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Targeting a European Monetary Aggregate

Review and Current Issues

Christopher Sardelis*



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1 INTRODUCTION

Twenty years of research in the field of intermediate targeting have clearly shown that finding a stable relationship between a monetary aggregate and output or inflation constitutes a promising but not a sufficient evidence that the particular aggregate can be successfully used as an intermediate target for monetary policy. An obvious reason for that can be traced back to the so called Lucas-critique, stating that when private actors realise that a particular relationship is used for policy decisions, the estimated parameters become more or less irrelevant as the policy measures can be anticipated and discounted in private behaviour. Moreover, to the extent such a relationship is necessary for anchoring monetary policies around a single aggregate, its mere existence has become a rare phenomenon. In Europe for example, it is only Germany which still can use its M3 as a reliable intermediate target, and it has been suggested that it depends on the slow development of the German financial markets. In countries where rapid financial innovation supplied a wide range of close substitutes to traditional monetary assets, similar relationships broke down.

In spite of the fact that a good correlation between monetary aggregates and real activity has been difficult to establish for individual EC-countries, several studies indicate that such a relationship exists at the Community level. It is therefore tempting to draw the conclusion that centralising monetary policies and targeting Community-wide aggregates can be a promising alternative to the existing system. Nevertheless, without questioning the empirical findings, several question marks can be put at the conclusion that all essential preconditions for monetary targeting at the Community level exist. The interpretation problem is discussed in the next chapter.

Chapter 2 is therefore devoted to a general investigation of the problem, starting with basic concepts, then trying to find a rationale for monetary targeting at the European level and finally investigating some of the consequences such a change may have on the functioning of the ERM. At one level, the conclusions are quite trivial as several well-known difficulties for successful targeting are found to be relevant and that a change of the present regime would drastically change the climate for policy coordination in the Community.

Chapter 3 summarises some econometric studies, which find a stable relationship between a European monetary aggregate, inflation and output. Having established this fact, we contrast some of the conditions for the *ex ante* stability of the function with the actual economic environment when it will be used, focusing especially on the influence of the present system on the estimators, and the influence of various types of financial innovation when the time for actual targeting comes. Again, the basic conclusion is that the econometric evidence is far from convincing about the prospects of actual targeting, giving the false impression of finding a solution to current problems.

Finally, chapter 4 takes up the difficulties of achieving unanimous decisions about the monetary target, given differences in the preferences of the member states. We also examine some of the difficulties in controlling money supply in a decentral-

ised institutional arrangement, i.e. an environment where national central banks still play a role in monetary management and the European aggregate is considered as the sum of national money. No substantial room is found for democracy, or subsidiarity, unless one is willing to bear economic costs in terms of unwarranted inflation, inefficiency and dynamics which are not compatible with other, more fundamental, ambitions of the Community.

In conclusion, several reasons for a cautious interpretation of the econometric evidence are presented. However, it must be strongly emphasised that just as the comforting empirical results are found insufficient as a guarantee for successful actual targeting, so is the scepticism arising from our critical remarks not sufficient for ruling out this possibility. Nothing but preconditions are examined in both cases, and both suffer from their *ex ante* nature.

2 TARGETING MONEY SUPPLY: PROBLEMS AND POSSIBILITIES

As Europe moves towards the creation of a monetary union, the question of intermediate targeting for the prospective European Central Bank (ECB) came to the surface. It is particularly important for the Community to find reliable intermediate variables, not only because one needs to show that a good technical alternative to the present system there exists, but also because such variables may facilitate two other functions, namely monitoring the actions of the ECB and exercising central bank accountability. The latter are probably of more fundamental importance, because member states face the prospect of voluntarily abdicating national monetary policies in favour of an independent, supra-national institution.

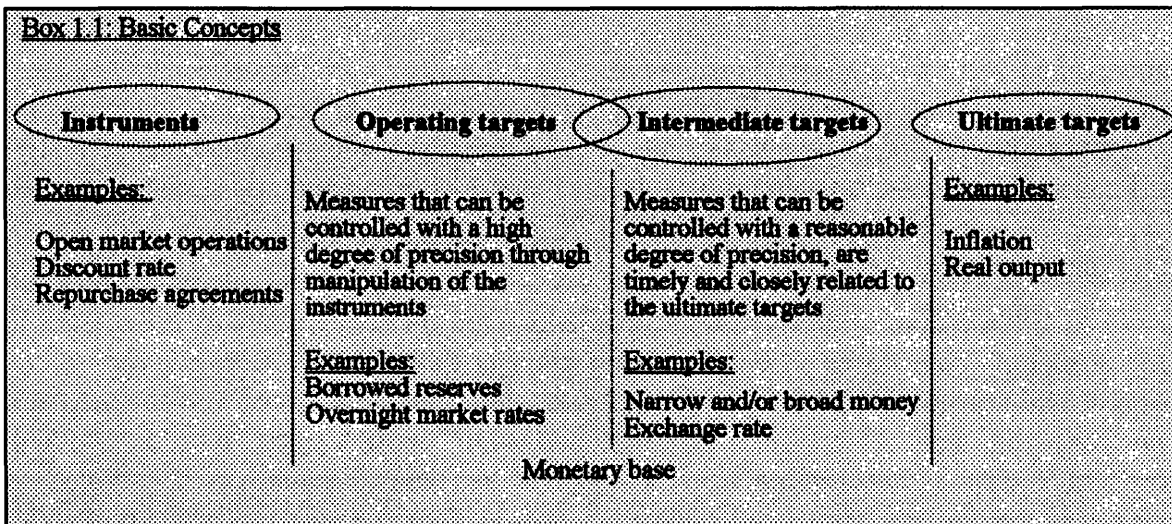
Targeting a European Monetary Aggregate (EMA) would therefore serve a double purpose. The first is the traditional one of providing a means of anchoring monetary policies. The second consists of making the operating actions of the ECB more transparent, not only for market participants but also for the governments of the member states. However, virtually all economists share the opinion that it is difficult to maintain a good correlation between intermediate and ultimate variables, if the former are systematically used in order to affect the latter. Then, the dilemma of using an intermediate variable only as an economic indicator, i.e. "soft use", or as an indicator of the policy stance, i.e. "hard use", arises. Soft use is probably necessary for the functionality of the intermediate variable in the long-run, but hard use is what monetary authorities from-time-to-time are tempted to adopt in order to correct disequilibria. So, if the trade-off is relevant, there is a time consistency problem, insofar an intermediate variable becomes useless when used. The following review of basic concepts and relations may help to clarify the reasons.

2.1 Basic Concepts

Box 1 gives an illustrative description of the concepts usually encountered in the debate of intermediate targeting. The most well-defined concepts are the *instru-*

ments and the *ultimate targets*, found at the two extreme points of the spectrum. Between them, there is a range of variables classified either as *operating* or *intermediate targets* whose function is to link the two extremes. These two concepts are overlapping and which measure falls under one or the other category depends on how well monetary authorities can control it. Operating targets are better linked to the instruments with respect to the controllability property, whereas intermediate targets are usually better correlated with the ultimate targets.

Following this structure, it is easiest to understand the use of intermediate variables if monetary policy is decomposed into two or three stages.¹ In the first stage, central banks determine the value of the intermediate target which would be consistent with the desired ultimate policy objective, under a variety of *ex ante* assumptions. At the second stage, the central bank proceeds, in some *ex post* fashion, to treat achieving this value of the intermediate target as if doing so were the objective governing policy. This second stage can be further decomposed in the same backward fashion into two substages. First, the central bank sets operating targets which are consistent with the intermediate targets and which, also *ex post*, are treated as if they were the ultimate policy objective. Second, daily use of the instruments is governed by the objective of achieving the operating targets, as if the latter were the overriding policy objective.



This backward procedure hints at the existence of (at least) two problems. The first consists of the controllability of the intermediate targets. Clearly, all intermediate variables are *endogenous* and controlling money supply presupposes that Central Banks exert satisfactory control over the money-creation process. The second stems from the difficulties of maintaining good correlation between intermediate and ultimate targets, the s.c. *stability* problem. To the extent rational expectations guide the actions of private actors, there is a risk that market manipulations undertaken by monetary authorities in order to achieve price or quantity changes are anticipated, and, on average, monetary policies have no effect. Besides, financial innovation provides continuously an appropriate panoply of hedging instruments, sufficient to make monetary policy quite ineffective. So, the links in the

¹ See also Friedman (1990).

chain of variables connecting instruments with ultimate targets is probably fragile and time variable. Central banks can either lose control over the intermediate variables or, the latter can show a poor correlation with the goals of monetary policy. These risks have been at heart of the debate.

The controllability problem arises from the fact that each and every of these variables is endogenous in reality, even if in macroeconomic modelling they are sometimes treated as pre-determined (set by the monetary authorities). Thus, a first trade off appears between controllability and fitness. Intermediate variables are usually chosen because of their good correlation with the ultimate variables but are more difficult to control than operating targets.

The second trade-off has relates stability and usefulness. Intermediate variables that are well correlated and under reasonable control usually lose these properties when they are exploited as "targets", i.e. they are subjected to regular manipulation in order to achieve the ultimate targets. This is because actors can predict the directions of such changes, if they know the normative importance monetary authorities attach to each observation. Therefore, a risk for slippages and overshooting emerges as actors anticipate the stance of next-period policies. If for example money supply is used as an intermediate target, and it currently exerts inflationary pressure beyond the target, an anticipated monetary tightening can be neutralised as an effect of portfolio rearrangements, whereby monetary assets are substituted for non-monetary ones with high liquidity. Asset substitution reduces monetary holdings without affecting the propensity to spending, and fears of excessive tightening may imply dramatic shifts in money demand without any significant effect on sectors deploying active portfolio management. Monetary policies of this kind become quite ineffective as the time passes and it can only affect income distribution.

A third trade-off sets the limits between short-run use and long-run optimisation for monetary authorities. It has been argued that monetary policies cannot affect output and employment in the long-run. This view has gained some empirical support as it has been found that the most successful central banks have conducted monetary policies only with a view on nominal variables. Optimal use of monetary policies over the long-run would therefore require that the set of ultimate targets is confined to price stability.

If so, intermediate targets can be best used to verify that the longer-run thrust of policy is consistent with long-run price stability, given that a good correlation between inflation and the intermediate variable exists. If this is possible, announcement of the intermediate target and adherence to it can serve as a "policy rule", in the sense the term is used in the time-consistency literature.

2.3 Optimal Choices

One of the conclusions from the previous section is that it is not possible to find the optimal intermediate target before the ultimate target is set. So, there is a choice to be made at each level and, of course, we need some criteria for

optimality. The two subsequent sections are therefore devoted to the questions of what might be the most appropriate ultimate and intermediate variables.

2.3.1 The Ultimate Target

In principle, there are three possibilities: Output, inflation or both. On one extreme there is the neoclassical school asserting that in the long-run output is determined by real factors (the potential output). Hence, in the long-run, monetary policies affect only prices and its corollary is that no sustainable real effects can be bought by means of higher inflation. This view has been further refined within the neo-classical tradition, underpinned with the rational expectations way of modelling. Its message is that monetary policies may have real effects only if monetary authorities succeed in surprising economic actors, which by definition can be achieved only on exceptional occasions.

This kind of short-run output oriented monetary policies may have some transitional effects but they are also associated with at least two negative effects, shown in the long-run. First, it creates informational noise and increases the uncertainty about the environment in which economic decisions are taken. Second, private actors are not completely ignorant about the probability of a surprise, since the preferences of the central banks in a democratic society are more or less known. Given that a certain probability of "surprise" is built-in in the economy, short-run policies are successful only if they surpass expectations, raising this way the threshold for securing some real effects. The costs in terms of inflation are therefore accelerating and the returns in terms of increased output (employment) diminishing. In other words, there is a critical point at which it does not pay to continue surprising private actors, and the problem is that this high-inflation natural-unemployment point is reached automatically if the private sector anticipates the process. This is the message from the time-consistency or credibility literature². High inflation is not necessarily a product of current inflationary policies. It is sufficient that prices and wages hedge market actors against such a risk.

The policy conclusions obtained from this literature are straightforward. Binding rules are preferred to discretionary power, because the latter may give rise to expectations about short-run, output oriented policies. Moreover, central banks must be independent, that is not inclined to yield to political pressures for employment boosting policies, and with an unquestionable price stability policy target.

Recent surveys by Grilli-Masciandaro-Tabelini (1991) and Eichengreen (1992) support these conclusions. It is found that central banks acting according to institutional rules which guarantee independence, measures according to some indices, and long-run antiinflationary policy orientation have been the most successful, in the sense that they have a better record with respect to inflation than central banks which pursued monetary policies with a view on a mixture of real

² See Persson-Tabelini (1988) for a review.

and nominal variables, whereas there is no empirical support that the latter category has been more successful in sustaining a lower rate unemployment.

These findings are in line with the statutes of the ECB in the Maastricht Treaty. Interpreting the statutes of the ECB, Alesina-Grilli (1991) draw the conclusion that, in terms of institutional prerequisites, the ECB can be positioned alongside the German Bundesbank. The following discussion takes therefore price stability as the given ultimate target. Having established this, the most obvious candidates for intermediate targeting, i.e. exchange rates, interest rates and money supply can be examined.

2.3.2 The Intermediate Target

Fixing the exchange rate is very important for an economy with a big external sector. Looking at the Community of today, it is easy to notice that it consists of countries which are small and medium-sized open economies with the intra-community trade being the dominating part of their external sectors. It is therefore natural to prefer exchange rate stability. This will not, however, be the case when the EMU becomes a reality, because Europe will be a large closed economy and the uncertainty stemming from devaluation risks for the intra-community trade will be automatically removed. Exchange rate stability *vis-à-vis* third currencies will therefore become less compelling for the European economy than it currently is for its member states.

Looking at the relative merits of the interest rates and monetary aggregates one must find criteria to make the comparison. In a world without risks and complete absence of shocks, the task becomes trivial because interest rates and money supply are perfectly controlled and there is an one-to-one relation between them. Thus, following Poole's classic contribution in the field, an intermediate target is optimal if it provides for good absorption of external shocks.³ It is easy to justify in the context of a traditional IS-LM model for a closed economy that monetary targeting is the best policy rule if real shocks are predominant and interest rate targeting is the most appropriate rule in case monetary shocks dominate. The reason is that real shocks tend to induce interest rate movements in a way that systematically dampen the original shocks, if money supply remains unchanged. If interest rates are flexible, which is the case when money supply is targeted, these movements will be realised, absorbing part of the shocks. If they are not, which is the case when interest rates are targeted, money supply must accommodate the swings in money demand. Income variability is therefore maximised.⁴

This is shown in diagram 1, with IS'' representing a boom and IS' a sudden drop in real demand. Interest rate flexibility implies that the new equilibria are established in positions A and B. Targeting the interest rate however, implies that increased money demand during the boom must be accompanied by increased money supply (LM'') or, in the other case by monetary tightening (LM'). Monetary policies are

³ See Poole (1970)

⁴ An excellent review of the optimal target literature is Friedman (1990).

therefore procyclical, and the equilibrium hovers between the points C and D. Money supply targeting is therefore optimal in the sense it minimises income variability.

The opposite will happen if the same policy rule is applied when the shocks appear on the monetary side. Assume for example the case of a sudden rise in velocity, with the attending drop in money demand. If money supply remains unchanged, excess liquidity will press the interest rate down to point F in diagram 2, or, it will push it up to G if the opposite had happened. Monetary targeting should therefore make income to oscillate between Y'' and Y' . If money supply is flexible, excess liquidity would be mopped up, or, excess demand for liquidity provided in order to keep the interest rate constant. In any case the shocks would not be transmitted to the real side because the interest rate is not allowed to move. Hence, the optimal policy rule is interest rate targeting.

Going back a step to the credibility aspect, Poole's analysis would allow the formulation of a policy rule which stabilises potential output. If so, there is a good chance to avoid high variability in inflation. Targeting interest rates at a level consistent with potential output estimates is a good rule if monetary disturbances are the problem. Similarly, a rule for monetary growth consistent with money demand around potential output constitutes an optimal long-run rule, if the most frequent disturbances have their origin in the real side of the economy.

Needles to say that interest rate targeting is equivalent to exchange rate targeting, if the exchange rate commitment is credible and capital movements unrestricted. The reason is that perfect capital mobility implies that the uncovered interest rate parity condition, $r^A = r^B + \hat{e}$, where r^i is country i 's interest rate and \hat{e} the expected depreciation of the currency of country A *vis-à-vis* the currency of country B. A credible exchange rate means that $\hat{e}=0$ and $r^A = r^B$. Thus, if a country keeps the exchange rate fixed when different asymmetric shocks afflict the own economy, exchange rate targeting and interest rate targeting become equivalent. Moreover, in case the exchange rate is targeted, money supply is automatically adjusted to money demand because capital flows eliminate any tendencies for interest rate differentials. For example, excess liquidity tends to create a negative interest rate differential, inducing outflow of capital. By the same token, excess demand for money will be instantly accommodated by capital inflows. If these flows are not sterilised, monetary equilibrium is always guaranteed. Thus, exchange rate targeting is to be recommended in case monetary disturbances dominate.⁵

⁵ The argument holds even if the exchange rate is not credible but the devaluation risk is time-invariable. In this case \hat{e} is a constant and capital flows are triggered when the interest rate differential differs from \hat{e} .

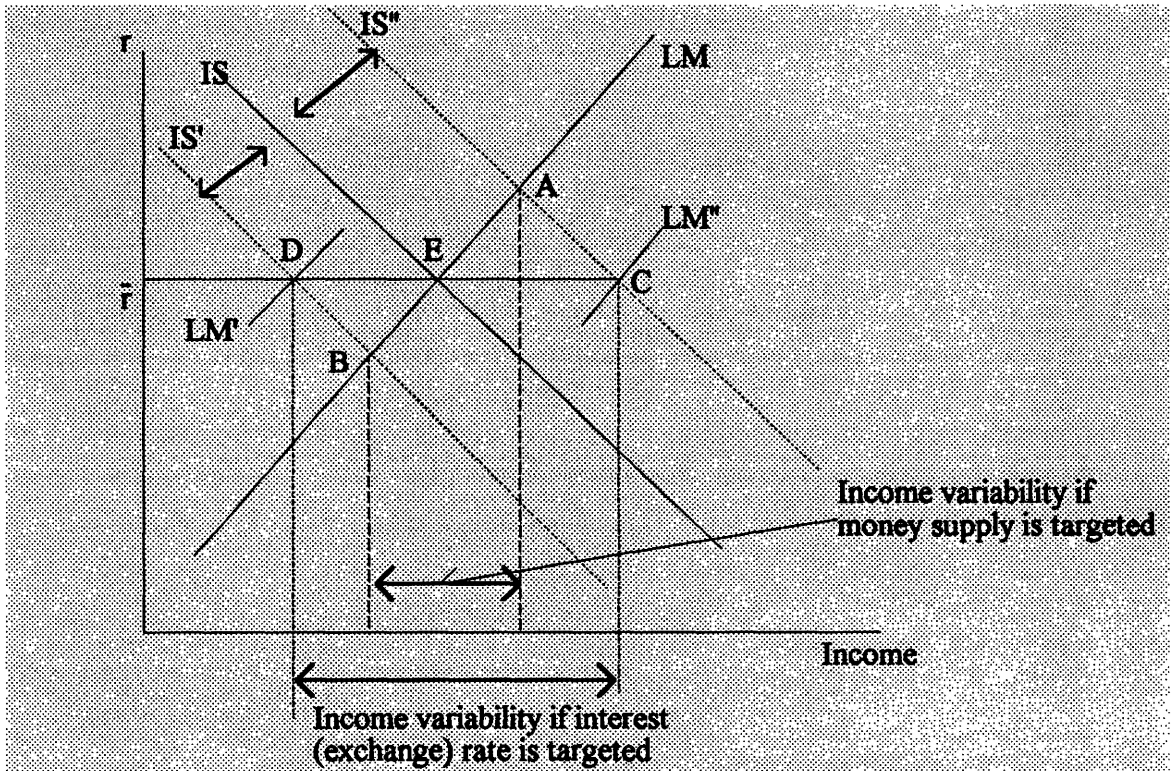


Diagram 1: Monetary targeting reduces income variability if real shocks are predominant

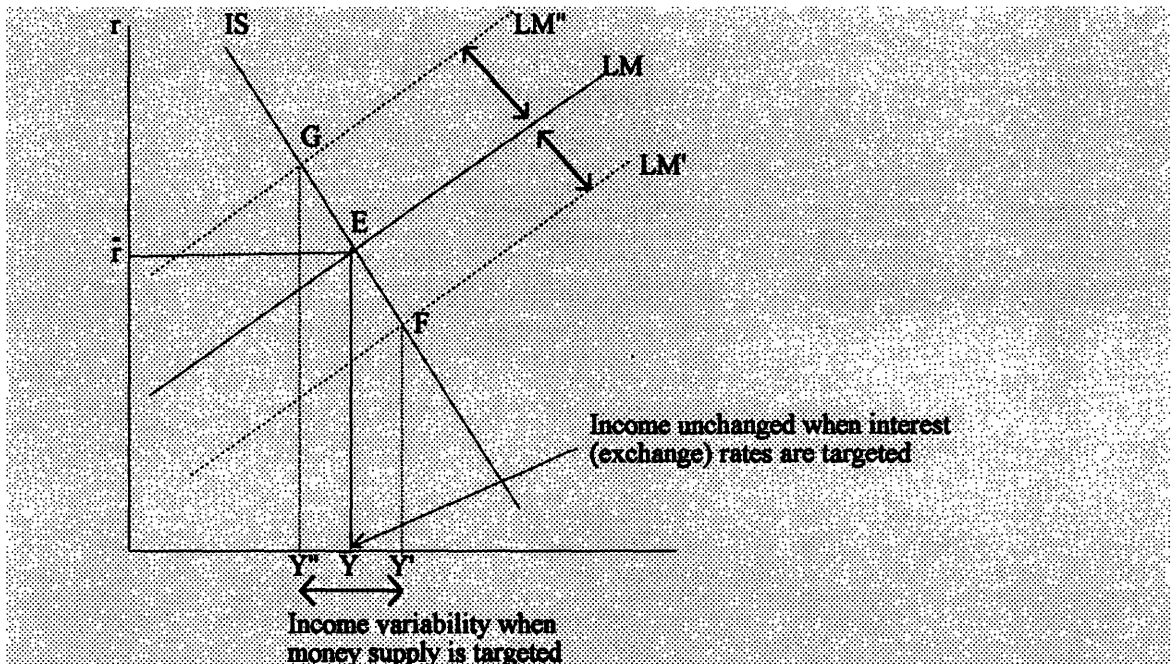


Diagram 2: Interest (exchange) rate targeting eliminates income variability when monetary shocks are predominant

2.3.3 Which variable?

The basic conclusion from the analysis above is that the whole issue of choosing the most appropriate intermediate variable boils down to the empirical question about the most likely sources of disturbance in the foreseeable future. In other words, the crucial point contains elements about which one only can speculate.

Undoubtedly, financial innovation, further discussed in section 3.3, will remain a factor of monetary instability. However, financial markets have been liberalised in the course of the 1980s, and the wave of shocks the European economies experienced in the wake of financial deregulation is about to abate. Thus, what can be expected to the turn of the century is a continuing strain owing to further exploitation of the possibilities that can be attributed to market globalisation, technological innovation and the attending decline in transaction costs.

On the real side, the process of exploiting profitable possibilities is more sluggish, due to considerable sunk-costs. So, the full effects of the internal market and the new political environment in Europe have not yet seen the light. The expected restructuring of the European industries in order to take advantage of the economies of scale and comparative advantages, the catching-up of the poor member countries and the quite unpredictable consequences of the yet unknown future trade relations between the Community and the former communist countries in the central and eastern Europe, certainly constitute sources of mighty real shocks.

Against this background, a plausible scenario for the optimistic advocate of the internal market and sound trade relations with neighbouring countries, is that the real shocks will be quite considerable and, probably, predominant, at least during the next decade or so. Having adopted this view, the logical consequence is that a Community-wide monetary aggregate might be the optimal choice as an intermediate variable, at least as long as real life supports the underlying assumption about the relative strength and frequency of the shocks. There is at least no reason to reject the assumption that monetary targeting is a good choice on the basis of the shock aspect.

2.3 Targets versus Indicators

Intermediate variables have proven to be very sensitive to their use. Trying to exploit their correlation with ultimate targets, as if there is a strong casual relationship between them, is sometimes considered as the main reason behind the breakdown of the correlation.

In principle, there are two potential uses for an *ex ante* good correlation between money supply and output or inflation. One consists of using it as an indicator of the current state of the economy. There is a strong case for looking at money supply as a timely indicator because financial statistics is easier to collect than measures of real output in most countries. It is also found that the path of narrow money often leads the time path of real output and inflation. The other potential use of an intermediate variable is to treat it as an indicator of the policy stance. This is the

case when one tends to believe in causality. The question is whether there is a trade-off between these alternative uses.

Good correlation between two endogenous variables is by definition not equivalent to a strong casual relationship between the same variables. In general, it is expected that variables which show a very close short-run correlation with real activity, such as total wealth, are usually beyond the accurate control of the authorities. On the other hand, variables under good control, as narrow money, only have a remote conceptual connection with ultimate variables and, of course, empirical correlation must be influenced by the behaviour of many other variables.

It shows that the issue is not only of theoretical interest. It has consequences for our view of the potential uses of the intermediate variables. Considering alternative transmission mechanisms for monetary policy, good correlation between money and, say, nominal income, can be found in either of the following cases.

Case 1: Instruments \longrightarrow Money \longrightarrow Nominal Income

Case 2: Instruments \longrightarrow Nominal Income \longrightarrow Money

In the first case, monetary instruments affect nominal income because they affect money. This is the monetaristic view and if it is adopted, controllability of money, the intermediate target, is of utmost importance.

Assume however that the challenging view is correct, namely that credit, not money, is what really matters. There is of course a close statistical correlation between the two measures, as one is found on the liability side and the other on the asset side of the banking sector. So, if real activity is propelled by credit expansion, there would be a good correlation between money and real activity as well, at least as long as deposit banks stand for the bulk of the credit supply. If monetary policies, say high interest rates, reduce credit demand and nominal income, then money demand will decline as well. In this case controllability of money is of secondary importance (but not controllability of credit). The same is true if interest rates affect nominal income directly, due to their impact on wealth, which in turn is reflected in monetary holdings. Again, controllability of long-term interest rates becomes crucial and the only use of money in these cases is of a *timely indicator*. This potential use presupposes that there are information lags on the current development of the economic activity, and that the relationship between money and income is stable.

Whatever is true with respect to transmission of monetary policies, a stable relationship between money and ultimate targets seems to be necessary in both cases. As a matter of fact, stability is a weaker property than controllability, in the sense that controllability becomes more or less useless in case of instability. The opposite, however, is not necessarily true. Money supply can be out of the range of monetary authorities without losing its importance as a good economic indicator.

The general notion among economists is that stability is undermined by the active use of intermediate variables as targets rather than indicators. The reason is that financial innovation supplies instruments that help private actors to better hedge their portfolios and prevent monetary policies from affecting their business. Quantitative controls can also be by-passed by the same token. For example, secu-

ritization reduces the possibilities of the monetary authorities to affect credit expansion, since control over the latter presupposes that the bulk of private sector credit is supplied by deposit banks, which are subjected under the supervision of the monetary authorities. Moreover, increased credit expansion outside the banking sector would damage the relationship between money and final goals, especially if one adopts the view that credit, wherever it is generated, has an impact upon them.⁶

In conclusion, stability in the link between intermediate variables and final goals is a necessary property, independently of the particular use of the variable. Controllability is important only if the intermediate variable is used as a target, but less material if used as an indicator. Nevertheless, systematic use of a variable as a target entails the risk that both properties disappear.

2.4 Why Targeting a European Monetary Aggregate

Despite the warnings raised in the previous section, several useful functions can be attached to intermediate targeting, especially in the case faced by the Community. Taking for given that a stable long-run relation to ultimate targets exists, relatively prompt reporting and leading indicator properties make money a *timely indicator* of economic activity. It can therefore form a basis for formulation of monetary policies. Next, used as an indicator of the stance of monetary policy, a monetary target constitutes a useful means of *communicating the intention* of the European Central Bank to the European governments, to financial markets and, more generally, to the public. This might be a particularly sensitive issue in the case of the EMU, because announcing its intentions in a persuasive way, the independent ECB can help the governments in formulating their fiscal policies, so that the attained policy mix is appropriate.

Moreover, following the backward procedure mentioned in section 2.1, intermediate targets form a basis for central bank *accountability*. If the monetary targets are derived in a consistent way from the commonly formulated and generally accepted price stability target, the procedure of monitoring the actions of the ECB will be helped by the use of feasible intermediate targets. Accountability can be exercised on the basis of the intermediate targets, and it will be also easy to go a step further and examine whether the operating targets have been appropriate with respect to the intermediate target.

The advantage of using an intermediate rather than an ultimate variable for the accountability procedure stems from the fact that accountability must be based on variables which are under reasonable control. This constraint makes ultimate targets less attractive. Moreover, monitoring the operations of the ECB requires an informational link between inflation, other policy objectives, e.g. employment, and the operating targets. If the ECB does not provide this link explicitly, despite its relative competence to do it, all the other parts who are interested in monetary

⁶ The causality debate goes back to Gurley-Shaw (1955). Gertler (1988) gives an insightful overview. See also Bernanke (1983), Stiglitz (1989) and Blinder-Stiglitz (1983).

policies (the governments, the markets, the Commission etc) will do it independently from each other. It is not difficult to imagine a situation when all operations are scrutinised with conflicting views, especially when even conflicting interests are present.

Intermediate targets facilitate also the formulation of policy rules, meaning that explicit monetary targets help to narrow down the room for discretionary jumps in the policy. This is an additional advantage, which may create *discipline* and strengthen the credibility of the ECB, according to the insights of the time-consistency literature. Formulation of intermediate targets *de facto* reduces the set of discretionary measures to what is consistent with price stability. As Davis (1990) puts it, "the appeal of intermediate targets in providing a nominal anchor for policy decisions is fairly clear. Such targets can provide, in principle, an indication that the longer run thrust of policy will be consistent with longer run goals for price behaviour".

Another argument for moving towards policies based on targeting an ERM-wide monetary aggregate, appeared in connection with the crisis in the exchange rate mechanism, the ERM. The idea is that targeting an ERM-wide aggregate will automatically bring *symmetry* to the system. Clearly, in a Community of equals it is difficult to find arguments for conducting monetary policies based on leader-follower relations among the countries, as we do in the asymmetric system of today. It is one of the reasons for taking as given the idea of targeting an EMA in stage III of the EMU. Nevertheless, the recent ERM crisis, where the leadership of Germany has been questioned, helped to revive the interest of targeting a community-wide monetary aggregate even before stage III, in the hope that it would strengthen the stability of the ERM and/or restore the credibility of the parity grid. It is therefore of particular interest to examine the consequences of such a change, which is made in the next section.

In conclusion, the risks a central bank runs when intermediate variables are used as targets rather than as simple indicators must be weighted against the numerous advantages of doing the latter. Since long-run stability is necessary, targets should also be used as long-run indicators of the policy stance. Early announcement of a monetary target can serve as a policy rule which, if credible, may help to maintain monetary stability at low social costs.

2.5 Consequences for the ERM

Financial liberalisation and integration in Europe have proceeded to a degree that lends substantial realism to the traditional assumption of perfect capital mobility. There is therefore good reason to believe that the uncovered interest rate parity condition, $r^A = r^B + \hat{e}$, where \hat{e} is the expected rate of depreciation of the currency of country A, holds. Obviously, the interest parity condition holds for any level of interest rates, and this indeterminacy gives rise to the problem of anchoring the exchange rate mechanism around a particular interest rate level.

In principle, the available possibilities are two, termed symmetric and asymmetric. In its pure form, the asymmetric system is one in which a single country, usually

called the centre country⁷, is chosen to conduct an independent monetary policy whereas the rest of the countries participating in the exchange rate mechanism, the so called peripheral countries, conduct policies that only maintain the exchange rates fixed. Arranging division of responsibilities this way implies that the system is anchored around a common interest rate which is produced by the monetary policy of the centre country. The mechanism equalising interest rates across the countries is capital movements. In the sequel, capital movements are assumed to be perfect.

In the other extreme model, the symmetric one, monetary policies are co-ordinated so as an area-wide monetary aggregate is targeted. This model is compatible with a variety of institutional solutions, ranging from completely centralised (a common central bank) to completely decentralised forms in which national central banks target a fraction of the total aggregate by controlling domestic credit expansion. Worth noticing is that even this model produces a common interest rate for the whole area, if financial markets are completely integrated.

There is little doubt that the ERM, as it functions for the time being, is very close to the theoretical asymmetric system of fixed exchange rates, with Germany playing the role of the anchor or centre country. Several studies verify this statement, reviewed in Gross-Thygesen (1992) and Fratianni-von Hagen(1992).⁸ The historical reason for this choice was a solid belief that the monetary policies of the Bundesbank could guarantee the lowest possible interest rate, the floor for the national interest rates. However, the ERM has never been a perfectly asymmetric system, as there is evidence that German monetary policy has been conducted under some -even if limited- consideration of the economic situation in other member states and the stability of the whole system. However, for the purpose of the following analysis the term asymmetric model refers to the theoretical model rather than to the existing system.⁹

2.5.1 Fluctuations and Distribution of Liquidity

As already mentioned, capital flows are the basic mechanism for monetary equilibrium. Moreover, if the parity grid is credible, interest rates become identical throughout the Community and any disturbances inducing local movements in interest rates will immediately also set capital flows in motion. The direction of such flows is of crucial importance under the asymmetric regime, because it determines

⁷ The terms centre and periphery have been adopted only for the purpose of distinguishing countries which conduct independent monetary policy from those which do not. No normative meaning is attached to the terms.

⁸ Worth noticing is also that there are official statements verifying the opinion of an asymmetric ERM. For example, commenting recent events in the ERM, the Governor of the Belgian Central Bank stated that "Whatever happens, the central bank will stick to its policy of sticking close to the mark as the anchor currency it always was and will remain"; REUTERS 17 March 1993.

⁹ A detailed and more rigorous presentation of the properties of the two systems can be found in the appendix.

total liquidity in the Community. Important is also that the whole adjustment takes place in the periphery for a very simple reason.

Under the asymmetric system, the centre country targets its money supply and, by definition, will not allow capital flows to derail its monetary policy. Capital flows are therefore an expression of disequilibrium which must be corrected by adjustment in the peripheral countries. As a consequence, an outflow from the periphery to the centre by definition reflects a situation in which interest rates in the periphery are too low, and they will be raised automatically if the outflow also reduces money holdings there. A capital flow will therefore reduce money supply in the periphery but not in the centre. Naturally, even the area-wide money supply will decline by the same amount as in the periphery.

If the opposite is noticed, i.e. a capital flow from the centre to the periphery, the outflow will be sterilised in the centre country but not in the periphery. Money supply in the periphery, and the whole region, will increase by the same amount. Again, the whole adjustment takes place in the periphery as the construction of the system gives the privilege of monetary autonomy only to the centre country. Arguments about how to share the burden of adjustment when disequilibrium in capital markets appears is ruled out by the inherent logic of the system.

The asymmetric system is therefore one which provides good conditions in terms of the interest rate level, given that the anchor currency lives up to the expected quality, at the expense of leaving all responsibility for adjustment in the periphery. Capital flows are always viewed as signals for monetary adjustment in the periphery.

Under the symmetric system, the treatment of intra-regional capital flows becomes symmetric as well. Assuming identical money multipliers, a capital flow from one country to another leaves the area-wide aggregate unchanged only if the out- and in-flows are not sterilised anywhere. The common monetary target is therefore best defended if all countries share the adjustment burden, in the sense that capital flows are allowed to bring about new equilibria, in which all interest rates have moved as a consequence of liquidity redistribution.

In conclusion, the basic difference between the two systems is located in the endogeneity or exogeneity of total money supply and which parts of the system are supposed to bear the costs associated with the variability in money supply.

2.5.2 Shocks and alternative adjustments

Combining the above mentioned features of the symmetric/asymmetric systems with Poole's analysis of the effects of various types of shocks can help us to investigate further the consequences of a transition from one system to the other. As the asymmetric system is constructed, it can be perceived as providing good protection against real shocks in the centre but as destabilising for the peripheral economies if real shocks occur there. On the other hand, it shelters the latter against monetary shocks, leaving the former completely unprotected against them. Accordingly, targeting an area-wide aggregate, with the consequence of bringing

symmetry to the system, is bound to bring symmetry even to pattern of the effects similar disturbances will have on the participating economies.

As explained in detail in the appendix, a real shock is expected to affect real activity and interest rates if it occurs in the centre country. This is because monetary targeting allows the interest rate to be used as an absorbing mechanism in the centre. By the same token, a similar shock in the periphery affects real activity and the money supply. The latter is adjusted automatically due to capital flows. As the real shock brings disequilibrium in monetary markets, tendencies for interest rates to rise or fall induce capitals flows which, as they are not sterilised, affect money supply. What is more interesting is that money supply always accommodates the real shock. The initial shock is therefore magnified as booms tend to raise interest rates and recessions to lower them.

Another interesting feature is that shocks in the centre transmit an adverse shock in the periphery but real shocks in the periphery do not reach the centre. The reason is that the common interest rate is set exclusively by the former. As interest rates move in a way that dampens real activity fluctuations, the common interest rate will rise in case of a boom and will fall in case of a recession in the centre. Thus, if business cycles are not synchronized, the asymmetric regime constitutes a destabilising factor for the peripheral economies.

For similar reasons, monetary shocks are also transmitted only in one direction, from the centre to the periphery because only the former possesses the ability of setting interest rates. This is however of more theoretical interest because an asymmetric system is chosen just for the sake of the solid stability in the centre country. As it is also expected from Poole's model, monetary shocks in the periphery are completely absorbed, as all tendencies for interest rate movements are neutralised by capital flows which are sterilised in the centre country.

Bringing more symmetry in the exchange rate system automatically implies that the one-way transmission of the shocks becomes two-way. Real as well as monetary shocks will affect the common interest rate regardless the geographical origin. Nevertheless, assuming that the probability of monetary shocks to occur is larger in the present periphery than in the centre, such a reform is liable to be accompanied by increased monetary instability. Moreover, the incentives for actively using fiscal policies in order to stabilise the peripheral economies weaken, as the mechanism reinforcing fluctuations in real income also weakens. The symmetric system is therefore preferable to the asymmetric one on distributional grounds but it may imply a more relaxed attitude towards real convergence. It is not clear which system provides more structural stability in the long-run as one form of tensions is exchanged by another.

This feature becomes more conspicuous if the assumption of full credibility in the exchange rate commitments is removed. Under the asymmetric regime, a speculative attack on a currency belonging to a peripheral country takes the form of a massive capital flow. Assuming that the entire flow is directed towards the centre country, the inflow there will be continuously sterilised until the required interest rate differential is achieved by the monetary squeeze of the periphery. Again, the entire adjustment cost is born by the peripheral country and awareness of these

consequences is the basic disciplinary device in such a system. Symmetry means non-sterilisation of inflows into the (former) centre economy which pushes the whole interest rate structure downwards. The interest rate differential required by markets can be achieved at a lower level and the lower adjustment cost for the country with the weak currency may prove detrimental for the sustainability of the exchange rate mechanism in the long-run.¹⁰

Table 1.1: Symmetric and asymmetric systems compared

	<i>Real asymmetric shocks</i>	<i>Nominal asymmetric shocks</i>	<i>Speculative attacks</i>
<i>Asymmetric regime</i>	<p><u>In the centre:</u> Monetary adjustment dampens the local shock Transmits a converse shock to the periphery</p> <p><u>In the periphery:</u> Monetary adjustment magnifies the local shock No transmission to the centre</p>	<p><u>In the centre:</u> Monetary adjustment accommodates the local shock Transmits a similar shock to the periphery</p> <p><u>In the periphery:</u> Monetary adjustment absorbs the local shock No transmission to the centre</p>	Required interest rate differential achieved only by higher interest rate in the periphery
<i>Symmetric regime</i>	<p>Interest rate adjustment in the whole area dampens the local shock and transmits a converse shock to the rest</p> <p>Redistribution of liquidity magnifies the local shock</p>	Interest rate adjustment in the whole area accommodates the local shock and transmits it to the whole area	Required differential achieved both by lower interest rate in the centre and higher in the periphery

2.6 The Aggregation Problem

The task of producing a reliable monetary aggregate for the entire Community has been allotted to a group of specialists working under the Committee of Central Bank Governors. The group has so far produced a report on the inconsistencies between existing national *broad* aggregates, and has therefore put forward proposals and suggestions aiming at improving the reliability of national aggregates and facilitating the aggregation procedure.

On one level, the problem seems to be two-dimensional: First, one has to define which types of assets will be included in the national aggregates, focusing on *the liquidity aspect* of the assets. This is not a trivial task, as differences in market

¹⁰ See section A3 in the appendix.

conditions and institutional arrangements must be taken into account. Second, one has to find a way of dividing the existing total monetary assets in Europe so as the national statistics add up to a reliable Community aggregate. This could be termed as a *statistical inference problem*, since insufficient data must be used in a way that closely reflect the existing actual aggregate.

2.6.1 Harmonisation of National Aggregates

The complexity of adding up national data in order to capture a proxy for the European aggregate is illustrated in diagram 3. Using the three criteria deployed in the work of the group under the Governors' Committee, eight (8) different types of monetary assets can be generated. These criteria are:

C1: Residence of the Holder; an actor can be either resident (R) or non-resident (NR) in a country.

C2: Location of the Issuer; The financial intermediary issuing the asset can be located either at the home country (H) or abroad (A). Finally,

C3: Currency of denomination of the asset; a monetary asset is denominated either in the domestic currency (D) or in a foreign currency, (F).

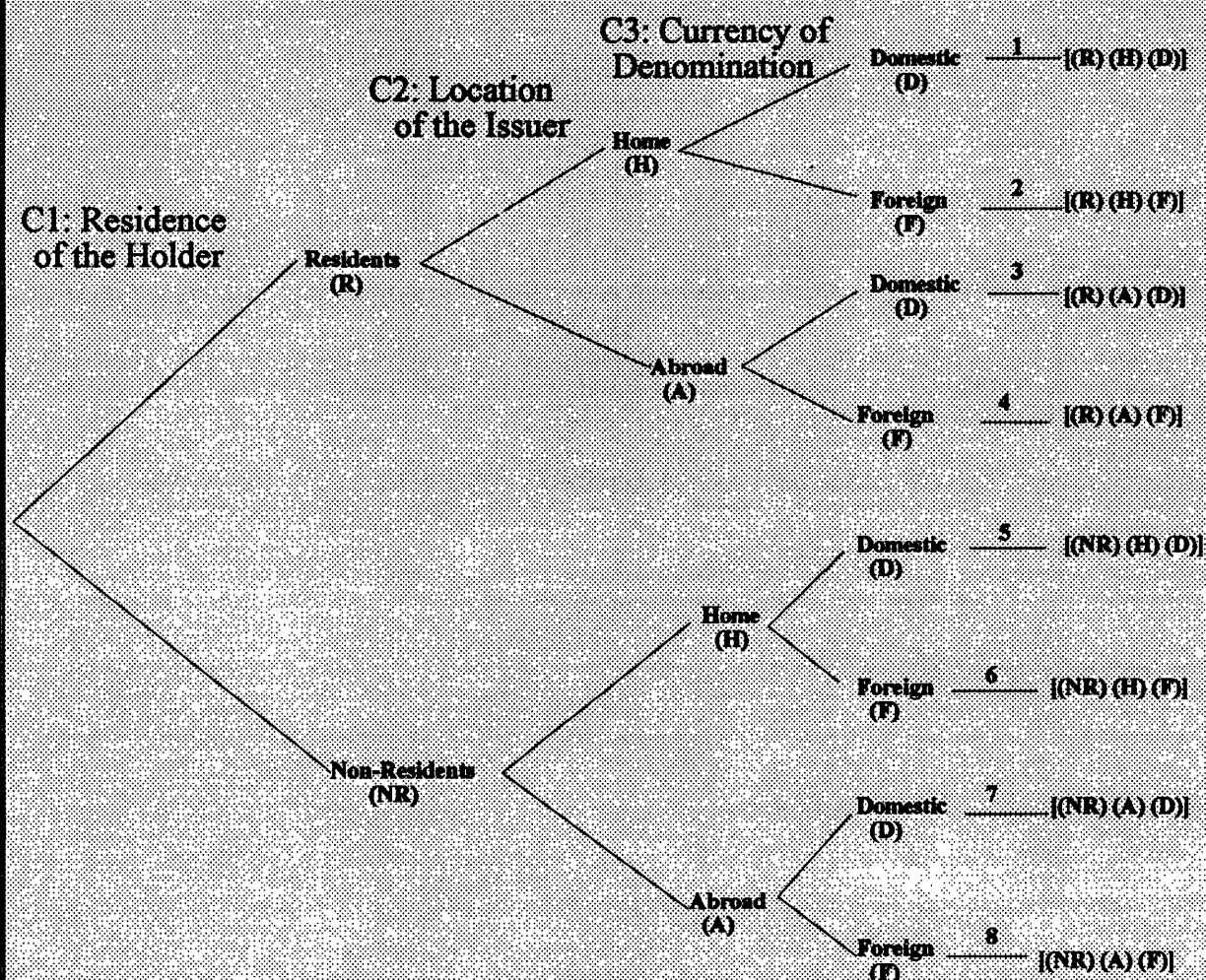
A monetary asset can therefore be described by its three elements, (R/NR), (H/A) and (D/F). For example, the monetary asset of a non-bank resident in a country which holds an account with a bank abroad in the currency of his residence country is [(R) (A) (D)]. By the same token, the asset [(R) (H) (F)] defines the holdings of a resident's monetary assets held at an account with a domestic bank and denominated in a foreign currency.

The point of presenting monetary assets this way is to demonstrate that the problem of harmonizing national monetary statistics does not stop with the definition of the liquidity characteristics of the assets. The international dimension of the assets puts additional consistency constraints which must be carefully respected before the numbers become compatible for addition. Otherwise the sum will not reflect exactly what one perceives as a European monetary aggregate, i.e. the monetary holdings of the European private sector.

For example, the British aggregate omits monetary assets held by U.K. residents in British banks if they are denominated in, say Deutsche Marks. Similarly, it omits all monetary assets held by U.K. residents in foreign banks, even if they are located within the EC. If the same practice is followed by other countries, aggregation to the Community level is bound to suffer from considerable omissions of much of the private sector's monetary holdings. As existing practices in Greece, Spain, U.K. and Luxembourg make use of all three criteria in their national M3-definitions, the only assets captured by their respective M3s are of type [(R) (H) (D)], and so will their four-country aggregate.

A combination of omissions and double counting may emerge if different countries apply different combinations of these criteria. Assume for example that country A allows for [(R) (x) (y)] (x= H or A; y=D or F) to be included in the M3(A) and country B does not care about the residence criterion, including in its

Diagram 3: The Aggregation Problem of the EMA



Current praxis in the EC-countries:

Two criteria are currently used in most European countries, the Residence of the Holder (C1) and the Location of the Issuer (C2). Thus, current national aggregates usually contain only assets [(R) (H) (x)], where x is D or F. As an effect, the cross border holdings are omitted at the national level and, consequently, not captured in the aggregate at the Community level, if the latter is defined as the sum of its national parts.

The Governors' Committee's basic proposal:

For the time being no radical changes are proposed, except from making the aggregate based on current praxis more consistent. However, it is suggested that in the long run only the Residence of the holder (C1) criterion will be used. When this rule is implemented, national aggregates will add up to an are-wide aggregate which is free both from omissions and duplications.

M3(B) all monetary assets denominated in the own currency held by domestic banks. The assets contained in M3(B) are therefore of type [(z) (H) (D)], where (z) is (R) or (NR). Omissions in the two-country aggregate appear to the extent monetary assets of residents in country B are held in foreign banks and/or foreign currencies. Moreover, the assets held by residents of country A in country B and are denominated in the currency of B are double counted.

2.4.2 The one-criterion Principle

Today, most Community countries practise a two-criteria definition, based on C1 and C2. It means that monetary aggregates in these countries contain assets of type [(R) (H) (x)], where x is D or F. Again, aggregating these measures implies an omission consisting of all monetary assets of type (3) and (4) in diagram 3, i.e. all holdings held at banks located outside the country of residence.

Assume instead that all EC countries applied only the Residence criterion, and that the whole world consists of the Community. Then, each national aggregate would be complete in the sense that all monetary assets held by residents would be registered, irrespectively of currency of denomination and the location of the issuer (bank). Since agents cannot be residents in more than one country there is no risk of double counting of their holdings. In terms of diagram 3, one country's statistics would cover assets (1)-(4), while (5)-(8) would be covered by the other countries. Under such circumstances, the European aggregate would be an accurate measure of the true monetary holdings by European non-bank residents. This is also the basic message of the expert group working for the Governors' Committee, namely that "adding up national aggregates across countries straightforwardly yields a consistent and comprehensive Community-wide measure if one, and only one, of the three criteria is applied in each and every country"¹¹.

In conclusion, the delicate process of monetary targeting presupposes reliable statistics and the current situation forms a shaky point of departure. This is shown both in the next part of the paper, where the possible influence of the presently insufficient statistics on the estimated relationship between money and the ultimate variables is discussed, and in part three where the process of monetary management based on national money is examined.

2.7 Summary and Conclusions

The principal pros and cons for monetary targeting have been presented in the beginning of part 2. In the context of the EMU, the use of intermediate variables as targets, i.e. indicators of the policy stance rather as indicators of the economic conjuncture, will prove beneficial for the process of monitoring the actions of the ECB and for exercising central banking accountability. Regardless the choice of intermediate variable, it has been argued that the optimal policy orientation is

¹¹ Governors Committee (1991), Annex 5 p.28.

price stability, which in the case of the ECB has already been secured by the Maastricht Treaty.

It has also been discussed whether a monetary aggregate is the most suitable candidate for intermediate targeting. Assuming that: (1) the forces released by the process of completing the internal market are as strong as expected; (2) that the catching up efforts of the poor member states become more impetuous, and (3) that the political changes in Europe open new trade opportunities, targeting a monetary aggregate can be seen as the optimal response to the anticipated challenges. These elements foreshadow an environment where real rather than financial disturbances will be predominant, as the strong wave of financial shocks which followed the financial deregulation of the 1980s has abated. The presence of the latter shall nevertheless not be ignored, and the risks of a continual financial innovation will be further investigated in the next part. Moreover, the possibility of targeting an area-wide aggregate before the third stage of the EMU has been discussed, showing that it will have far-reaching consequences for the functioning of the exchange rate mechanism, the ERM.

However, successful monetary targeting presupposes that several technical problems such as harmonisation of national monetary statistics find their solutions. This issue is further investigated in part 3 along with other technical conditions for a successful monetary management. But what above all is needed is a stable relationship between the area-wide aggregate and the ultimate targets, an issue we now turn to.

3 EMPIRICAL EVIDENCE

Using a European Monetary Aggregate (EMA) as intermediate target requires that a stable relationship exists between the monetary aggregate and the ultimate target, stabilization of real output around the potential. This is another way of expressing what is set out in the Maastricht Treaty, namely "... the primary objective of the ESCB shall be to maintain price stability. Without prejudice of price stability, it shall support the general economic policies in the Community with a view to contributing to the achievement of the objectives of the Community as laid down in Article 2 of this Treaty"¹².

So, the first question one has to answer concerns the existence of a stable relationship between the EMA, the intermediate target, and the ultimate targets, the inflation rate or the potential output.

Approaching the empirical studies one hopes to find results supporting the hypothesis that not only a stable, but also a *simple* relationship for money demand exists. The additional constraint of simplicity can be justified by the fact that the estimated function will serve as a guide-line in decision-making. Allowing the set of explanatory variables to expand, in order to receive the best possible explanatory power, is probably the best choice for the ambitious econometrician but cannot be optimal for the central banker. As the set of arguments expands, the use of the function as a basis for policy formulation may become cumbersome, since reliable forecasts for all variables involved are necessary.

Artis (1992) observes that "there have been two principal kinds of response to the perceived breakdown of such simple relationships. One has been to allow for more complex dynamics, or to set these on side whilst emphasising the stability of long-run relationships. The other has been to augment the long-run relationship itself". There are many good examples of the latter category, e.g. Hall, Henry and Wilcox (1989), but their normative importance is limited because they fail to meet the simplicity criterion, as the latter is conventionally perceived due to the influential work of Friedman-Schwarz (1963).

The Bekx-Tulio (1987) study constitutes a good attempt in this direction. They estimated a relationship between the Community-wide narrow money (M1), real income, inflation, interest rates and the (current) exchange rate of the ECU *vis-à-vis* the U.S. dollar. Besides a peculiar result concerning the coefficient of the price level, estimated significantly larger than unit, the model was reexamined by Kremers and Lane (1990) and found misspecified as the Chow tests for parameter stability exposed that the whole function was unstable. However, repeating the exercise with somewhat different model specification and controlling the estimation process with a variety of sophisticated statistical tests, they find that a robust and stable relationship between the same variables exists.

¹² Article 2 states that the primary task of the Community is "to promote a harmonious and balanced development of economic activities, sustainable and non-inflationary growth respecting the environment, a high degree of convergence of economic performance, a high level of employment and of social protection, the raising of the standard of living and quality of life, and economic and social cohesion and solidarity among Member States".

Using the same specification as Kremers-Lane, Bomhoff (1992) took another step in checking the quality of the previous estimates, and his findings reinforce the impression that a stable and well-specified relationship is now available. Moreover, Bomhoff undertook some extensive tests for the forecastability of the income velocity applying the Kalman-filtering technique, using the long-term government bond yield as explanatory variable and, among other things, he finds that "forecasting aggregate velocity for a community aggregate would have been easier than forecasting velocity in each country separately and adding forecasts". This is a comforting result which reinforces the impression that the ERM-wide relationship possesses better qualities than that of most individual countries, and, at least, not worse for that of Germany, which has been the most successful case in this respect.

Monticelli and Strauss-Kahn (1992) have reported similar results for broad money. Again, what seems difficult to hold in individual ERM countries seems to hold quite well at the aggregate level. The ERM-wide demand for broad money is found to be "a stable function of income and interest rate (and the rate of change in the ECU-U.S. dollar exchange rate)". Even in this case, the results appear to be robust since they prove to be insensitive to changes in samples, techniques etc.

There is one hypothesis which these papers put forward as a possible explanation for their remarkable findings. National monetary aggregates are probably affected by developments in other ERM-countries. As financial markets are linked with highly correlated interest rates, events in each and every member country may induce portfolio adjustment so that assets denominated in one currency are substituted by assets in other currencies and probably even issued by foreign institutions. Since part of these assets falls within the category of monetary assets, asset substitution implies even currency substitution and the behaviour of national monetary aggregates cannot be explained merely on the basis of other national variables. Such externalities are although "internalised" and counterbalanced at the aggregate level. This hypothesis is not unreasonable, because the period when most national aggregates behaved strangely, basically the period after the mid-1980's, coincides with the intensification of the financial integration process.

In conclusion, there should be no doubt that there is sufficient econometric evidence that a stable relationship for both narrow and broad European money exists. The crucial question, however, is whether these findings are sufficient for the conclusion that all essential preconditions for monetary targeting exist. As a definite answer to this question requires that the EMA *actually* has been used in monetary policies, any *a priori* appraisal of the *ex ante* econometric results must rest on hints provided by an investigation of conditions under which the econometric work has been done. For this purpose, the rest of this chapter is devoted to support three, probably very important, qualifications. First, there is good reason to believe that much of the good correlation between the variables must be attributed to the asymmetric nature of the EMS, i.e. the prevailing system of fixed exchange rates during the later part of the sampling period. The important question here is whether the estimate can be invariant to the symmetry/asymmetry aspect of the fixed exchange rate regime. Second, a test is needed about how our best guesses about financial innovation in the future will affect the relationship. Fi-

nally, a warning about the robustness of the result must be raised, related to the fact that the relationship has been estimated before we started using the aggregate as a policy variable.

3.1 The Influence of the Present System

As explained in section 2.5, the German dominance in the EMS is well documented in the existing literature. Although dominance is a badly defined concept, in its most frequent use it purports to reflect the fact that the Bundesbank, the German Central Bank, is anchoring the exchange rate mechanism by setting explicit and achievable monetary targets, whereas the rest of the participants only try to keep fixed rates against the DM.

The immediate consequence of this order is that the money supply in the ten ERM "peripheral" countries has been completely determined by money demand, a direct implication of the exchange rate targeting. Moreover, as explained in the appendix, fluctuations in real activity in these countries have been accommodated by more or less automatic adjustments in their money supply, stemming from capital flows. Real shocks tend to be magnified because changes in real demand, *ceteris paribus*, are positively correlated with money demand, as it is supposed to be, tending to create interest rate differentials which induce capital inflows during booms and outflows during recessions. Since the nature of the asymmetric system does not allow sterilization of the capital flows in the periphery, money supply must be very well correlated both with real output and inflation.

The asymmetric nature of the ERM must therefore exert some influence in the explanatory power of output and inflation on money supply, at least in the ten peripheral countries of the ERM, especially during the period between 1987-1992, when the system functioned without friction.

On the other hand, the econometric studies are supposed to answer the question whether there is an area-wide money demand function which endures the targeting procedure. Because non-targeted money is not equivalent to targeted money, the estimates explain the influence of inflation and output on money which has not been subjected to the manipulations of a central bank. The asymmetric nature of the present exchange rate mechanism has therefore helped to explain things. Accordingly, a change to a symmetric regime, which occurs automatically if the area-wide monetary aggregate is targeted, justifies the suspicion that the estimated functions give a too optimistic view of the possibilities to succeed better at the European level with what has been a failure at the individual countries.¹³

3.2 Currency Substitution

In the world of international business, future payments in different currencies are effectively hedged by holdings counterbalancing liquid assets or liabilities in the

¹³ Discussions with H. Matthes brought this aspect under my attention. See also Matthes (1993).

same currencies. For example, to eliminate the exchange rate risk of an export (import) credit, one can borrow (invest) the same amount in the currency in which the future asset (liability) is denominated. More generally, optimal portfolio management in the international world of today usually takes the form of holding assets denominated in a large amount of different currencies.

The process is facilitated by the computer and information technologies, allowing for quick reshuffling in portfolios on the basis of new information and shifts in expectations. To the extent portfolios contain monetary assets, such rearrangements imply shifts in the demand for various monetary assets, usually not captured in national statistics.

Substituting domestic monetary assets for monetary assets denominated in foreign currencies is called currency substitution. The phenomenon has probably increased in importance in recent time, as both the technological possibilities of receiving and processing information tend to make portfolio management more active and as the costs associated with asset substitution have been sharply trending downwards. As an effect, when private actors in countries with deregulated markets hold monetary assets denominated in various currencies and, as explained in section 2.6, national statistics usually do not capture assets other than those of more traditional nature suitable for closed monetary systems, the phenomenon of currency substitution is liable to produce statistical problems in national money demand functions, of continually larger significance.

There is an additional source of concern, associated with the ambition to make the European currencies closer, if not perfect, substitutes, before the countries decide to proceed to the final stage of the EMU. Generally, the closer substitutes the European currencies become, the stronger the expected shifts in national money demand functions should be. This is so because, when assets become more identical, small changes in the risk/return profile will induce significant asset substitution. So, increased exchange rate stability among the ERM currencies, itself strongly desired and necessary for the transition to the final stage of the EMU, will certainly augment the instability in national money demand, unless the recommendations of the Committee of Governors to improve the routines of collecting data are followed.

If the only reason behind the observed instability in many national money demand functions were currency substitution, then the problem would disappear if statistics were improved and definitions of monetary assets followed the one criterion rule¹⁴. Moreover, McKinnon's idea that monetarism can be reinstated at a global level, asserting that global money demand is stable since all problems with currency substitution are internalised, would be very attractive and, adopting McKinnon's hypothesis, one could have a good explanation for the econometric results reported above.¹⁵ Artis, for example, asserts that "it is difficult to see how the results obtained could have any other explanation and, on the face of it, Kremers and Lane have already shown that M1 is in stable (and simple) demand at the Euro-

¹⁴ The one criterion rule is described in section 2.6.

¹⁵ See McKinnon (1982).

pean level and could, therefore, make a highly suitable policy target for Stage Three".

However, the authors in all the studies mentioned in the previous section admit that the monetary assets involved in their estimates do not capture monetary assets held by non-residents, or issued by institutions located abroad. With reference to the diagram 4.1 in section 2.6, the monetary assets do not include assets other than those of type [(R) (H) (D)]. The rest is not included for statistical reasons¹⁶. What these omissions imply for the quality of the estimates is difficult to say, but it is fairly clear that, as intra-ERM cross border holdings and monetary assets issued by foreign institutes have been omitted, Artis' conclusion seems a little bit premature, if not irrelevant.

3.3 Financial innovation

Financial innovation has been described and explained in so many different ways so as to make one quite sceptical about the analytical strength and robustness of the concept. First, it is fairly clear that it is both the cause and the effect of financial (de)regulation. Regulations, if they are binding, distort relative prices and create pools of unexploited rents which remain inaccessible unless instruments for circumventing them are invented. In other words, there is always an incentive to undermine regulations and make them ineffective. For example, capital controls became ineffective and abolished sooner than otherwise in some countries when well-functioning future markets hollowed out the monetary autonomy they were supposed to protect. This is the so called "constraints' theory" of financial innovation. At the same time, a generally accepted view among economists is that liberalised markets provide the most favourable conditions for innovative activity.

Second, financial innovation has been presented as a process driven by the availability of new technologies and as a process propelled by a strong demand for new assets. This is so because investors are always seeking more effective ways to hedge their portfolios, or to make portfolio management more flexible. The strong development in computer technology during the two last decades have drastically lowered the transaction and information costs. It also enhanced market transparency. Instruments requiring complex operations in order to become practically useful, like swaps and options, although conceptually always feasible, did not come into day-to-day use unless the computer technology reduced the calculation work to a simple routine. Moreover, new information is now instantly processed and disseminated through prices in global markets, which probably boosted the liquidity in the trade for some instruments. Extrapolating these trends, Artis (1992) draws the important conclusion that "at a fundamental level, computerization offers the prospect ultimately of the disappearance of money: with instantaneous clearing, alternative earning assets can be liquidated on the spot to finance transactions and the need to hold money in advance of expenditure will vanish".

¹⁶ The ECU/U.S. dollar exchange rate involved in the estimated equations aim just at capturing currency substitution between the holdings in European currencies and dollar denominated assets. The intra-ERM holdings are however missed.

Whatever the underlying forces might be, financial innovation is of practical interest because it affects the manageability of the monetary instruments and the efficacy of monetary policies. Even if it takes some time for exchange of non-monetary assets to become equally efficient as means of payment as money, the transaction-demand for money is bound to decline, to the extent new assets can be used for the same purpose. Undoubtedly, the stability for especially broad money demand is eroded by this kind of asset substitution, if the measure does not expand continuously to encompass new categories of financial assets. De Boissieu (1992) finds additional reasons for why this process may affect money demand, consisting of what he calls contribution and indirect effects. The former describes vaguely effects on the savings ratio, resulting from enhanced possibilities for financial diversification. The idea is that if savings become less risky, *ceteris paribus*, the demand for total savings increase. The latter is perceived to reflect the influence of sophisticated hedging and risk management techniques on the usual determinants of money demand, such as income, interest rates and wealth.

Securitization is another particularly interesting phenomenon of financial innovation, bringing to our attention the potential changes in the role of financial intermediaries, the banks. This is another concept encircling a broad range of market tendencies. In general terms, it describes the increased, in both absolute and relative terms, direct borrowing through capital markets, by issuing marketable debt instruments. In more specialised use the term describes the process of selling out of previously illiquid bank loans, transformed to marketable instruments. This is a somewhat surprising trend since banks in traditional monetary theory were thought of as institutions specialised in risk evaluation, assuming that most industrial and other investment projects involved idiosyncratic rather than systematic or market risk, i.e. risk that can be priced appropriately.

More modern literature has also modelled banks as an invention pooling real risks, i.e. an insurance system for savers (e.g. Diamond-Dybvig (1983)). It is still too early to appraise the consequences and the sustainability of the disintermediation process experienced during the 1980's but, if the trend holds, not only the asset side of the banking sector but also money, its statistical counterpart, will certainly become a blunt approximation of total credit expansion and real activity. If so, securitization constitutes another threat to the relationship on basis of which monetary policies are formulated. Again, this is probably most alarming for the present measures of broad money, conceived as best correlated with total financial wealth and real activity. This trend suggests also that total liabilities of the central banks, the monetary base, may be relatively more stable but, as stated in chapter 1, the better controllability of this aggregate does not compensate for its remoteness from the ultimate variables.

Another interesting issue, addressed in Boissieu (1992) is whether the ongoing financial integration in Europe will accelerate or retard the process of financial innovation and its effects. First, there will be a continuous supply of new technologies, partly a by-product of the rapid development of the computer industry, and hence not expected to abate. Second, the increased need of prudential supervision and control, a side-effect of financial globalisation, is expected to induce a wave of innovations in order to circumvent these controls. This is in line with the

"constraints' theory", mentioned above. Third, continuing deregulation, necessary for further integration, enhances the scope for financial innovation as the process is, to a certain degree, self-generating. At last, in the wake of integration we expect invigorated competition and probably the problem of overcapacity. The need of survival will certainly be one of the strongest driving forces.

In conclusion, financial innovation entails several risks for the stability of the relationship between money and ultimate targets. Lower transaction costs for clearing based on heterogeneous assets, continuing inclusion of new assets in portfolios, outright asset substitution as non-monetary instruments become more attractive than monetary assets and securitization, imply several risks for the control and the efficacy of monetary policies based on simple monetary targeting. These trends will probably affect most of the parameters encountered in both money demand and money multiplier functions.

3.4 The Target Problem

Any comparisons between national and ERM-wide aggregates with respect to stability and other properties must take into account one fundamental difference. In contrast with national measures, the European monetary aggregate is nothing but an estimate, never used for any purpose in monetary policies. A wide-spread and theoretically well-founded opinion among monetary theorists is that the major threat of instability and breakdown of an otherwise good relationship comes from the very fact that a particular aggregate is used as a target.

As already mentioned, the phenomena of financial innovation and currency substitution reflect an activity whose purpose is to better hedge private portfolios. From the private point of view, monetary policies constitute a disturbance and it should be surprising if the inventive abilities of the market did not focus on keeping out any kind of undesired influence from monetary authorities. This is in accordance with the "theory of constraints", and as a corollary to this approach, the demand for instruments capable to prevent the influence of monetary policies on private portfolios must be stronger the more active and "surprising" monetary policies are.

This observation suggests also that there might be an additional reason, besides the traditional credibility argument, for why monetary authorities should be strongly disinclined to violate the fundamental constraint of stability in policy rules and, acting in pure self-interest, to curtail their own discretionary power to a minimum. On top of the lack-of-credibility cost there is probably even a lack-of-ability cost, growing when monetary authorities are suspected to serve goals other than price stability or when, for some other reasons, inflation becomes of more disruptive nature and monetary policies must be "overactivated" in order to master it.

This is probably the explanation for the survival of monetary targeting in Germany. It is widely recognised that financial innovation has been much slower in Germany than in other parts of the world. Issing (1992) asserts that "in Germany the financial system would appear to have been less in need of innovation". This is of course a diplomatic way of expressing the fact that deregulation did not proceed

with the same pace as in other countries.¹⁷ This should be a part of the truth. There is reason to believe that if financial markets were really constrained by the policies of the Bundesbank, remaining regulations should become ineffective, as it happened in other parts of the world. Thus, believing that markets possess this ability, the incentives must have been rather weak and a possible explanation for the stagnant financial climate might be the stable monetary climate, at least until recently. If so, the recent inflationary episode with the attending mobilization in order to achieve the monetary target constitutes a sustainability test for the long-run stability¹⁸.

In conclusion, monetary aggregates are probably not as flexible as one is led to believe according to traditional literature. Current use reduces probably the possibility of using them successfully in the future. The practical importance of this view is that it may be of critical importance for the actual stability of the estimated money demand functions that the member countries do not hand over to the ECB a situation requiring active policies from the outset.

3.5 Conclusions

Ex-ante econometric stability is not equivalent to *ex-post* stability. Stated differently, econometric stability is necessary but not sufficient. Currency substitution and financial innovation are phenomena that undermine the relationship in the long-run. One hypothesis put forward in section 3.4 is that the speed by which this erosion takes place may depend on the actual use of the estimated relationships in decision-making. Hence, the degree of *ex post* stability will be gradually revealed in the course of the trial and error process that starts as soon as the ECB targets the aggregate.

¹⁷ According to Svensson (1992), German households and small and medium-sized firms have no substantial alternative to bank saving. Hence, the opportunities for asset substitution, e.g. between bank saving and private bonds or various types of funds are small, which contributes to stability in the money demand function.

¹⁸ In Switzerland, another good example of a low-inflation economy with successful monetary policies, the stable relationship between the targeted "Seasonally Adjusted Monetary Base" collapsed in the wake of the inflationary episode during the second half of the 1980's.

4 MONETARY MANAGEMENT

An interesting but also very difficult question is how the principle of subsidiarity can be applied in the operation of the ESCB. There are several sources of concern. First, there is the problem of achieving consensus in the Governing Board on the monetary target, given that its members represent countries either with different needs, due to unsynchronized business cycles, or different preferences *vis-à-vis* inflation or both. This aspect is treated in section 4.1. Second, there is an unanswered but institutionally very important question concerning the role existing central banks will be assigned to play in monetary management. Questions like who will make the Open Market Operations, how actions can be best coordinated in order to achieve the common target and how to act in order to deliver clear messages about policy intentions, are good examples of issues pertinent to the second aspect. Section 4.2 is devoted to these aspects.

4.1 Setting the Target

If output fluctuations across the Community were perfectly correlated, there would be no problem in setting a target that stabilises the European economy. However, it is well-documented that business cycles are not synchronised, which implies that the thrust of the common monetary policy is bound to be stimulative for some economies and contractive for others. Moreover, there will be a bias in the system insofar the output of the major economies will dominate in the composite output index, and therefore better correlated with it. As a result, monetary policies will not be distributionally neutral at the various phases of a business cycle, to the extent real activity in some minor economies will not perfectly correlate with the dominant economies, essentially Germany, France and U.K..

The problem should not be over-emphasized though, because such differences will net out over a business cycle, and will probably disappear unless some structural features in these economies do not produce a systematic lack of synchronization. This can be the case with big oil-producers, because oil shocks normally are detrimental for most European economies but beneficial to them. But according to the optimum currency area literature, this type of economies are not the best candidates for the EMU. They are not so many either and, if their participation is based on other benefits, e.g. political, then the costs of non-tailored monetary policies must have been discounted in the decision to participate in the monetary union. But this might rather be the exception than the rule. In normal cases, common policies should bring convergence in business cycles.

One mechanism which may help to bring the business cycle of deviating small economies more in phase with that of larger economies might be the stabilizing development of production costs. Assume for example a small open economy whose business cycle is not in phase with the bulk of the Community. The common monetary policy is therefore liable to exert inflationary pressure on the small economy during "global" recessions whereas it will tend to be disinflationary when policy becomes tight during "global" booms. Thus, the competitiveness of the small economy will tend to fluctuate countercyclically, with rising costs during

"global" recessions and improved competitiveness during "global" booms. The countercyclical fluctuations in competitiveness will therefore mitigate the procyclical impact of monetary policies and, if competitiveness is of greater importance than monetary policies for profit, it is likely that the private sector will quickly adjust to the new realities.

That depends among other things on the importance of the intra-community trade, i.e. the degree of its integration with the common market. If this trade is important, the incentives to hold back costs during "global" recessions will be dominant. Moreover, if the economy is well integrated with the rest of the community, there is no reason for the business cycle to be deviating. To the extent it happens today must depend on deviating domestic policies, and this source of distortion will be removed when policies will be better co-ordinated.

In conclusion, if the members of the Governing Council of the ECB are prepared to support policies aiming at low and stable global inflation, the problem of finding a target which is not destabilizing for any economy will become trivial as time passes. However, at this point it should be worth investigating another possibility, related to the preferences of the members of the Governing Council.

Assuming that inflation is a monotone function of money supply, agreeing on a target for money supply automatically means that a simultaneous decision about the inflation rate has been taken. Looking at the inflationary record of the candidate countries, it is not difficult to find support for the suspicion that the Governing Council, the body entrusted to formulate the policy orientation and whose members will be the governors of the national central banks, will not be as monolithic in terms of preferences as the German Bundesbank, whose statutes served as a model for those of the ECB. Even if the members of the Governing Council are not supposed to take national interests into consideration, the theoretical possibility that this can happen makes some authors quite sceptical about the political independence of the ECB, and see the presence of national representatives as an Achilles' heel in the proposed composition of the ECB.¹⁹ Hence, facing the eventuality of diverging notions about what might be the appropriate inflation under various circumstances, it is worth investigating the costs that, at least theoretically, can be associated with the institutional weakness of the ECB.

First we have the Barro-Gordon (1983) type of credibility costs.²⁰ What will be the private actors' expectations, given that low- and high-inflation preferences are mixed in the decision-making? If markets believe that the high inflation countries have given up any ambitions to influence monetary policies, the expectations will of course be in line with the low inflation preferences. This is not unlikely to happen, because the convergence criteria ensure nominal convergence before the creation of the EMU. However, the problem is whether this procedure is sufficient to convince market participants that a change in preferences has taken place. It is possible that good inflationary performance under some years can be interpreted as an effort to pass the entrance criteria rather than as an evidence of a structural

¹⁹ See for example Tarkka-Åkerholm (1992).

²⁰ This issue is treated in detail in De Grauwe (1992).

change in preferences. If the latter happens, the countries with low inflation preferences can either accept facts and live with unnecessarily high inflation or, they must be prepared to pay with unnecessarily high unemployment for a time in order to re-establish market expectations at a lower level. Again, how can they convince the high inflation partners to accept disinflationary policies?

Arranging the participating countries according to their (revealed) preferences, median desired inflation is probably the one which secures majority in the Governing Board. In such a case, it should be a cost associated with targeting median inflation, born both by the countries situated on the "left" and the "right" side of the target. For high inflation countries there should be a cost in terms of asset deflation, loss of inflation tax and higher taxes, just to mention some of the classical costs that must be born in order to establish a low inflation equilibrium. For low inflation countries there is a cost in terms of living with the risk of moving towards a high inflation equilibrium.

Taking monetary equivalences of these costs, one can easily establish a compensation scheme whereby lower inflation can be bought. If low inflation countries compensate high inflation countries for their fiscal and other losses, a new majority can move the inflation target from the median position towards the low-inflation end of the spectrum. In pure economics terms, the final position depends on the marginal rate of substitution between money and inflation costs for the net contributors, and the marginal rate of substitution between money and the low inflation costs for the net recipients. ²¹

The cynical world of bargaining for side payments, like the one described above, is an integral part of the second best solutions one has to live with when political constraints are imposed on institutions whose task is to conduct sound economic policies. From this point of view, the Maastricht Treaty and the realisation of the EMU involve such compromises. The cohesions funds can very well be interpreted in these terms. They are net transfers to countries which are supposed to bear a high convergence cost. The more traditional structural funds had almost the same purpose, namely to help poor member states to catch-up. In pure economic terms, they are nothing but a substitute for non-differentiated voting power, so that the preferences which are most compatible with the final goal can break through. In the present case, the ultimate target is to replicate the previous performance of the Bundesbank, and this must be achieved under the constraint that German preferences weight as much as the preferences of the rest.

In conclusion, the credibility aspect of monetary policies suggests that the problem of achieving the ultimate target is not only a technical one. A decision must be taken by the Governing Council of the ECB and the presence of heterogeneous preferences, to the extent they are heterogeneous, may prove problematic. There is good reason to believe that the correlation between money supply and inflation is not invariant to the expectations of the market participants about the underlying

²¹ Tarkka-Åkerholm (1992) provide a formal model of a compensation scheme, able to secure unanimous decisions in the Governing Board. Unanimity is however a stronger constraint than the prescribed majority rule in the Maastricht treaty.

preferences. In the case of the ECB, the side-payment equilibrium may be time-variant, as the marginal utility of money is not time-invariant.

4.2 Monetary Control

We turn now to the second aspect of subsidiarity, namely the tasks to be assigned to the National Central Banks, hereafter NCBs, in the process of controlling money supply and executing OMOs. Two models will be examined, the so called the decentralised or three-tier model and the centralised or two-tier model, both being in the core of economists' interest after their first appearance in the Delors Report and, of course, the Maastricht Treaty.^{22,23}

Diagram 5.1 depicts simplified versions of the two models, focusing on the most interesting features for the present purpose. As shown in the diagram, there are two important differences. First, in the tree-tier system the ECB tries to control money creation indirectly, by imposing reserve requirements on the National Central Banks (NCBs), whereas in the centralised (two-tier) system the ECB exerts direct influence on the assets of the money creation institutes, the deposit banks (DBs). Second, and partly as a consequence of the previous feature, exchange of reserves in the ECB-Funds market takes place at the level where the reserve requirements apply, that is between NCBs in the decentralised model and between DBs in the centralised one.

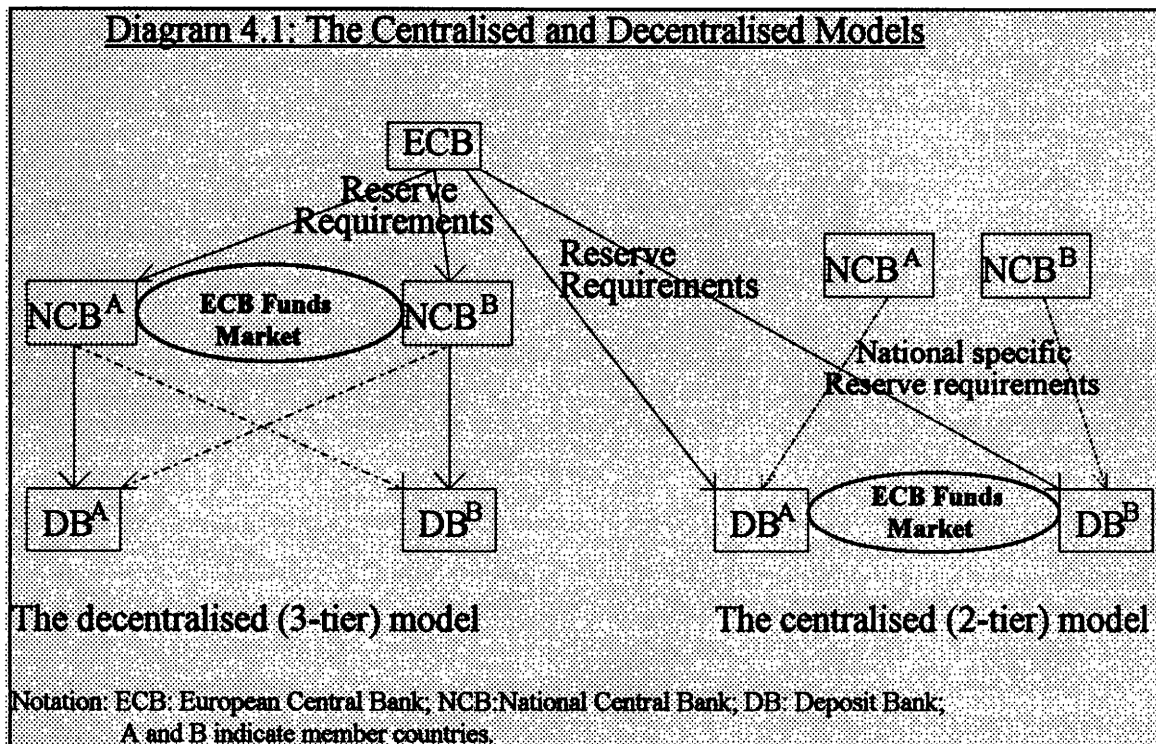
The appearance of an ECB Funds market is an important complement to the reserve requirement instrument, because it constitutes the most effective way of diffusing existing liquidity in the ESCB-area and, without good possibilities of redistributing local surpluses and deficits, monetary policy is bound to have tremendous distributional effects. An efficient payment system must hencefore be underpinned with a well-functioning market for ECB Funds, essentially a clearing system guaranteeing smooth exchange of ECU-denominated assets held with the ECB.

According to the decentralised or the 3-tier system, the ECB seeks to control the area-wide money supply by imposing reserve requirements on the national central banks. As indicated in box diagram 4.1, each member central bank will hold a part of its assets at an account with the ECB, whose size can be completely determined by changes on reserve requirements. They correspond to reserve requirements some central banks apply to deposit banks within their respective jurisdictions today. As is the case with traditional national monetary systems, any increase in reserve requirements increases the total liabilities of the central bank, the monetary base, but it slows down credit expansion and deposits, i.e. monetary expansion. Similarly, any increase in the liabilities of the ECB *vis-à-vis* a national central bank has to be backed by a commensurate decrease of other assets in the national

²² Gros (1991) Gros-Thygesen (1992) and Kenen (1992) provide good analytical descriptions of them. The terms centralised/decentralised are used by Kenen whilst Gros and Gros-Thygesen prefer to describe strongly overlapping ideas with the terms two/three tier system, first encountered in the Delors Report.

²³ Extracts from the Delors Report presenting the original ideas are found in the annex to this chapter .

Diagram 4.1: The Centralised and Decentralised Models



Maastricht-treaty: Protocol on the Statute of the ESCB and of the ECB

Article 18 - Open market and credit operations

18.1 In order to achieve the objectives of the ESCB and to carry out its tasks, the ECB and the national central banks may:

- operate in the financial markets by buying and selling outright (spot and forward) or under repurchase agreement and by lending or borrowing claims and marketable instruments,
- conduct credit operations with credit institutions and other market participants, with lending being based on adequate collateral.

18.2 The ECB shall establish general principles for open market and credit operations carried out by itself or the national banks, including for the announcement of conditions under which they stand ready to enter into such transactions.

Article 19 - Minimum Reserves

19.1 Subject to article 2, the ECB may require credit institutions established in Member States to hold minimum reserves on accounts with the ECB and national central banks in pursuance of monetary policy objectives.....

central bank's account, basically the provision of funds to commercial banks. This, in turn, induces banks to cut down deposits basically by means of more restricted lending policies. Equivalently, if the central bank sells bonds, commercial banks will finance the increased holdings of government debt by cutting down commercial loans.

In conclusion, higher reserve requirements on NCBs under the decentralised model should, *ceteris paribus*, imply a monetary contraction. Inherent to this system is, of course, that OMOs are executed by the national central banks. Whether deposit banks located abroad (but within the ESCB-area) will be allowed to participate in such tenders or not is not clear, and the consequences of alternative scenarios will be examined later.

According to the centralised system or the 2-tier system, the ECB tries to control money creation directly at the source, i.e. by imposing reserve requirements on banks. It is not impossible that such reserve requirements can co-exist with national ones, to the extent national central banks want to use this instrument. Apparently, the OMOs will be executed by the ECB and the national central banks may be allowed to play a secondary role in the process, for example by collecting the bids from domestic institutions. Total deposits and money supply in a genuine 2-tier system are influenced by the control ECB has on its liability side, assumed to be as good as that of existing national central banks.

Naturally, at the final stage of the EMU, especially after the introduction of a common currency, the centralised system is the only feasible. One of the questions addressed in this chapter is whether this transition could possibly be smooth, i.e. in several stages, or it is preferable to have a sudden, bang-bang transition. As seen in the attached quotation, the Maastricht Treaty leaves this question open, allowing the co-existence of both models and going back to the Delors Report, where the early ideas about the EMU are found, we find three different approaches. Ciampi (1989) proposes a genuine decentralised system, Thygesen (1989) finds the idea quite attractive but also "unduly confining" as a model for stage three, for which he advocates the 2-tier system, while Lamfalussy (1989) suggests a cooperative solution according to which existing central banks create a common subsidiary to start with, acting as a proxy for the ECB but whose authority is granted by the existing central banks. Relevant parts of their papers are quoted in the annex to this chapter.

4.2.1 European Money and National Monies

National money is defined as the part of a national monetary system's liabilities comprising currency (CU) and deposits, demand deposits (DD) for narrow money and even other deposits for different measures of broad money. Since liabilities and assets always balance, the asset side of the consolidated balance sheet also reflects national money. Box 4.1 provides schematic balance sheets for the institutions involved in the ESCB, namely the NCBs, the DBs and the ECB. Aggregating NCBs and the DBs operating in their respective jurisdictions, we receive a national monetary system whose assets/liabilities represent national money and,

Box 4.1: Schematic Balance Sheets for the ESCB According to the Decentralised (3-tier) Model

National Central Bank		Deposit Money Banks	
<i>Assets</i>	<i>Liabilities</i>	<i>Assets</i>	<i>Liabilities</i>
ECU DEPOSITS AT ECB(*) FOREIGN ASSETS (FA) DOMESTIC CLAIMS -On Central Government -On Domestic Banks (**) (*) (**)	RESERVE MONEY (H) (MONETARY BASE) -Currency Outside Banks (CU) -Banks' Reserves (RE) (***) (***)	FOREIGN ASSETS RESERVES (RE)(***) DOMESTIC CLAIMS -On Central Govern. -On Private Sector (*) (***)	DEMAND DEPOSITS (DD) TIME DEPOSITS (of Residents) FOREIGN LIABILITIES (to Non-Residents) CREDIT FROM THE NCB(**) OTHER ITEMS
↓		↓	
National Monetary System		European Central Bank	
<i>Assets</i>	<i>Liabilities</i>	<i>Assets</i>	<i>Liabilities</i>
ECU DEPOSITS AT ECB(*) FOREIGN ASSETS (Net of foreign liabilities) DOMESTIC CREDIT (DC) -On Central Government -On Private Sector (*)	MONEY (M) -Currency Outside Banks -Demand Deposits QUASI-MONEY -Residents' time deposits OTHER ITEMS	FOREIGN ASSETS ECU endorsed securities denominated in different ERM-currencies	ECU DEPOSITS Owed to NCBs (*)
↓		↓	
Consolidated ESCB Monetary System			
<i>Assets</i>		<i>Liabilities</i>	
FOREIGN ASSETS ECU ENDORSED SECURITIES DOMESTIC CREDIT -On European Central Governments -On European Private Sector		MONEY (the EMA) -Currency Outside Banks -Total Demand Deposits QUASI-MONEY -EMU-Residents' Time Deposits OTHER ITEMS	

Aggregation: Deposit Money Banks + National Central Banks = National Monetary System
 National Monetary System + European Central Bank = ESCB Monetary System

(*) (**) and (***) indicate items that net out in aggregation

aggregating all national monetary systems along with the ECB, we receive the European Monetary System, whose assets/liabilities should be the EMA.

There are two important observations that can be made on the basis of these balance sheets. First, as indicated in the box, the balance sheets are constructed according to the decentralised or the 3-tier system. This is so because the institutions which hold reserves at the ECB are the NCBs. However, when NCBs and DBs are aggregated at the national level, the institution keeping reserves becomes immaterial. It is the national monetary system which owns the assets held in account with the ECB. Thus, *ex post* money, i.e. the actual money produced by the system and registered in the balance sheets, is invariant to the choice of the institution whose liabilities are subjected to reserve requirements.

The second observation has to do with the normative status of the reserves owned by each national monetary system. Aggregating on the European level, the total assets consisting of these reserves net out with the liabilities of the ECB *vis-à-vis* each NCB. It means that the *ex post* EMA is invariant to the distribution of reserves among the national monetary systems. For example, if NCB^A borrows reserves from NCB^B in the context of the decentralised system, the balance of NCB^B with the ECB will decrease and the balance of NCB^A increase but the total assets of the ESCB will remain unchanged. Accordingly, there is no reason to attach what Kenen (1992) calls "a normative importance" to the central banks' balances with the ECB.

The only conclusion that can be drawn from these observations is that *ex post* money is invariant to the institutional differences of the two alternative models. Hence, if any differences exist, they must be found rather in the possibilities of controlling the process of money creation and of monitoring the development of the monetary aggregate. In other words, we proceed by investigating the *ex ante* properties of the two models.

As already mentioned, at the pure accounting level national money in principle can be considered as a simple component of the EMA. According to this approach, the EMA, the European money supply M^E is simply defined as the sum of the realised money supply in member countries M^i , where $i=1, \dots, 12$. In principle, the EMA could also be defined without any reference to national statistics, simply as a bundle of relevant financial assets held by European actors. It would be possible to go this way, if detailed financial data were available. Obviously, if these two ways of accounting were equivalent, the relationship between national and area-wide money would be clearly additive, i.e. $M^E = \sum M^i$, where $i=1, \dots, 12$. There are, however, good reasons to believe that the relationship is not additive if the EMA is defined independently of the sum, i.e. according to some economic criteria, and the rest of the section is devoted to demonstrate the pitfalls of adding national money.

In order to keep track with definitions and variables, we put down the components of national aggregates:

<u>From the Asset Side</u>		<u>From the Liability Side</u>
$\text{Money (M)} = \left[\begin{array}{c} \text{Deposits at ECB [(ECB)DEP]} \\ + \\ \text{Foreign Assets (FA)} \\ + \\ \text{Domestic Credit (DC)} \end{array} \right]$	=	$\left[\begin{array}{c} \text{Currency Outside Banks (CU)} \\ + \\ \text{Demand Deposits (DD)} \end{array} \right]$
$M=(ECB)DEP+FA+DC$		$M=CU+DD$

Besides these definitions, it is usual to connect the total liabilities of the monetary system, i.e. money, with the liabilities of the central bank (monetary base, H), using the money multiplier equation $M=mH$.²⁴

What will be particularly examined in the next three subsections is whether it is desirable to keep the national monetary aggregates alive. The only reason for why national monetary aggregates would continue to exist might be that the ECB tries to control the EMA, the European total, through its national parts. But as will be clear in the sequel, there are several reasons for not following this procedure. First, national statistics suffer from inconsistencies, making the sum of national monies a bad image of the actual EMA. Second, capital flows among member countries may not be neutral with respect to the aggregate. Finally, keeping the national monetary systems alive in a decentralised or a quasi-decentralised framework may prove detrimental to the parallel effort of promoting financial integration.

4.2.2 Statistical Inconsistencies

Utilising traditional concepts, a European Monetary Aggregate, hereafter EMA, should be nothing but the aggregate liabilities of the ESCB, i.e. the liabilities found in the consolidated balance sheet of the national central banks, the deposit banks and the ECB. So if national aggregates were consistently defined, they should sum up to an aggregate that mirrors the actual liabilities of the ESCB.

One problem with this particular aggregation is that traditionally defined national money suffers from **statistical inconsistencies**. As explained in section 2.6, national monetary aggregates are not harmonised and existing, quite arbitrary, national definitions do not capture all monetary assets in an appropriate way. For example monetary assets such as demand deposits held by foreigners on accounts with domestic banks are not included in many national aggregates. Thus, to the

²⁴ Simple manipulation of the definition the monetary base $H=CU+RE$, where CU is currency in circulation and RE the reserves of the banking sector, gives the traditional money multiplier equation:

$$H = \frac{CU + RE}{M} M = \frac{CU/DD + RE/DD}{CU/DD + 1} M = \frac{cu + re}{1 + cu} M, \text{ where } cu = CU/DD \text{ and } re = RE/DD. \text{ Defining the money multiplier as } m = \frac{1 + cu}{re + cu}, \text{ we get } M = mH, \text{ where } m > 1 \text{ because reserves are only a small fraction of deposits}$$

extend many European residents are treated as foreigners in national statistics a monetary aggregate derived as a sum of existing national aggregates is liable to *omissions*, consisting of all cross-boarder monetary holdings within the ECB area. A similar problem arises because of a another practice in many countries, namely the practice of excluding monetary assets denominated in foreign currencies, even if they are held by residents in domestic banks.

On the other hand, there is a risk of *duplication* if one country includes in its national statistics monetary holdings of its residents held at banks abroad, and the statistics of the country where this asset is issued (e.g. a bank account) includes assets held by foreigners. If the foreigner is a Community resident, these assets will be counted twice, once in the country of residence and once in the country of the bank issuing the asset.

In conclusion, a far-reaching harmonization of national statistics is necessary before national aggregates sum up to a fairly good European aggregate. As already suggested by the Governors' Committee, the ideal should be that all countries apply one and only one criterion in their national statistics, the residence of the holder criterion. Such a reform should bring consistence in existing statistics but it requires quite radical changes in reporting routines. This statistical problem would however, disappear if the intermediate stage of national aggregates were skipped and all European deposit banks reported directly to the ECB. Doing it this way would imply that monetary data could not only be more accurate but also more timely. The EMI/ECB can start targeting a European aggregate without waiting the completion of the harmonization of national data.

4.2.3 Non-neutral Capital Flows

Another problem created by national aggregates is that their sum, the EMA, may be unstable as an effect of capital flows among the participating countries. This is because money multipliers can be of different size. To demonstrate the point, assume that Europe (E) consists of only two countries, A and B , and the target of ECB is based on narrow money, M^i ($i = E, A, B$).

$$M^E = M^A + M^B = m^A H^A + m^B H^B = \frac{1 + cu^A}{re^A + cu^A} H^A + \frac{1 + cu^B}{re^B + cu^B} H^B$$

If $m^A = m^B = m$, then a capital flow, say from country B to country A has no effect on the European aggregate, because $\Delta M^E = m(+\Delta H^A - \Delta H^B) = 0$. Apparently, $\Delta M^E \neq 0$ if the multipliers are not equal, and the difference may lie on the reserve ratios re^i , on the currency to deposit ratios cu^i , or on both. In case $cu^A = cu^B = cu$, things become very simple because harmonizing the reserve requirements is sufficient for neutralising all effects stemming from capital flows. In case $cu^A \neq cu^B$, harmonization of reserve requirements is not a sufficient instrument, and monetary control requires partial sterilization of the capital flows. The latter must of course be based on reliable estimates of the money multipliers involved.

Obviously, the case should become more complicated if M3 rather than M1 is targeted, because more parameters would appear in the money multipliers.

The immediate reflexion one makes on basis of these observations is, again, that it would be preferable to skip the intermediate level of monetary control. As a matter of fact, the possible effects of capital flows would be completely internalised and brought under control without bothering about which particular capital movement took place and if there is a need for partial sterilization. Every tendency for money supply to increase would be automatically detected if deposit banks held their reserves in accounts with the ECB. Since increased money supply is identical to increased private deposits and part of the latter has to be kept as reserve money at the ECB, a statistically closed system would be in operation, making the monitoring function simple and efficient.

One possibility of making the decentralised system tractable from the control point of view is to try to steer the asset side of the monetary aggregates. As shown in the definitions above, each national central bank has three categories of assets, but only one is automatically controlled by the ECB, namely the reserves the NCBs are obliged to hold in accounts with the ECB. This is, however, not sufficient for complete monetary control, because the composition of the other two assets, i.e. foreign assets and domestic credit, should matter to the extend money multipliers differ, as explained above. If, however, the domestic counterpart of national money is also restricted by allotments decided by the ECB, then the task of sterilising capital flows to appropriate extend is also decentralised, and the whole system becomes more functional. For example, a rapid expansion of private credit in high multiplier countries, owing to capital inflows, can be prevented to exceed certain limits if the central bank undertakes open market sales of government debt. Nevertheless, the effectiveness of open market operations in national markets can also be questioned if financial markets do not operate on a national basis, as the next subsection purports to highlight.

4.2.4 Open Market Operations and Leaking National Monetary Systems

Presently, there exist well-functioning markets for reserve money in every member state, but not at the Community level. In other words, the markets for central banks' money are segmented. This is not a problem as long as monetary policies are in the hands of the NCBs, but the existence of an integrated market for ECB-Funds is one of the necessary conditions for a successful centralisation of monetary responsibilities at the level of the ECB. Without this market, diffusion of liquidity across the Community is hampered as local excess liquidity cannot be smoothly channelled to institutions with excess demand.

Lack of an ECB-Funds market has some implications for the way open market operations can be executed. Since the instrument is used to affect total liquidity, the optimal area for central bank money must be identical with the area for which a liquidity target is set. Targeting a European monetary aggregate should therefore imply the obligation of organising and developing the market for central bank money. Again, two alternatives exist.

The first is that the ECB-Fund market exists only for exchange of funds among NCBs, and the only reason for such an arrangement might be that NCBs are also used for orchestrated implementation of monetary policies, which fits well with the probable ambition to preserve a decentralised system. In effect, the various NCBs will seek to affect local liquidity the traditional way, i.e. by buying and selling appropriate amounts of government debt. At the other extreme we can think of a completely centralised system in which the ECB implements its OMOs directly, by choosing among a small number of primary dealers operating in the major financial centres.

Since the purpose of OMOs is to affect total liquidity and the task of allocating it among potential users rests upon the financial markets, it is quite instructive to investigate how the interaction of different markets determines the ultimate effect of monetary policies. For the present purpose it is sufficient to focus on two markets, the market for commercial credit and the more fundamental ECB-Funds market, and table 4.1 can serve as a guide-line for the following discussion.

Financial markets have been segmented but they move quickly towards complete integration. Markets for central bank money are however still segmented, but an integrated ECB-Funds market must be established as soon as the targeting of a common aggregate takes effect. Thus, the original position has been (D) and the ambition is to move to (A). Meanwhile, we are probably between (D) and (C), heading towards (C).

Table 4.1: Possible financial market situations

		Commercial Capital Markets	
		<i>Integrated and well-functioning</i>	<i>Segmented</i>
<i>ECB Funds Market</i>	<i>Integrated and well-functioning</i>	<ul style="list-style-type: none"> • Liquidity easily disseminated to the banking system in the entire ECB area (A) • Efficient allocation of commercial credit in the entire ECB area 	<ul style="list-style-type: none"> • Liquidity easily disseminated to the banking system in the entire ECB area (B) • Allocation of commercial credit restricted in the area of each NCB
	<i>Segmented</i>	<ul style="list-style-type: none"> • Slow and uneven dissemination of liquidity (C) • Efficient allocation of commercial credit in the entire ECB area 	<ul style="list-style-type: none"> • Slow and uneven dissemination of liquidity (D) • Allocation of commercial credit restricted in the area of each NCB

Consider now the possibility that a monetary institution operating in the jurisdiction of NCB^B is allowed to participate in a tender undertaken by NCB^A

and makes the best offer in, say, an open purchase. If the reserve money of NCBA^A is equivalent to the reserve money of NCB^B, as it ought to be in a monetary union, the OMO will immediately imply a liquidity leak from the monetary system of country A into the monetary system of country B, so that the OMO, instead of affecting the monetary aggregate of A as intended, will affect the aggregate of B. Similarly, even if this possibility is ruled out so that only national primary dealers are allowed to participate in the tenders, there is no guarantee that a similar leak does not occur if for example an international firm borrows a commensurate amount from the local banks and places the money in the banking system of another member country.

The point is that possibilities like those mentioned here will exist, and they are desirable in order to promote integration of financial markets. At the same time, these transactions are bound to produce some undesirable effects on the balances of the NCBs with the ECB, because the latter are supposed to be subjected to reserve requirements. So, there is a source of tension arising from the possibility that "a normative importance" can be attached to the balances of the NCBs with the ECB. Open market operations in a decentralised system may have effects on the reserve balances of NCBs, depending on the identities of the counterparts or the ultimate users of liquidity. So, from the very narrow nationalistic point of view, NCBs would prefer a system of complete segmentation, which maximises the effectiveness of their own policies. In many respects, their ideal resembles (B) which is exactly what we had and what the projects of the internal market and the EMU tried to abolish.

If, on the other hand, an ECB-Funds market is established at the level of DBs, which essentially is identical to the centralised system, it will be completely immaterial who is the original recipient of liquidity or where the system is drained from liquidity, and the transition to the ideal final position (A) does not need to pass through the intermediate stage (C). Financial and monetary integration are probably complementary, with one reinforcing the other.

In conclusion, the ambition to promote financial integration is not fully compatible with the idea of decentralised monetary control, as the former undermines the possibilities for the NCBs to control their liabilities. On the other hand, a system of an ECB-Funds market at the level of private banks may enhance the possibilities to speed-up even other forms of market integration.

4.3 Conclusions

The ESCB is supposed to work under the principal target of maintaining price stability. How well it succeeds with its task is, among other things, a function of the institutional framework and how markets perceive the institutional guarantees. There is an element in the proposed model for the ECB which may give rise to credibility problems, namely the risk that diverging national preferences *vis-à-vis* inflation can break through in the policy stance. If institutional arrangements are material for the credibility aspect, the proposed model may suffer from a structural weakness. Complementary mechanisms such as side-payments are probably

necessary for driving the policy stance towards low inflation, and the problem is that markets can always speculate about the adequate amounts of transfers and the current willingness-to-pay from the side of the net contributors. Thus, there is a risk that the ability of the monetary aggregate to produce the desired effect may vary according to the expectations about the outcome of the bargaining.

A similar conclusion has been drawn about decentralisation, if existing NCBs are supposed to play a significant role in monetary management. It is difficult to find room for any substantial subsidiarity under the constraint that monetary policy must be effective. Undoubtedly, the idea of a smooth, step-by-step, transition from the very decentralised system of today to the completely centralised system of stage three, is very attractive. As Cros-Thygesen (1992) put it, "it anticipates the hierarchical structure between the ECB and national central banks that will arise once full EMU has been reached. If the reserves are levied on the monetary base, the reserve coefficient could be raised over time until it reaches 100 per cent. At this point national central banks would become the equivalent of wholly owned subsidiaries of the ECB".

However, we have seen that the dynamics of a gradual transition work against the effectiveness and stability of the system, and our conclusion is that long periods of intermediate regimes can derail the whole project.

5 SUMMARY AND CONCLUSIONS

A favourite cliché among central bankers is that monetary targeting is as much an art as a science. Yet, to the extent it is a science, it is more econometrics than economics. Undoubtedly, this conventional wisdom reflects the fact that the eternal trial-and-error process associated with monetary targeting, can be best perceived as being in the intersection of these concepts. However, to analytically define this intersection must be an art *per se*.

The starting point for this paper was that a convincing econometric evidence about a stable relationship between a European monetary aggregate, and European inflation and output exists. Hence, the relevance of a monetary aggregate as a first choice intermediate target was examined in section 2.2. According to the analysis, the EMA is a good choice if the predominant shocks to the European economy in the foreseeable future have their origin on the real side. It was found that its candidature can be supported by our best guesses about future shocks. Besides, the closeness of the European economy makes exchange rates less attractive than they used to be for the individual countries.

Then, an appraisal of the econometric evidence was endeavoured, and the question marks attached to the relevance of this evidence had their origin in the following.

First, the *ex ante* nature of the relationship was examined in detail. More specifically, the influence of some factors that are likely to distort the behaviour of the estimate in the future has been examined. Among other things, we looked at the so called targeting aspect, the institutional aspect and the possible influence of its worst enemy, financial innovation.

In general terms, the so called targeting problem suggests that monetary aggregates are quite inflexible as policy instruments; current use makes them less capable for future use. So, the stability property is not invariant to the frequency of the use, and successful targeting by the ECB presupposes that it takes over a stable situation. In other words, in order to preserve the strength of the aggregate for a rainy day there should be no need for immediate over-activation of it.

The pertinence of the institutional aspects stems from the credibility aspect, i.e. the institutional guarantees for adherence to ultimate targets. In a sense, institutional arrangements reflect the underlying preferences. In this respect, the composition of the Governing Council of the ECB may prove problematic, as there is a risk that private actors, rightly or not, can be led to believe that the preferences of its members are heterogeneous. Therefore, the policy stance can be perceived as being subjected to bargaining, about which markets can speculate. If suspicions are verified, the capability of the EMA, and monetary policies in general, to maintain price stability will be seriously damaged for a long period if not permanently. If not, a demonstration period is necessary to persuade market participants, with an obvious risk to make the EMA useless due to the above mentioned targeting aspect.

Finally, in the wake of financial integration, there is an increased need for prudential supervision of financial intermediaries. Besides, competition is expected to be more vigorous and we face the problem of overcapacity in the banking sector.

Thus, there are strong incentives for financial innovation, with the attending instability in money demand.

Second, the money demand functions have been estimated under special conditions. The most important are the inconsistent statistics and the positive influence of the asymmetric nature of the ERM. The EMA has been derived by the method of adding up national monies, which has been shown to be inappropriate due to statistical inconsistencies. So, to the extent these inconsistencies are significant, the estimate is not statistically identical with the aggregate which will be targeted by the ECB. Moreover, the asymmetric nature of the ERM makes the estimated EMA entirely determined by the demand side and, consequently, very well correlated with real activity. As an effect, the strong correlation found in the studies is partly a function of the current regime. A targeted EMA will be a completely different thing.

Even the subsidiarity aspect of monetary control has been examined, and no arguments have been found supporting the possibility of keeping the NCBs active in monetary management. The ESCB will certainly perform better if its basic functions are centralised.

In conclusion, we know very little about the *ex post* properties of the EMA. This is hardly surprising and certainly not a very comforting result. However, we know where to search for additional information.

APPENDIX: ASYMMETRIC AND SYMMETRIC SYSTEMS COMPARED

As mentioned in section 2.5, the key-factors in the adjustment are the direction of capital flows and what makes interest rates in the centre country to move. In the following subsections we present the case-by-case effects of different types of shocks under the two alternative exchange rate regimes.

A1: Real Asymmetric Shocks

Assume that a real shocks afflicts one of the European countries. The first example, shown in diagram 3, considers a case which in many respects reminds of the German unification shock. In order to keep this parallel, we treat the German unification as a demand shock pushing the IS curve to the right. If the centre country keeps its money supply unchanged, the increased money demand will push the interest rate upwards. The attending interest rate differential induces capital flows from peripheral countries into the centre. As this inflow is sterilised, the area-wide money supply will decline and the new equilibrium will be established at a higher interest rate level. This particular adjustment transmits therefore a converse shock (i.e., a negative monetary shock) into the peripheral economies. In total, higher interest rates dampen the local shock in the centre (as in Poole's one-country model) at the expense of a monetary squeeze in the whole area. Thus, when this type of shocks occur, the monetary system redistributes economic activity between the centre and the periphery. Moreover, one can observe a correlation between aggregate money supply and economic activity in the periphery.

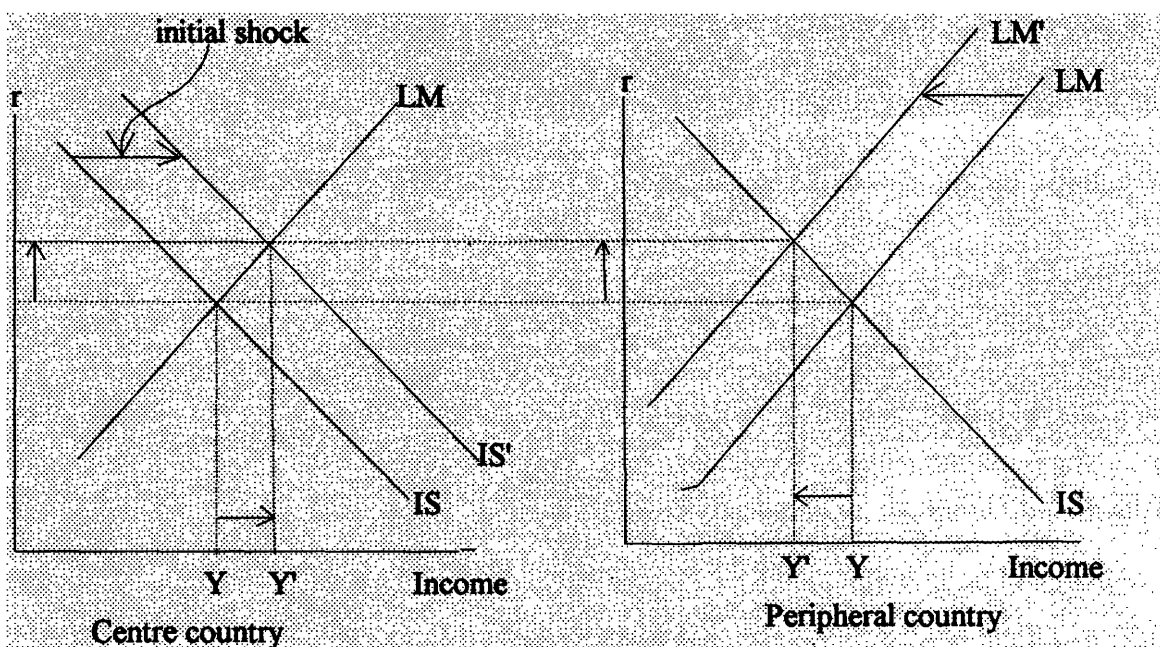
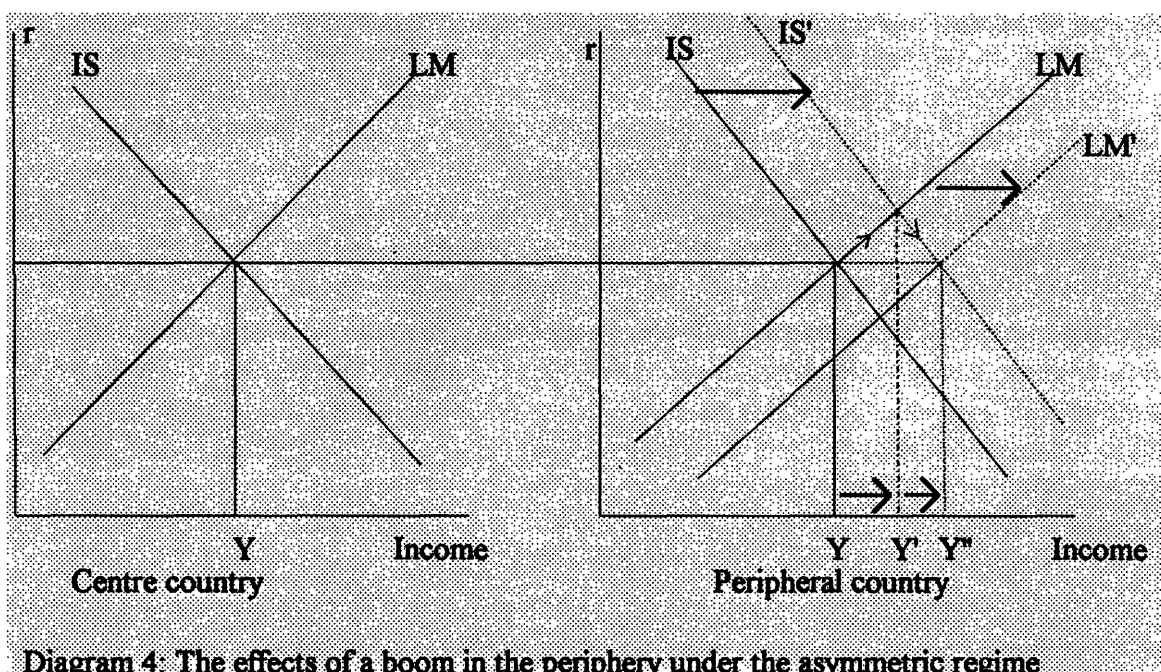


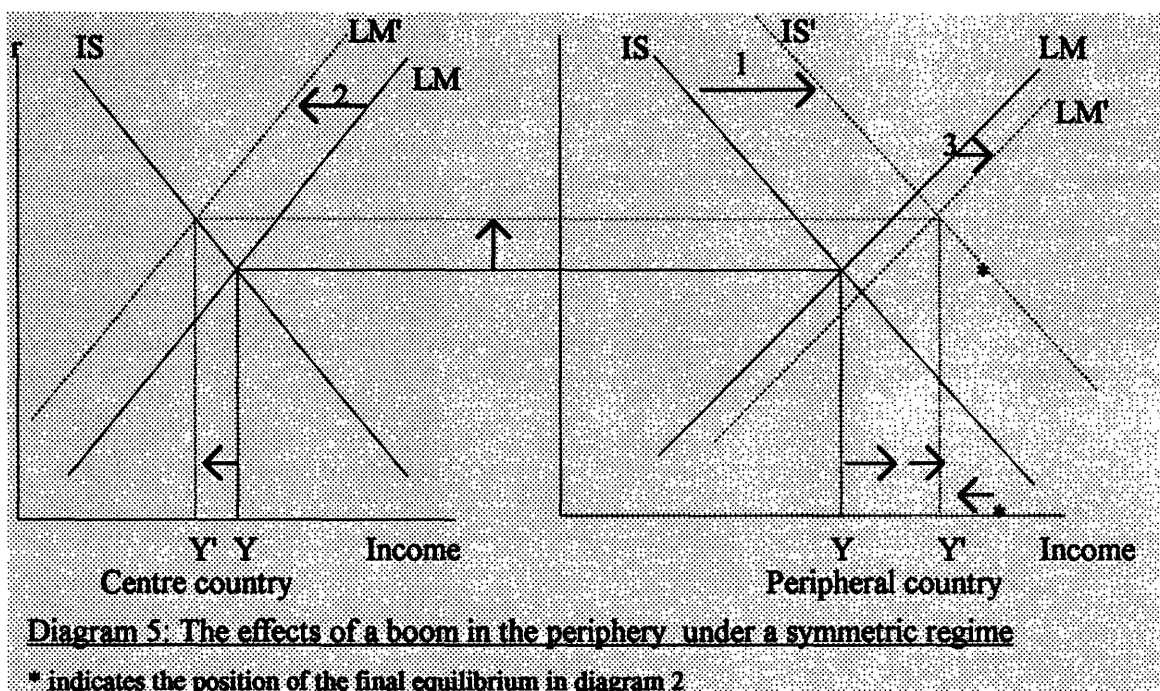
Diagram 3: The effects of a boom in the centre under the asymmetric regime

In a second example we consider a similar real shock in the periphery. For the same reason as before, the demand shock moves the IS curve to the right, tending to raise the interest rate of the periphery. The interest rate differential induces a capital inflow from the centre, but this inflow is not sterilised in the periphery. Sterilization²⁵ of the outflow in the centre leaves however money supply and interest rate unchanged, implying that the capital flow continues until the capital inflow in the periphery has fully accommodated excess money demand. The monetary accommodation of the real shock simply means an additional stimulus in the peripheral economy, shown as a move of the LM curve to the right in diagram 2. In total, real asymmetric shocks in the periphery are **magnified** by the monetary accommodation, but **not transmitted** into the centre. Again, one can observe a strong correlation between aggregate money supply and income in the periphery.



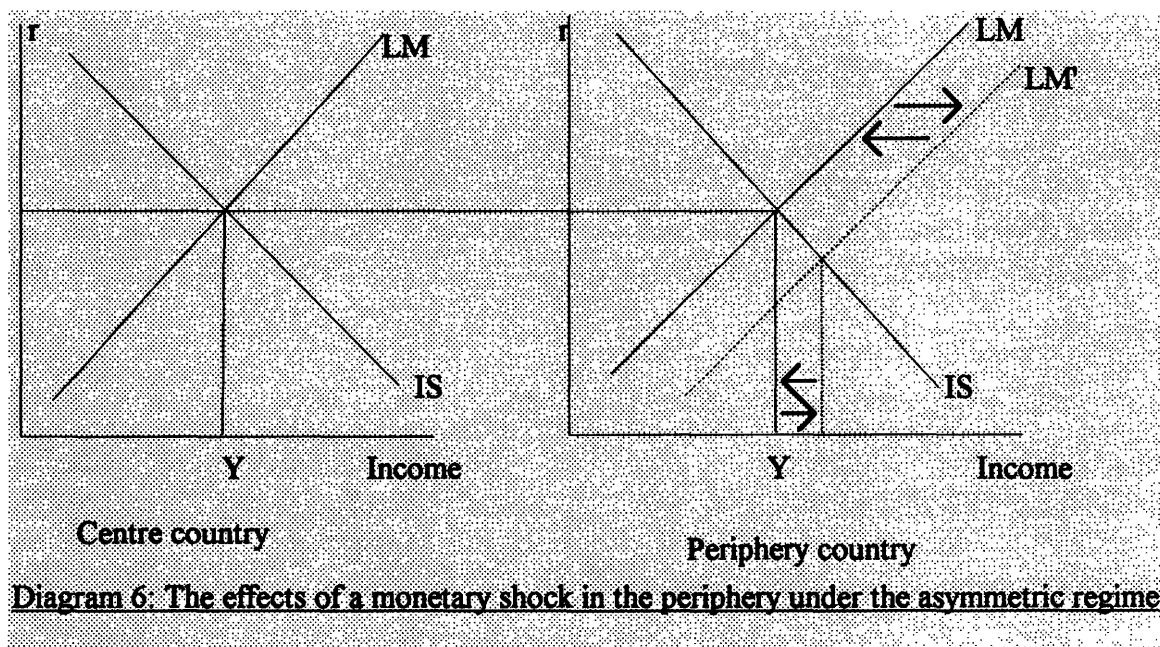
Consider now a similar real shock as in the previous case but under a symmetric regime. The basic difference is that the capital outflow from the centre reduces money supply there, because the targeted monetary aggregate is the global one. In diagram 4 it is shown as a jump of the LM curve to the left. Moreover, interest rates tend to increase in the centre country which has a stabilising effect on the capital flows. For the same reason, increased base money in the periphery helps to attain a new equilibrium which, because of the flexibility of the interest rates, is less dramatic in its real effects than in the case above. However, this stabilising property came about by imposing a real cost on the other country, as the monetary adjustment transmits a negative shock in the centre country.

²⁵ This can be achieved in several ways, for example by purchase of bonds by the central bank.



A2: Adjustment to Nominal Shocks

Consider a nominal shock in the periphery, for example a decline in money demand depicted in diagram 6 as a move of the LM-curve to the right. Excess supply of liquidity in the periphery tends to lower the local interest rate, causing an capital flow from the periphery to the centre. As the inflow in the centre is sterilised, interest rates do not move in the centre and the outflow from the periphery continues until a new equilibrium is established at the original level. Thus, the asymmetric regime has the capability to completely absorb all asymmetric monetary shocks in the periphery.



As monetary stability is the salient feature of a country in order to gain the privileged position in an asymmetric exchange rate regime, examples of the effects of monetary shocks have only a theoretical interest. However, in case a monetary shock occurs, it will be immediately transmitted into the peripheral countries as for example a drop in money demand sets a capital flow in motion which increases liquidity in the entire area. This is the case illustrated in diagram 7. It is also self-evident that there should be no difference in what concerns adjustment and effects between the symmetric and the asymmetric systems. Under the symmetric regime, a drop in money demand anywhere will leave the whole area with excess supply of liquidity and the shocks will be transmitted in the whole area.

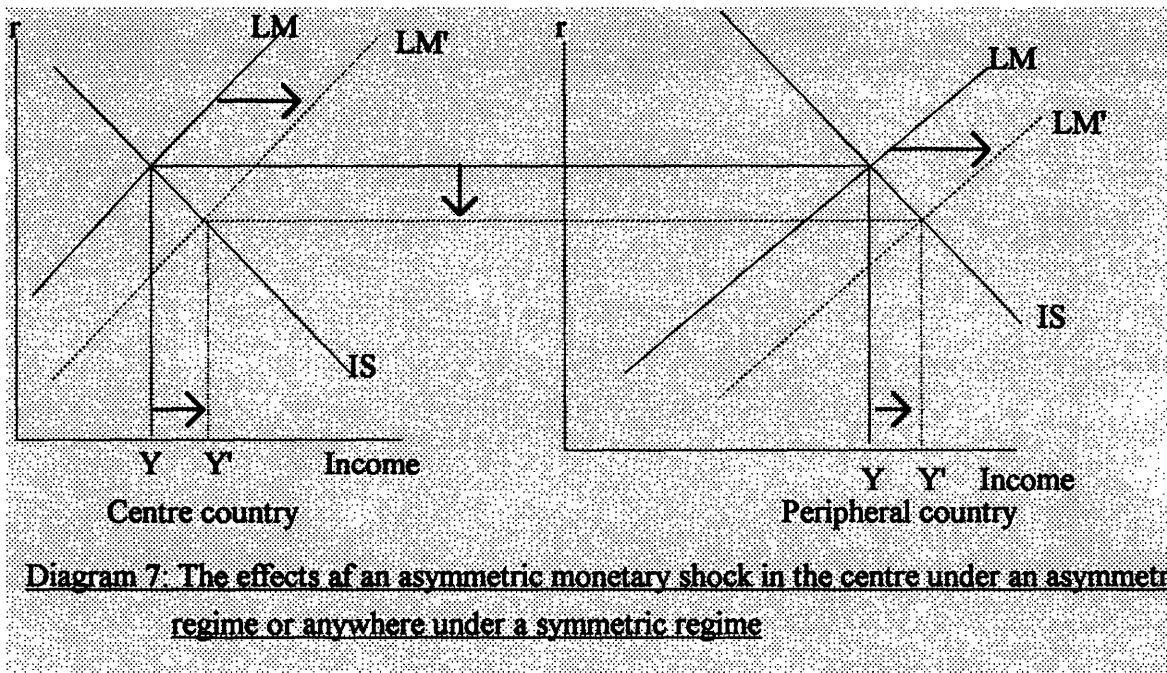


Diagram 7: The effects of an asymmetric monetary shock in the centre under an asymmetric regime or anywhere under a symmetric regime

A 3: Speculative Attacks

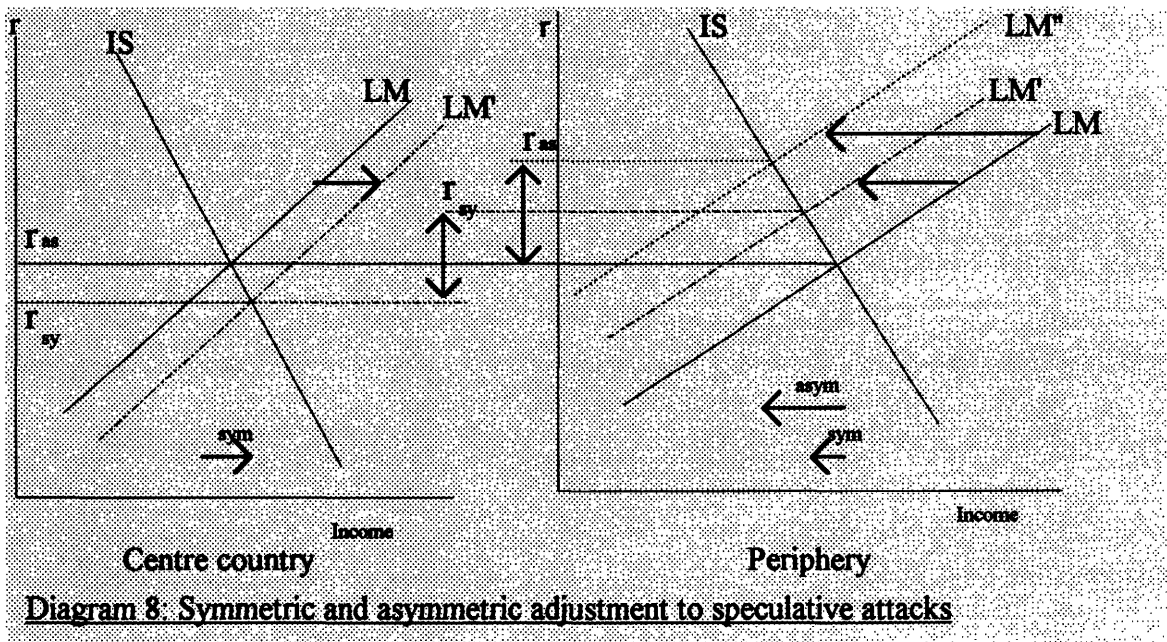
All previous cases are based on the assumption that the exchange rate mechanism is credible. In terms of the uncovered interest rate parity, interest rates were equalized because expected devaluation was zero. Recent experience shows nevertheless that this is not the case, and speculative attacks may resurface before national currencies are replaced by the ECU. It is therefore worth examining the two systems even from this point of view.

A speculative attack takes the form of a capital outflow from a country whose currency is expected to devalue. The outflow abates as outflows create a interest rate differential which compensates for the devaluation risk. As shown in diagram 8, the effects of such an attack are quite different under the two alternative regimes. Assume first the asymmetric system. The outflow is illustrated by a jump in the LM curve in the peripheral country to its new position LM'' . Again, the LM curve of the centre country does not move because the inflow is sterilised. The

capital flows stop when the interest rate differential attains the required level, illustrated as the vertical distance between the r_{as} .

Non-sterilization of the inflow under the symmetric regime makes however the LM curve in the centre country to shift to the position LM' . The shift reflects an increase in base money which lowers the interest rate in the centre. Thus, the required interest rate differential can be achieved at lower levels, which is beneficial to the peripheral countries but implies shared burden between centre and periphery.

If the reason for the attack is to be found in lax policies in the periphery, a transition from the asymmetric to the symmetric system entails the risk of market discipline less compelling. Under such circumstances, the asymmetric system is preferable on its efficiency properties whereas the symmetric on its distributional properties.



ANNEX TO SECTION 4.2: SOME EARLY IDEAS IN DELORS REPORT

(1) The proposal of Governor Ciampi (Delors Report pp. 225-232)

(10) Under the scheme the monetary organization of the Community would have *three levels*: the central monetary institution, national central banks and commercial banks. At the top, the central monetary institution would only engage in transactions with member central banks; these, in turn, would maintain their present relationships with domestic commercial banks. The central monetary institution would act as the central bank of the national central banks and use its creation of ECU reserves to influence the monetary actions of member central banks....

(12) The scheme involves three fundamental components. The first is an *autonomous balance sheet* for the central monetary institution, The second is a mechanism for ensuring direct and *firm control of the supply of ECUs* by the central monetary institution, in strict analogy with the control exercised by national central banks over domestic money supply. The third is a set of provisions to *strengthen national central banks' demand for official ECUs*....

(13) The balance sheet of the central monetary institution would be based on *capital* in the form of contributions by the central banks.....

(15) *Credit mechanisms*,....., are similar to the rediscount facilities for commercial banks at the national level.... The cost of this credit would also be fixed discretionary.

(16) The third component needed to complete the scheme,, is a specific and *exclusive use for the ECUs* held with the central monetary institution. This is provided by requiring member central banks to hold the ECUs as deposits with the central monetary institution in the form of both *compulsory and free reserves*.

(2) Professor Thygesen (Delors Report pp 157-175)

"The essential feature is that the ECB should be empowered to impose - uniform or differentiated - reserve requirements on either the increase in the monetary liabilities of each national central bank or on the credit extended by the member banks to their respective domestic sectors. This requirement would be met only by holding reserves with the ESCB; and the supply of reserves would be entirely controlled by the latter through allocations of a reserve asset (official ECUs) to each central bank corresponding to the demand which would arise, if agreed targets for money creation or domestic credit expansion were observed. Alternatively, the supply of reserves would be created by open market purchases of the ESCB. Both cost and availability considerations would provide central banks with an incentive to stay close to declared objectives."

"In the variants of an operational framework for an integrated monetary policy described in Governor Ciampi's paper and in the previous paragraph, the ESCB would not have any direct contact with commercial banks or with financial markets in general. Its sphere of operation would be confined with the second tier of the three-tier system, the national central banks. This would be unduly confining from the time during stage three when a common currency is introduced. To manage a common currency the ESCB would need to have direct transactions with commercial banks, as does a national central bank at present.

(3) Professor Lamfalussy (Delors Report pp. 213-219)

"..... , three possible approaches to stage two are proposed. The first would be to implement a gradual but formal transfer of decision-making power from the monetary authorities of the member countries to a federal central banking institution. The second approach - outlined in Governor Ciampi's contribution to this collection of papers - would be to set up a formal two-tier system of monetary control based on the requirement that member central banks back their creation of local currency reserves with ECU reserves supplied by a federal central banking institution. Finally, at the core of the third approach set out in this paper is the idea that EC central banks should set up a jointly owned subsidiary, whose facilities they would share in

performing certain of their functions - notably the implementation of monetary policy through the domestic money and foreign exchange markets - but which would not require them to give up any substantial degree of individual sovereignty over those functions."

.....

"The first two approaches implicitly assume that some element of central bank authority or resources would need to be put under collective control as a necessary condition for establishing a new operational institution in stage two. By contrast, the third approach essentially reverses the order of progress so that operations are centralized in a new institution *before* resources are formally pooled or authority is granted to a collective body."

"However, the largest boost to the monetary union process would come from centralizing the operations through which national monetary policies are implemented. This would cover domestic open market and lending operations, as well as intervention in the foreign exchange markets. It would be achieved by establishing a common operations floor and accounting system within the jointly owned subsidiarity which could be known from the outset as the ESCB. Initially, each member central bank would staff its own operations on the common floor rather like a branch, but over time these separate national staffs would be merged into a single unit."

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