates to reduce their inflation rates independently , i. e. on the basis of relatively low credibility of their national central bank. Under the aspect of monetary policy credibility the inevitable disinflation

[14]See, however, Paul de GRAUWE und Guiseppe Tullio (1993)

process would be less costly for countries like Greece and Portugal if they were allowed to stabilise under the aegis of the more credible European Central Bank. Unfortunately this strategy is now definitively ruled out by the Maastricht Treaty.[15]

Seen from this perspective a currency union could be beneficial not only to high inflation countries but to all EU member countries in general. As it transfers all monetary policy responsibilities from the national to the supranational level, it considerably reduces the influence of national politicians on the conduct of monetary policy.[16] Of course, this effect depends on a common central bank system which is designed similar to the model of the politically independent Bundesbank. The statute of the ECB that was agreed in the Maastricht Treaty has copied the Bundesbank Act as far as possible and is in some aspects even more stringent.[17]

3.5. The role of asymmetric monetary shocks

Nothing makes the one-sidedness of the traditional theory of optimum currency areas more obvious than the fact that it deals so intensively with the possible disturbances of real shocks, but at the same time completely neglects the negative macroeconomic effects that can be associated with asymmetric monetary shocks under any system of adjustable exchange rates.

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[15] See BOFINGER (1993 b).

[16] The problem of political interference would be most serious in very small currency areas. If one assumes, for instance, currency areas that are identical with the states of federative countries, even a politically independent status of the central bank could not prevent a stronger informal pressure on monetary policy decisions.

[17] This benefit of a monetary union which is based on the "Denationalisation of Money" (HAYEK) was introduced into the EMU debate by Olaf SIEVERT (1993). For discussion about the construction of the ECB see BOFINGER (1993 c) and VAUBEL (1993).

If one tries to identify such effects, one is confronted with the fundamental problem that there exists no normative theory of international money and capital movements. Many economists are of the opinion that market determined capital movements and exchange rates optimal per se: "The market can do no wrong". Thus, they would simply deny the possibility that unrestricted money and capital movements could lead to suboptimal macroeconomic outcomes. Consequently, the mainstream view has neglected these issues in its analysis of optimum currency areas.

Despite its popularity this reasoning does not provide an adequate treatment of the problems that are raised by very mobile international financial flows and by market determined exchange rates. Even if it might seem obvious to compare the foreign exchange market with the market for potatoes, one should not stop the analysis at this point. A closer examination reveals very fundamental differences between these two markets:

- Unlike the price for potatoes the exchange rate is a fundamental macroeconomic variable, whose optimality can only be judged in the context of overall macroeconomic targets. In this respect it is important to regard in which way the theory of optimum currency treats asymmetric real shocks. Irrespective of the microeconomic origin of such shocks it is only concerned with their impact on inflation and unemployment under different monetary regimes. In this theoretical framework it seems to be sufficient to show that the overall macroeconomic situation is better under adjustable than under absolutely fixed rates.

- Whereas the price for potatoes is mostly determined by the utility households attach to the consumption of potatoes and by the individual production costs of potato farmers, such real factors have almost no importance for foreign exchange markets. The only

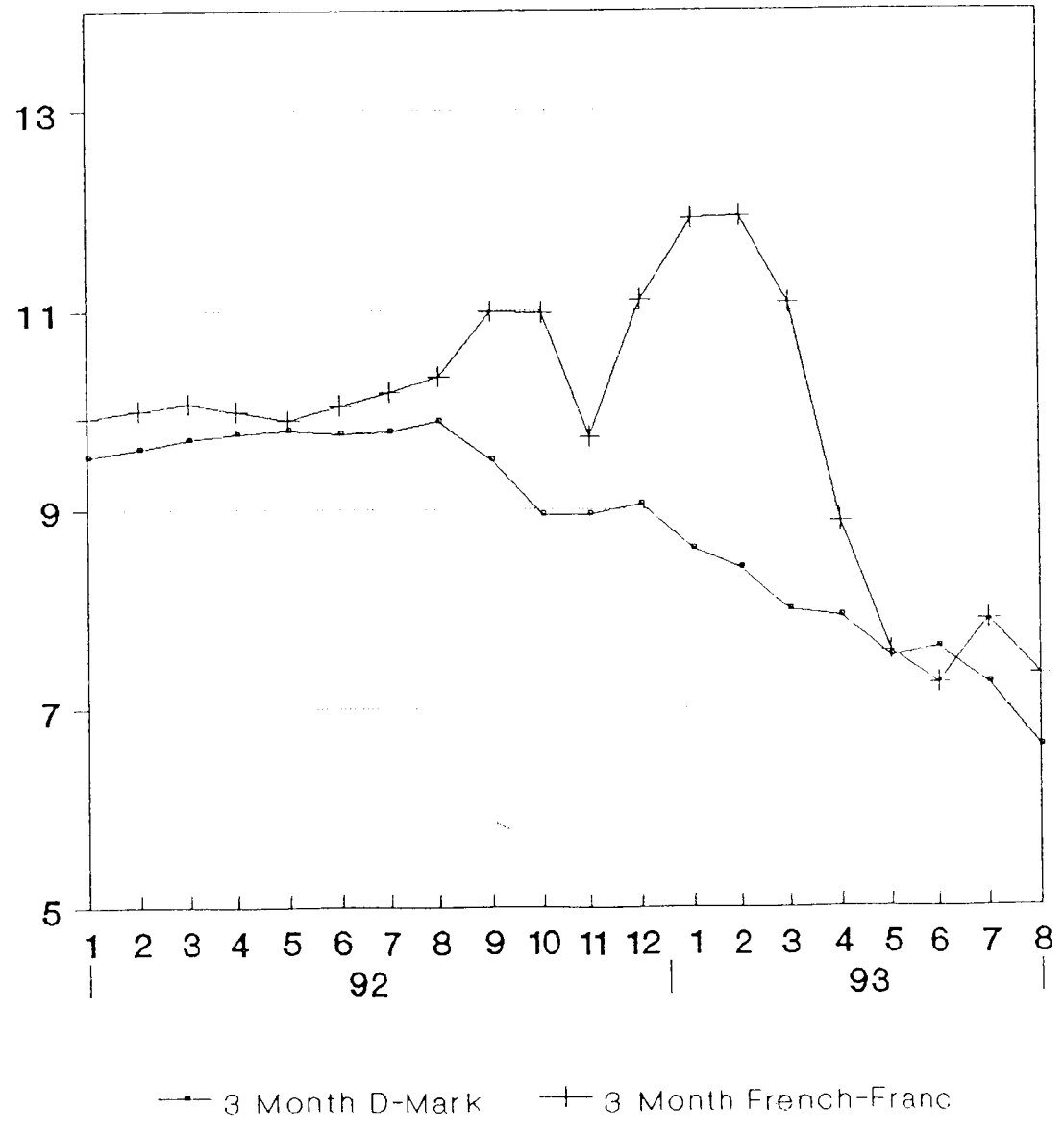
utility foreign exchange deposits provide to an investor is the possibility to sell them against the national currency at a latter date. Thus, speculators are mainly concerned with estimates of how other speculators will assess exchange rates in the future. As a consequence, there is a strong element of circularity which can always lead to speculative bubbles so that the actual exchange rate completely loses the contact with its "fundamentals".

Thus, a microeconomic foundation of the theory of foreign exchange markets it is not adequate to stop with the analogy with the potato market. While this task goes beyond the scope of this paper, it seems at least obvious that the individual rationality of foreign exchange market speculators does not necessarily lead to outcomes that are optimal in terms of macroeconomic targets.

Such a situation was given above all in the period after September 1992 when the ERM countries with the lowest inflation rates became the object of massive speculative attacks. The effect of this shock on output and employment in France (and the smaller low inflation countries) was clearly negative. Interest rates had to be kept at levels that were much higher than what would have been required under purely domestic considerations (chart 2). Thus, analogous to the traditional theory of optimum currency areas one can label capital movements that have lost any contact to macroeconomic fundaments as asymmetric monetary shocks.

In this respect the ERM crises since September 1992 have contributed a lot to the understanding of the costs of a non-monetary union. The continuos capital flows out of the French Franc into the D-Mark confronted the two central banks with a dilemma which was difficult to solve:

Chart 2: Short-term Interest rate differential for D-Mark and French-Franc



Source: Deutsche Bundesbank and OECD

- Germany and France could have decided to devalue the Franc against the D-Mark. With a lower inflation rate in France than in Germany the already unfavourable competitiveness of German firms would have deteriorated even more. The result would have been an even further increase in the German unemployment rate. At the same time such a policy would have resulted in a loss of confidence in the French Franc which was unjustified by the macroeconomic situation.

- The other option was a defence of existing the parities by an increasing interest rate gap between the Franc and the D-Mark. This policy was followed until the end of July 1993 (graph 2). It reached its limit when a policy of high interest rates had become completely incompatible with the deterioration of the economic situation in France.

Thus, the adverse effects of such asymmetric monetary shocks on all countries involved provide an important argument against all monetary arrangements based on adjustable exchange rates. The complete avoidance of such shocks constitutes a very fundamental benefit of any monetary union. Surprisingly this issue was not even mentioned in the comprehensive study by the EU-Commission (1990). Under the arrangement of a single currency such speculative attacks can basically not occur. This is also the case under monetary union where national currencies are irrevocably locked:. With the complete substitutability of currencies and the unlimited ability of the common central bank to exchange currencies against each another the rationale for speculative attacks is absent. If that nevertheless were to happen, the ECB could react to such a portfolio shift by reducing the Franc money supply and increasing the D-Mark money supply, while the aggregate money supply would be kept constant. In principle, the Bundesbank could have reacted to the ERM crisis in a similar way. However, under present institutional conditions it is understandable that it was not ready to react in such

a "symmetric" way. Above all, unlike the ECB, it had no guarantee that a reduction in the money supply in France would indeed take place.

3.6. The efficiency of monetary targeting and monetary policy instruments in areas with a high degree of financial market integration

A main flaw of the traditional theory of optimum currency areas is that it cannot explain why a nation is a better currency area than regions or even cities of that nation. Under aspects of monetary policy efficiency the answer is much easier:

Within a nation state financial institutions can operate freely and residents can shift their assets without limit from one region to another. Breaking-up a nation into separate currency areas has, therefore, the effect of leading to less stable money demand functions:

- Intra-regional shifts occurring within a common currency area only affect the regional money demand functions but not the national demand function.

- The creation of regional currency areas by itself increases the amount of intra-regional capital flows because of currency speculation.

Thus, nobody would suggest to give for instance the Landeszentralbank in Bavaria (the regional central bank performing the Bundesbank´s functions in the state of Bavaria) the right to pursue an autonomous monetary policy for Bavaria.

With the creation of the internal market in the area of the EU, for financial transactions and activities national borders have become completely irrelevant. Thus in this respect

the analogy with a federative state seems quite appropriate. Already now the stability of an aggregate EU money demand function is higher than that of the national money demand functions. Using econometric estimations KREMERS and LANE (1990, p. 777) reached the following results:

"Aggregate demand for M1 in the countries participating in the exchange rate mechanism (ERM) of the European Monetary System is shown to be a stable function of ERM-wide income, inflation, interest rates, and the ECU-dollar exchange rate.(...) This results, if robust, suggest that, even at the present stage of economic and monetary integration, a European central bank might be able to implement monetary control more effectively than the individual central banks."

Despite methodical criticism (BARR 1992) several recent studies confirm the finding of a stable money demand function for Europe.[18] The increasing integration of the financial markets in Europe will over time reinforce the superiority of a European monetary targeting over nationally oriented policies.

Additional advantages for the conduct of monetary policy in areas without internal borders for financial activities are related to the use of monetary policy instruments. A European central bank could continue to apply the instrument of minimum reserves. With independent national central banks it seems now clear that this instrument would have to be given up completely. Already now the competition between financial centres in Europe has led to a very far-reaching reduction of minimum reserve ratios all over Europe, especially in Germany.

The attempt of market participants to circumvent such restrictions has also negative effects on monetary aggregates. This is especially true in the case in Germany. Since

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[18]See SARDELIS (1993) as well as KREMERS and LANE (1992).

several years the German money supply M3, extended by Euro deposits of Germans and short-term bank bonds issued by German banks, shows a strong deviation from the traditional money stock aggregate M3 (Table 3): Until now the Bundesbank has not been able to give a satisfactory explanation for this deviation. This indicator is not complete either, as it only records Euro-deposits, which are held with foreign subsidiaries and foreign branches of German credit institutions, while it does not include deposits of German investors held with foreign banks.

Thus, a European monetary union has the substantial macroeconomic advantage that it leads to a European monetary constitution, which especially from the point of view of "Ordnungspolitik" is the only viable solution for a financial area without national frontiers. From the German perspective it is particularly attractive that the future European Central Bank System is very similar to the model of the Bundesbank.

3.7. The size of integrated financial markets as a substantial determinant of optimum currency areas

The explicit consideration of monetary aspects leads to criteria which all show a bias in favour of relatively large currency areas. Thus, while the traditional theory would call for the breaking-up of all existing monetary unions into very small currency areas, the approach developed here provides a clear justification for maintaining at least the existing currency areas.

In the case of the EU, within which all internal borders for financial transactions have been removed, this argument calls for a rapid realisation of a monetary union. It should remain open whether weaker forms of financial market integration - especially among countries where all restrictions for capital movement have been removed - would

Table 3: Money Supply M3 (traditional and extended)

Rate of Change

Year	M 3 traditional (average)	M 3 extended
1987	7,3	6,9
1988	6,3	6,6
1989	4.5	8,4
1990	5.6	7,8
1991	6,1	7.2
1992	8,4	9,6
1993 Mai	7,1	9,9

Source: Deutsche Bundesbank; the rates of May 1993 show the changes calculated for the last six months on annual rates.

already be sufficient to justify the introduction of absolutely fixed exchange rates. In any case there is no doubt that the consideration of monetary aspects allows a much more comprehensive and balanced assessment of the desirability of common currency areas. Because of its bias in favour of large currency areas the "monetary approach" presented here offers an important counterweight to the reasoning derived from the traditional approach. The advantages of large currency areas are additionally enhanced if one assumes that the independence and thus the credibility of the monetary policy in a supranational central banking system will be more pronounced than in national (and local or regional) currency areas.

Thus, the extension of the theory of optimum currency areas developed in this paper makes it possible for the first time to formulate a real optimisation process, as it allows to compare the economic benefits of small currency areas (based on the analysis of real shocks) with the advantages of large currency areas (based on the analysis of monetary policy issues).

4. Is the European Union an optimum currency area ?

Even if one would confine the discussion on EMU to the traditional theory of optimum currency areas, it would be difficult to make a convincing case against the creation of EMU, as it was decided upon in the Maastricht Treaty. None of the economies in the EU have much in common with MUNDELL's "one country-one sector model". Thus, it is fundamentally difficult to imagine a major asymmetric real demand shock at all. In fact, in the many publications of the EMU critics not a single concrete example can be found. With the high international openness of most EU-countries and the intensive experience of all national trade unions with inflationary developments it is hardly plausible to assume a relevant degree of money illusion. Finally it is absolutely uncertain whether

adjustable exchange rates in Europe would always react to asymmetric shocks in the way being described in the theory of optimum currency areas. With the de facto collapse of the EMS in July 1993 this seems even less guaranteed than in the years before.

While potential real shocks do not speak against the creation of EMU, all monetary arguments are certainly in favour of this arrangement. For countries with a less pronounced stability tradition than Germany the creation of an independent ECB would lead to an enormous improvement of monetary policy credibility. In addition, negative effects on employment and inflation caused by asymmetric monetary shocks could no longer occur. Finally, with regard to monetary efficiency, it would be advantageous that a single monetary institution is in charge of the integrated financial market in Europe

For those who find all this too futuristic there is finally a famous quote from John Stuart MILL (1984, p. 176):

"(...) So much of barbarism, however, still remains in the transactions of most civilised nations, that almost all independent countries choose to assert their nationality by having, to their own inconvenience and that of their neighbours, a peculiar currency of their own."

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