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Problems in the Transition to European Monetary Union

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I. Introduction

With the envisaged establishment of European Monetary Union (EMU) in 1999, attention is increasingly directed towards the management of the immediate transition period. Against this background this paper investigates three selected problems in the transition to EMU: the choice of a misaligned conversion rate with the changeover to a common currency, the uncertainty with respect to the future stance of monetary policy of the European Central Bank (ECB) and, finally, the implications of an asymmetric real wage push within the monetary union. The theoretical design extends the model by *Buiter* and *Miller* (1981) to a three-country world. It serves as a fruitful framework to analyse the macroeconomic effects of the above-mentioned disturbances and to evaluate alternative strategies for monetary and fiscal policy.

II. Implications of a Misaligned Conversion Rate

According to Article 1091(4) of the Maastricht Treaty, the rates of conversion of the national currencies to the Euro will be determined on January 1, 1999. On the other hand, the decision about EMU membership will be made in the beginning of May 1998. This creates a transition period of uncertainty and may invite strong and destabilising speculation.[1] Against this background, the EU finance ministers and central bank governors agreed at the Mondorf ECOFIN meeting in September

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[1] For the discussion of the potential instability during the interim period resulting from the indeterminacy of the last-day exchange rate see *Begg* et al. (1997) and *De Grauwe* (1997).

1997 that in early May 1998 not only EMU membership will be announced but also the *method* at which the bilateral parities of EMU participants will be irrevocably fixed at the end of 1998.

Numerous scenarios for the transition period and for currency conversion have been developed.[2] Nevertheless, only two alternative conversion methods are seriously discussed (*Lehment,* 1996): first, currency conversion may be based on the current parities of the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS) which may be labelled the parity method. If credible, this method allows for a smooth transition to monetary union. Figure 1 presents the current deviation of EU-currencies participating in the ERM from the central DM- and ECU-parities. Despite the wide ERM-bands of +/− 15 %, the implied exchange rate changes are relatively small for almost all countries participating in the Exchange Rate Mechanism. The notable exception is Ireland whose currency is presently very strong.

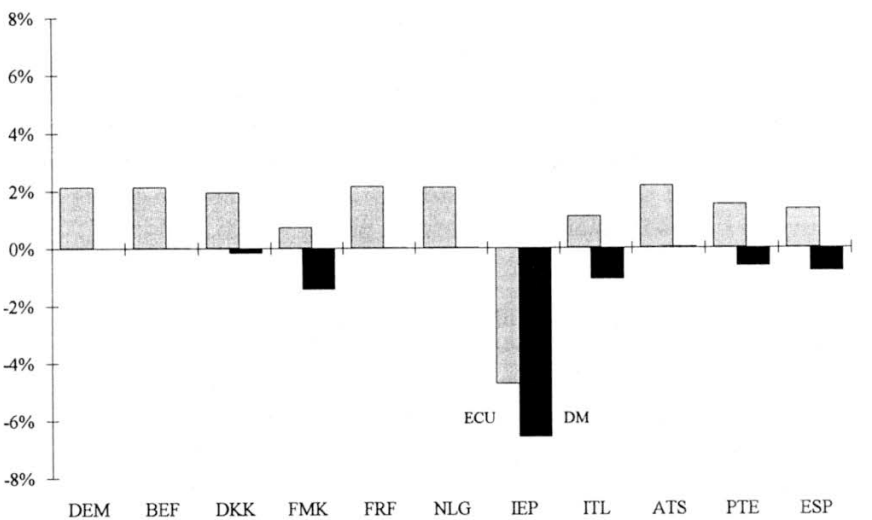

Figure 1: Deviations from DM- or ECU-Parities
Data source: Deutsche Bundesbank, Foreign Exchange Statistics, November 1997.

The problem with the parity method is that in the absence of full credibility foreign exchange markets may initiate speculative attacks. This concern leads to the second alternative which is (among others) put for-

[2] See *Begg* et al. (1997) for further elaboration and discussion.

ward by the former president of the European Monetary Institute (EMI) and therefore called the Lamfalussy rule. Lamfalussy suggests to calculate the conversion rate as a weighted average of market rates during a longer period prior to monetary union. This conversion rule appears to offer an attractive alternative to the previous two methods since both, speculative attacks and large misalignments may be avoided. However, as *De Grauwe* (1996) demonstrates, the Lamfalussy rule introduces at the instant of its announcement substantial exchange rate changes. More importantly, after the announcement intra-EMU exchange rates are likely to experience substantial drift. It can not be ruled out that monetary union starts with misaligned conversion rates. Against this background, it is interesting to analyse the impact of misaligned conversion rates at the start of the monetary union on the member countries of EMU.

The framework by *Buiter* and *Miller* (1981) characterised by short-run price stickiness and rational expectations in the foreign exchange market will be extended to a three-country world. It borrows in its setup on *Wohltmann* (1993 and 1994) but introduces some simplifications.[3] The monetary union is small relative to the rest of the world and consists of only two countries with similar structure. Country 1 is called Germany and country 2 France. The exchange rate within the monetary union is fixed, except for a single exogenous change. It is denoted by E and indicates the amount of German mark to be paid for one franc. The monetary union enjoys flexible exchange rates towards the rest of the world which is called the United States. The German external exchange rate is denoted by E^* and represents the amount of German mark to be exchanged for one dollar. Correspondingly, the external exchange rate of France is E^*/E.

In conventional models of a monetary union the internal exchange rate is fixed and normalised to unity. This simplifies the aggregation of price levels and real incomes. In this model, the internal exchange rate is taken as a parameter. All variables at the level of the monetary union have to be expressed in one currency which is taken to be the German mark. Furthermore, the structure of the model is log-linear (except for interest rates) and all parameters are positive.

Equations (1) and (2) represent reduced forms of goods market equilibria in Germany and France. In Germany, the demand for domestic

[3] The corresponding discussion paper (*Clausen* (1995)) includes a more general model specification and a very detailed analytical annex. It is available upon request.

output depends on an autonomous component a_0, real government consumption g_G, and the trade balance.[4] The trade balance is affected by real income abroad (where income in the United States is assumed to be fixed and normalised to unity) and by the real exchange rates with respect to the trading partners France $(p_G - (e + p_F))$ and the United States $(p_G - (e^* + p^*))$.

$$(1) \qquad y_G = a_0 + g_G + b_1 y_F - b_2 (p_G - (e + p_F)) - b_3 (p_G - (e^* + p^*)),$$

$$(2) \qquad y_F = a_0 + g_F + b_1 y_G - b_2 (p_F - (-e + p_G)) - b_3 (p_F - (e^* - e + p^*)).$$

The equation for France is based on the same principles. Moreover, Germany and France are regarded as completely symmetric. All behavioural parameters are assumed to be identical. Due to the log-linear structure of the model the behavioural parameters are to be interpreted as elasticities. The parameters b_1, b_2, and b_3 reflect the elasticities of the trade balance with respect to real income in the partner country in the monetary union and to the real exchange rates within the monetary union as well as *vis-a-vis* the United States.

Price adjustment within the economies results from a macroeconomic background in which prices for the domestic good are set as a markup over wages. Wages, in turn, are fully indexed to the cost of living and, furthermore, depend on the state of excess demand or supply in the goods market. The cost of living or consumer price index includes domestic goods as well as imported goods from the respective partner country and from the United States. In the case of Germany it is defined as $p_G^c = \alpha_1 p_G + \alpha_2 (e + p_F) + \alpha_3 (e^* + p^*)$ with $\alpha_1 + \alpha_2 + \alpha_3 = 1$. Equations (3) and (4) describe the implied price adjustment processes within the economies. The rate of inflation with respect to the price of the domestic good depends on the rate of inflation based on a consumer price index and on the deviation of actual from full employment income.

$$(3) \qquad \dot{p}_G = \alpha_1 \dot{p}_G + \alpha_2 \dot{p}_F + \alpha_3 (\dot{e}^* + \dot{p}^*) + \delta (y_G - \bar{y}_G),$$

$$(4) \qquad \dot{p}_F = \alpha_1 \dot{p}_F + \alpha_2 \dot{p}_G + \alpha_3 (\dot{e}^* + \dot{p}^*) + \delta (y_F - \bar{y}_F).$$

Equation (5) reflects perfect capital mobility within the monetary union as well as between the monetary union and the United States. The

[4] The real interest rate as a determinant of spending is omitted. The inclusion of real interest rates does not affect the qualitative nature of the results.

traders in the foreign exchange market form rational expectations which are equivalent to perfect foresight in this deterministic model. Within the union exchange rates are fixed except for a single unexpected discontinuous change.[5] Interest rates within the union are therefore identical ($i_G = i_F$). Expectations concerning the external exchange rate may drive a wedge between the level of interest rates within the monetary union and in the United States. It follows:

$$i_G = i_F = i^* + \dot{e}^*. \tag{5}$$

Equation (6) defines money market equilibrium within the monetary union. The aggregate European money stock expressed in German marks ($m_G + e + m_F$) is exogenous due to the assumption of flexible external exchange rates. The distribution of the money stock within the monetary union is, in contrast, endogenous and determined by money demand in the respective countries. This follows from the fact that both central banks are obliged to support the precommitted internal exchange rate by foreign exchange market intervention. That intervention has to be non-sterilised, since sterilised intervention is ineffective under conditions of perfect capital mobility. For simplicity, money demand is assumed to depend on full employment income.[6]

$$\begin{aligned} m &= m_G + e + m_F \\ &= (p_G + d_0 + d_1 \bar{y}_G - d_2 i_G) + (e + p_F + d_0 + d_1 \bar{y}_F - d_2 i_F) \end{aligned} \tag{6}$$

The solution of the model follows the method of *Aoki* (1981). The model is decomposed into two subsystems which describe the aggregate behaviour of the monetary union with respect to the United States as well as the developments within the monetary union. The aggregate behaviour can be derived by adding the relevant equations for the two countries. Following *Buiter* and *Miller* (1981), the system is reduced to the real exchange rate (τ) and the real money stock in Europe (ℓ) as endogenous variables. Solving the model for the state space representation is straightforward and yields the following system (7):

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[5] This complete "surprise" is to some extent unrealistic since foreign exchange dealers know that some announcement will be made in May 1998. For this reason, anticipation effects are likely to occur. Exchange rate behaviour prior to the announcement will be influenced by the conversion rates using the competing methods weighted with the respective probabilities. For further discussion see *Lehment* (1996, 67 - 69) and *De Grauwe* (1996, 20 - 21).

[6] This simplifies the dynamic system without affecting the qualitative nature of the results.

$$(7)\qquad \begin{bmatrix}\dot{\tau}\\ \dot{\ell}\end{bmatrix} = \begin{bmatrix}\frac{-b_3\delta}{\alpha_3\lambda} & 0\\ \frac{b_3\delta}{\alpha_3\lambda} & 1/d_2\end{bmatrix}\begin{bmatrix}\tau\\ \ell\end{bmatrix} + \begin{bmatrix}\frac{\delta}{\alpha_3\lambda} & 0 & \frac{-\delta}{\alpha_3}\\ \frac{-\delta}{\alpha_3\lambda} & 1 & \frac{\delta}{\alpha_3}-\frac{d_1}{d_2}\end{bmatrix}\begin{bmatrix}g_G+g_F\\ \dot{m}\\ \bar{y}_G+\bar{y}_F\end{bmatrix} + \begin{bmatrix}c_1\\ c_2\end{bmatrix}$$

with $\lambda = 1 - b_1, \tau = p_G + e + p_F - 2(e^* + p^*)$, and $\ell = (m_G - p_G) + (e + m_F - e - p_F) = m_G - p_G + m_F - p_F$. The expressions c_1 and c_2 denote constants. The determinant of the system matrix is unambiguously negative and the system exhibits saddle point behaviour.

The adjustment of the system can be analysed in two phase diagrams. Figure 2 represents system (7) graphically and illustrates the effects of the franc appreciation on the overall monetary union in Europe. The long-run consequences of a change in the internal exchange rate e can be directly derived from the model equations. In order to be able to compute steady state values of the nominal external exchange rate and of the price levels it is assumed in this section that the rate of growth of the money stock is zero. The long-run equilibrium is characterised by full employment, price stability, and interest parity. From the long-run equilibrium conditions of the goods market equations and of the money market equilibrium condition it follows that $d\bar{p}_G = 0.5\,de, d\bar{p}_F = -0.5\,de$,

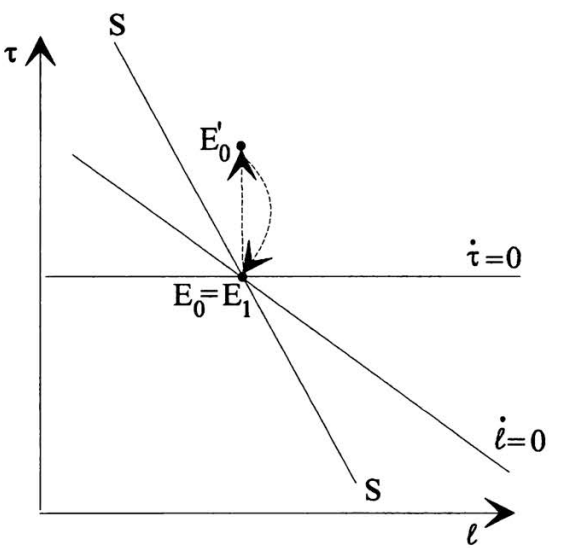

Figure 2: Effect of a Misaligned Conversion Rate on the Union as a Whole

and $d\bar{e}^* = 0.5\,de$. An appreciation of the franc within the monetary union (i.e. $de > 0$) correspondingly leads in long-run equilibrium to an increase of the price level in Germany, a fall of the price level in France, a depreciation of the DM/dollar exchange rate, and an appreciation of the franc/dollar exchange rate.

The loci of the $\dot{\tau} = 0, \dot{\ell} = 0$, and, consequently, of the stable branch of the saddle point (SS) are undisturbed by a change in the internal exchange rate. The effect of the franc appreciation on the competitiveness of Europe towards the United States ($E_0 \rightarrow E_0'$) will be immediately neutralised by a depreciation of the DM/dollar exchange rate. The system remains in the original position and no further dynamics occur ($E_0 = E_1$).

The developments within the monetary union can be represented by a single dynamic equation which reflects the evolution of competitiveness within the monetary union as measured by the internal real exchange rate ($c = p_G - e - p_F$). The equation can be easily derived as:

$$(8)\quad \dot{c} = \frac{\delta}{(1 + b_1)(1 - \alpha_1 + \alpha_2)} \left[-(2b_2 + b_3)\,c + g_G - g_F - (1 + b_1)(\bar{y}_G - \bar{y}_F)\right].$$

The sign of the coefficient with respect to c is unambiguously negative and the dynamic equation is therefore stable. The adjustment dynamics

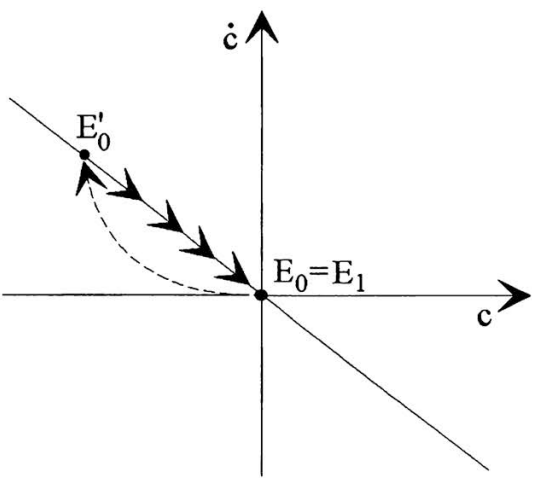

Figure 3: Effect of a Nominal Appreciation of the Franc within the Monetary Union

to a change in the internal exchange rate are illustrated in Figure 3. The nominal appreciation of the franc leads with given prices in the initial situation to a real depreciation of the German mark and has a negative impact on the internal real exchange rate $c(E_0 \rightarrow E_0')$. The excess demand for goods leads to rising prices in Germany. In France, in contrast, the appreciation of the franc and the reduction of foreign demand lead to an excess supply of goods and falling prices. In sum, the internal real exchange rate appreciates during the adjustment process. The increase of c lasts until the original equilibrium value is reestablished ($E_0 = E_1$).

The overall evolution of all endogenous variables can be derived from the results of both systems (*Aoki,* 1981). The adjustment paths are illustrated in Figure 4:

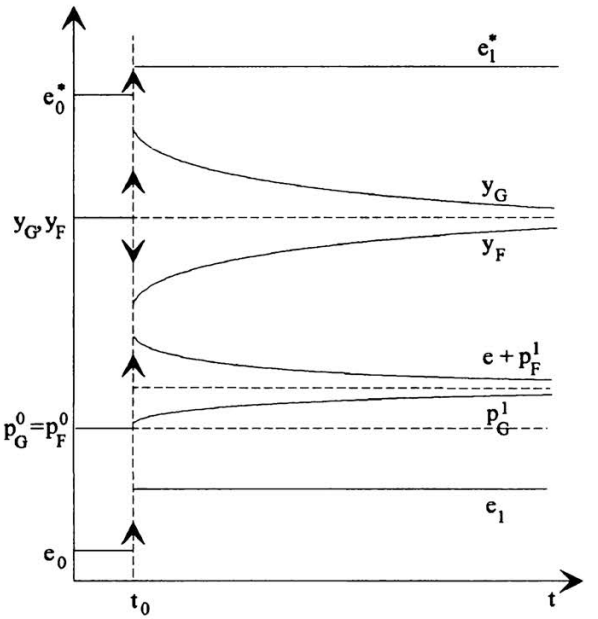

Figure 4: Evolution of the Entire System
After a Change in the Internal Nominal Exchange Rate

It turns out that the appreciating country, France, runs through a recession during the adjustment process. It seems likely that this country calls for expansionary measures in order to avoid deflation. In this respect there are several alternatives:

1. Transfer from Germany to France

One possible policy response is a reduction of government spending in Germany matched by a corresponding increase in France tailored such that the internal *real* exchange rate after the change in the internal *nominal* exchange rate constitutes the new equilibrium value of the system. The system achieves the new equilibrium without adjustments in national price levels and temporary disequilibria in the national goods markets (Figure 5). This policy package may be interpreted as a transfer from Germany to France.[7]

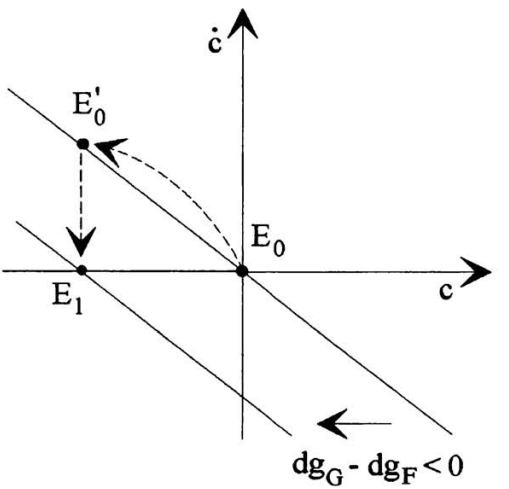

Figure 5: Effects of a Transfer from Germany to France in Conjunction with a Nominal Appreciation of the Franc

The necessary increase in spending in France can be calculated on the basis of equation (8). The case of a transfer is characterised by the restriction $dg_F = -dg_G$. In order to maintain price stability in France and Germany, i.e. $d\bar{p}_F = d\bar{p}_G = 0$, government spending in France (Germany) has to be increased (reduced) as follows:

$$dg_F = \frac{1}{2}(2b_2 + b_3)\,de. \tag{9}$$

[7] Since the model does not include an intertemporal solvency constraint for the public sector this case could equally well be taken as increased borrowing in France and decreased borrowing in Germany, without any inter-country transfers.

The necessary *permanent* increase in government spending and the transfer from Germany will be the higher, the stronger the appreciation of the franc and the higher the elasticities of the trade balance with respect to internal and external exchange rates.

However, it seems unlikely that Germany is willing to finance a permanent transfer such that France may have to identify alternative means to avoid deflation in the French economy.

2. *Unilateral Expansionary Fiscal Policy in France*

France may decide unilaterally to pursue an expansionary fiscal policy without a corresponding German cut in spending. Suppose once again that the spending level in France is set such that in the new equilibrium the price level in France remains unchanged. The necessary increase in spending in France can be derived analogously to the previous case but now without the restriction as:

$$dg_F = (2b_2 + b_3)\,de. \tag{10}$$

In comparison to the transfer the necessary increase in spending in France now has to double. The consequences within the monetary union are identical to the previous case (Figure 5). In addition, there are now effects with respect to the monetary union as a whole since overall government spending in Europe has increased (Figure 6).

The equilibrium schedules ($\dot{\tau} = 0, \dot{\ell} = 0$) as well as the stable branch of the saddle point shift upwards to the new equilibrium in E_1 which is characterised by a real appreciation towards the United States and an unchanged real money stock in Europe. The new equilibrium is reached instantaneously and no further adjustment dynamics take place.[8]

The analysis shows that in the unilateral scenario France may have to substantially increase public spending in order to avoid deflation in France. However, the increased borrowing in France sets debt dynamics in motion which may become unsustainable. This limits the degrees of freedom for future fiscal policy. Against the background of the planned Excessive Deficits Procedure it is questionable whether such a strategy will be feasible. This leaves us with the last policy option.

[8] This result is linked to the assumptions that (1) the nominal money stock is deflated by the producer price index (and not by the consumer index) and (2) full employment income is invariant to real exchange rate changes.

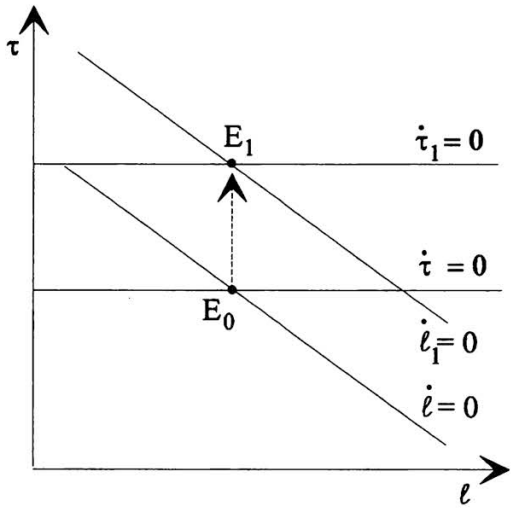

Figure 6: Effects of Expansionary Fiscal Policy in France in Conjunction with Nominal Appreciation of the Franc

3. Expansionary Monetary Policy of the ECB

The last possible strategy for France is to exert pressure within the ECB towards a more expansionary monetary policy. In order to avoid deflation in France, the money stock in Europe will have to increase once and for all by the same percentage as the appreciation of the franc.

In the long-run, the combined effect of both disturbances will leave the price level in France and the DM/dollar exchange rate unchanged whereas the price level in Germany increases by the same proportion as the increase in the money stock and the appreciation of the franc. In terms of the model the increase in the money stock only affects the system representing the monetary union as a whole (Figure 7). E_0 represents the initial and final equilibrium. The increase in the money stock tends to lower interest rates in Europe and incurs a real depreciation towards the United States ($E_0 \rightarrow E_0'$). The improved international competitiveness leads to excess demand for European goods. Over time, the system experiences price increases, a fall in the real money stock and a real appreciation until the original equilibrium ($E_0 = E_1$) is reestablished.

This policy alternative is likely to meet the opposition of Germany. Following the depreciation *vis-a-vis* France and the United States it faces

expansionary impulses and a threat to price stability. The real exchange rate adjustment within the monetary union will then be solely accomplished by the upward adjustment of the price level in Germany.

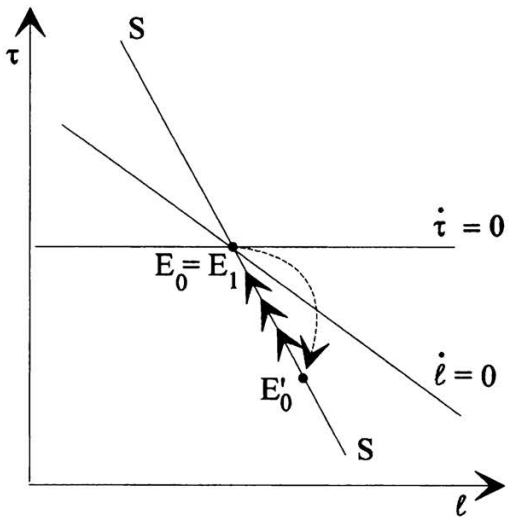

Figure 7: Effects of an Increase in the European Money Stock on the Union as a Whole

In conclusion, on the basis of the conversion procedure as currently envisaged by the Treaty of Maastricht and speculation in the foreign exchange market, a misalignment of conversion rates at the outset of EMU can not be ruled out. This puts pressure on macroeconomic policy to alleviate the resulting adjustment problems in the monetary union. It is demonstrated that – technically – stabilisation policy measures have the potential to neutralise the disturbance. However, the use of these measures introduces undesirable side effects. Against this background the best solution is certainly to avoid a misalignment of conversion rates in the first place. The most promising way to accomplish this is to announce jointly the membership of EMU as well as conversion rates based on the current bilateral parities in the European Monetary System (see *Bayoumi,* 1996; *Begg* et al. 1997; *De Grauwe,* 1996; and *Lehment,* 1996).

If, for whatever reason, a misalignment of conversion rates occurs the adequate response will simply be to let the economies adjust to this disturbance. As demonstrated, the misalignment of nominal conversion

rates has only transitory effects on competitiveness within the monetary union. Over time, the nominal misalignment leads to wage and price adjustments which tend to reestablish the initial real exchange rate. Nominal misalignments do not incur persistent real misalignments and the member countries may well be better off abstaining from stabilisation policy measures.

III. Uncertainty about the Stance of Monetary Policy in Europe

One key question about EMU is whether the ECB will pursue the goal of price stability as much as the Bundesbank does. A number of arguments supports the notion that the ECB will be as price-stability oriented as the Bundesbank:

1. The institutional setting for the ECB basically corresponds with the framework of the Bundesbank. The ECB will be largely independent from government and primarily committed to the goal of price stability.

2. Political pressures on the ECB are likely to be small. In the case of an individual country, governments may put pressure on central banks in pre-election time. In the case of Europe with non-synchronised election patterns, the influence of individual governments on joint monetary policy is likely to cancel out (*Bean*, 1992). Furthermore, the European Parliament is fairly weak *vis-a-vis* the ECB compared with the respective settings in individual member countries.

3. Representatives from the member countries are likely to experience the *Thomas Becket effect* when appointed to the ECB. The decision makers are subject to the new institutional setup and incentive structures such that their behaviour may not coincide with their behaviour revealed in the respective member countries.

This optimistic scenario is challenged by the following arguments supporting the view that the ECB will generate – compared with the Bundesbank in Germany – on average a higher rate of inflation in Europe:

1. Central bank independence and the commitment to price stability are in itself not sufficient to guarantee price stability. The crucial element is the social consensus on the benefits of price stability ("stability culture"). In Germany, the preference for price stability appears to be higher than in most other European countries (*Hayo*, 1997).

2. Europe is not an optimal currency area. While the member countries of EMU lose the internal exchange rate as a shock absorber in the case of asymmetric disturbances, other potential adjustment mechanisms are unlikely to fill the gap. The degree of labour mobility is low. Real wages exhibit downward rigidity. Automatic stabilisers at the level of the EU do not exist. The room for unilateral fiscal manœuvre is limited by the stability pact. Under these conditions it is almost inevitable that countries suffering from relatively high unemployment call for a more expansionary monetary policy stance of the ECB.

3. The move towards a common currency and more integrated European financial markets provides incentives to a more expansionary fiscal policy. The reason is that imprudent fiscal behaviour of some member countries will not be accompanied by an increase in risk premia, interest rates, and debt burden. The announcement of fiscally sound EU member countries not to bail-out troubled member countries is not credible. The disciplinatory effect of the stability pact is likely to be small. In the end, fiscal policy may put pressure on monetary policy to a more expansionary stance. Even a de jure independent central bank can not be fully insulated from these pressures. The current debate on the role of the fiscal criteria in the Treaty of Maastricht illustrates that these risks are not to be underestimated.

The enumeration of the respective arguments explains why economists hold differing views on the likely future stance of the ECB. In this context the size of EMU is of critical importance. In a small or core monetary union comprising only stability-oriented countries it is not to be expected that the future course of monetary policy of the ECB differs noticeably from the course of the Bundesbank. In a larger monetary union which also includes some (or all) Meditarrenean countries, financial markets are (very) likely to speculate on a more expansionary monetary policy of the ECB.

Uncertainty concerning the future stance of monetary policy in Europe has important implications for the monetary union in the transition period (Figure 8). Suppose that the equilibrium in the case of tight monetary policy is the original equilibrium E_0. The case of a more expansionary monetary policy is represented by a higher rate of growth of the money stock. In long-run equilibrium this leads to a fall in the real money stock in Europe while leaving the real exchange rate unchanged. The real money stock falls, since money demand depends negatively on the nominal interest rate which increases in the long-run one-to-one with respect to the rate of inflation and the rate of growth of

the money stock. The real exchange rate remains unaffected since the goods market does not experience a disturbance. During the transition period the real exchange rate is lower than in the original equilibrium, generating the excess demand and the price increase necessary to bring about the fall in the real money stock.

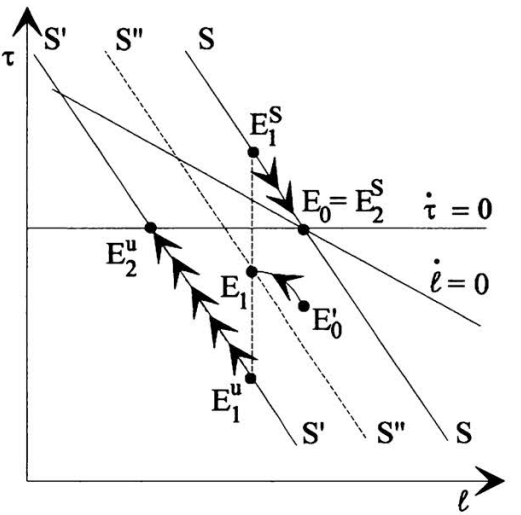

Figure 8: Consequences of Uncertainty about Future European Monetary Policy in the Transition Period

Assume that the date of the eventual regime change is known with certainty. This condition is taken to be fulfilled in the case of EMU since it is part of the Treaty of Maastricht.[9] Suppose further that in the view of the foreign exchange market tight and loose monetary policies have equal probability. Under these assumptions the following adjustments occur: during the period of transition and therefore also at the time of the announced regime change, expected profits in the foreign exchange market have to be zero. The "expected" stable branch is denoted with S'' S''. The point E_1 reflects the zero expected profit condition at the time of the expected regime change. In order to attain that position the system experiences on impact a real depreciation to E_0' and moves along an unstable path computed relative to the original equilibrium E_0. This presumes that prior to monetary union the stance of monetary policy in

[9] For a discussion of postponement of EMU, i.e. the uncertainty about the timing, see *Clausen* and *Willms* (1997).

Europe is more or less predetermined by the monetary policy of the Bundesbank. After the establishment of the ECB there are two alternative adjustment paths: either the ECB pursues a more expansionary stance than the Bundesbank and the monetary union experiences a further real depreciation to E_1^u. Or the ECB basically reproduces the monetary policy stance of the Bundesbank. Under this condition the monetary union faces an immediate real appreciation to E_1^S which has a deflationary impact. The original equilibrium ($E_0 = E_2^S$) will be achieved via a real depreciation.[10]

The analysis has two implications for the transition period: as long as there is any uncertainty regarding the stance of the ECB towards inflation, it is likely that (1) major fluctuations of the common external exchange rate occur[11] and that (2) the ECB faces exactly at the time of the establishment of monetary union a real appreciation of the common currency and a loss of competitiveness exerts deflationary pressure on the European economies. These results can be interpreted in two directions: one conclusion for the ECB is to signal ex ante as clearly as possible to the private sector the commitment to price stability. Another conclusion relates to the decisions about the size as well as the composition of membership within EMU. The stability-oriented stable branch may be interpreted to reflect the monetary policy stance of a "core" monetary union. In order to smooth the transition to EMU it will be important to take the convergence criteria seriously and to limit membership in order to strengthen the credibility of the ECB.

IV. Asymmetric Wage Pressure, Fiscal Transfers, and Macroeconomic Adjustment

A third potential disturbance related to the establishment of a monetary union is that the transition to EMU may be characterised by upward wage pressure. The introduction of a common numéraire may provide an incentive for trade unions in low-wage regions to call for an equalisation of wages since relative wage levels become more transparent. Another factor contributing to a wage cost push in low-wage regions may result from efforts to harmonise social standards in the EU. The

10 For a more detailed discussion of anticipation effects in stabilisation policy and the corresponding formal treatment of the adjustment paths see e.g. *Wohltmann* (1994).

11 However, in recent years the ECU-Dollar exchange rate remained fairly stable (*Funke* and *Kennedy*, 1997).

implications of an asymmetric push in *real* wages are permanent and can be illustrated in a suitably extended model which devotes more attention to the specification of the supply side of the economy.[12]

In the short-run, output remains demand-determined such that the reduced forms of the output equations still apply. In the long-run, equilibrium output is assumed to be affected by *equilibrium* real external exchange rates (*Wohltmann,* 1994). To see this, suppose firms produce output with a Cobb-Douglas production function. With perfect competition and no intermediate inputs imported from abroad their long-run equilibrium output varies with the producers' real wage which equals the nominal wage w_F deflated by the price of domestic output p_F. In the case of France it follows:

$$\bar{y}_F = k - \theta(\bar{w}_F - \bar{p}_F), \tag{11}$$

where k represents a constant. Nominal wages are determined in the labour market on the basis of a contract model in which nominal wages are indexed with respect to the consumer price index:

$$w_F = w_F^0 + \beta p_F^c. \tag{12}$$

The parameter β indicates the degree of wage indexation and may vary between zero (nominal wage rigidity) and one (real wage rigidity). In the following analysis, it is assumed that β equals 1 such that nominal wages are fully indexed. Changes in the expression w_F^o can then be interpreted as a *real* wage push.[13] Using the definition of the consumer price index for France and inserting the long-run equilibrium of (12) in (11) yields:

$$\bar{y}_F = k - \theta(w_F^o - \alpha_2(\bar{p}_F + e - \bar{p}_G) - \alpha_3(\bar{p}_F - \bar{e}^* + e - p^*)). \tag{13}$$

With redefinitions this can be expressed as:

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12 One might argue that an exogenous wage push may not be very satisfactory as a premise. However, the analysis in this section may equally well be taken for any kind of asymmetric supply shocks hitting the European economies, say from technology or demography.

13 The assumption of real wage rigidity – even in the short-run – is admittedly extreme. In view of the high degree of unemployment in Europe, long-run real wage rigidity may also be questioned. The empirical evidence is mixed. While *van der Ploeg* (1990) cannot reject empirically real wage rigidity in Europe (except for the United Kingdom), *Layard* et al. (1991) find evidence against it (p. 406f). In general, it may be difficult to make inferences based on historical data sets. The introduction of a common currency is likely to affect the behaviour of wage negotiators since a bail-out via a currency depreciation is no longer possible.

$$\bar{y}_F = f_o + f_1(\bar{p}_F + e - \bar{p}_G) + f_2(\bar{p}_F - \bar{e}^* + e - p^*), \tag{14}$$

where an exogenous real wage push can be interpreted as $df_0 < 0$. The previous macroeconomic model will be augmented by equation (14) specified for Germany and for France. The steady state effects in the model change substantially by this modification. In the previous model, steady state real exchange rate changes did not have any lasting impact on real income or on the price level. In the modified model, a persistent real exchange rate appreciation leads in the steady state ceteris paribus to an increase in full employment output and a fall in the price level.

At the level of the monetary union and in the steady state the real wage push incurs a reduction in full-employment income, a rise in the price level, a fall in the real money stock, and a real appreciation towards the United States. Possible adjustment patterns are illustrated in Figure 9.[14] The real wage push leads to an upward shift of the $\dot{\tau} = 0$- and $\dot{\ell} = 0$-curves: the corresponding stable branch may shift to the right or to the left. The direction of the shift depends on several structural parameters. If real money demand strongly responds to full employment income, i.e., d_1 is sufficiently large, then substantial price increases will be necessary to bring about the decline in the real money stock. In this case, the adjustment process is more likely to start with a real depreciation towards the United States.

Within the monetary union the real wage push in France leads to a shift of the adjustment path to the left. Without a policy response or a transfer system the monetary union will experience a real appreciation of the franc within the monetary union. In conjunction with transfers the overall effects for Germany and for France are as follows: France will necessarily experience a decline in real income and a rise in the price level. The impact on the macroeconomic variables in Germany is ambiguous.

This raises the question of what type of policy mix might be appropriate in the case of an asymmetric real wage push. In general, monetary policy will be ineffective. An increase in the level of the money stock does not have an impact on the steady state real exchange rate. The same holds for an increase in the growth rate of the money stock. In contrast,

14 The analysis assumes that the real wage push does not feed immediately into prices. With prices reacting immediately to wage pressure but sluggishly to disequilibria in the goods market it is possible to apply the mode of analysis by redefining the real exchange rate and the real money stock with respect to nominal wages (see *Buiter* and *Miller*, 1983).

changes in government spending have implications for the real exchange rate and may therefore serve as a shock absorber. In general two alternative strategies may be feasible: an expansionary fiscal policy in the country experiencing the real wage push in order to stabilise real output or a transfer system within Europe (fiscal transfer policies).

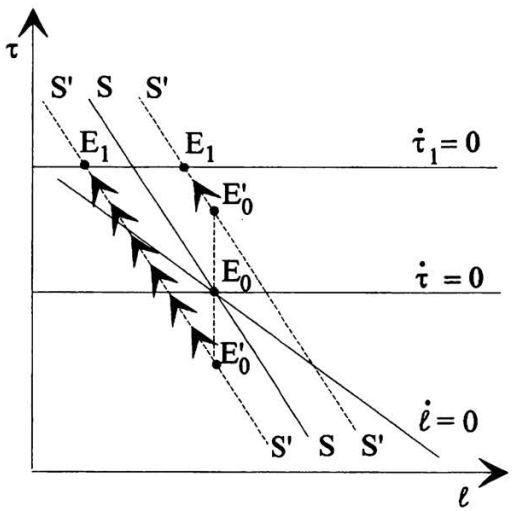

Figure 9: Impact of an Asymmetric Real Wage Push on the Union as a Whole

Since the idea of a transfer system enjoys some support[15] it will be examined more closely (Figure 10). Suppose that a transfer system for fiscal policy will be designed with the aim to synchronise the evolution of real output within the monetary union, i.e. $dg_G = -dg_F$ is adjusted such that $d\bar{y}_G = d\bar{y}_F$. Under this scheme, Germany will transfer funds to France and both countries will experience a recession. The burden of adjustment to a real wage push in one country has to be borne by *all* European countries. An automatic transfer system is therefore not well suited to absorb the effects of the real wage push. The situation is especially unattractive for the Germans. They transfer funds to France on a *permanent* basis and experience on top a recession. Furthermore, this kind of transfer system will *reinforce* the real exchange rate appreciation within the monetary union and may lead to frictions within the mone-

[15] See e.g. *Goodhart* and *Smith* (1993).

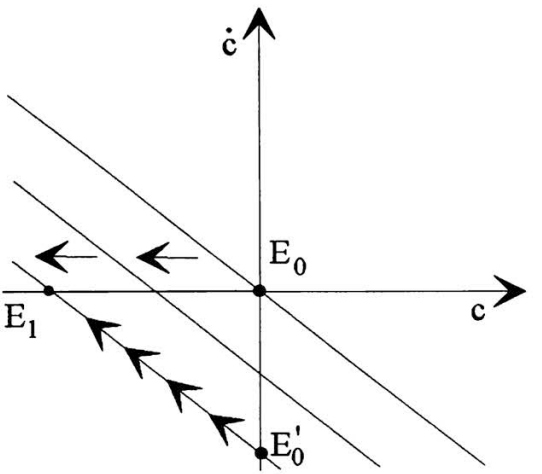

Figure 10: Impact of Real Wage Push in France within the Monetary Union with Transfers

tary union. This is a reflection of the fact that demand side policies which respond to a supply side shock and aim at real output stabilisation destabilise the evolution of the price level.

V. Conclusions

This paper demonstrates that the transition to EMU may be characterised by substantial macroeconomic instability. This instability may result from various sources with differing implications for stabilisation policy. Furthermore, it is shown that three-country models can be fruitfully applied not only to questions of monetary and fiscal policy but also to a wider set of questions related to the transition to EMU.

One important result of the analysis is that interregional transfer systems may be suitable shock absorbers in the case of asymmetric demand shocks but certainly not in the case of asymmetric supply shocks in the form of a real wage push. It is, however, questionable that a country prefers a permanent transfer to the other country participating in the monetary union to a one-time permanent change in the price level. In principle, it is necessary to compare the net present values of both costs and the country is likely to decide in favour of price adjustment. In any case, with interregional transfer systems of the

nature discussed above[16] distributional conflicts among EU-member countries are inevitable since transfers will have to be permanent.

Another important result is that the uncertainty with respect to the future stance of the ECB policy may lead to major fluctuations of the common external exchange rate. The ECB is likely to face a challenging economic environment since exactly at the time of the establishment of the monetary union a real appreciation and a loss of competitiveness exert deflationary pressure on the European economies.

A route for further theoretical analysis is to investigate in more detail the role of credibility of the ECB in the pursuit of price stability. The assumption that the stance of the common monetary policy is revealed immediately and with certainty is surely extreme. In reality, one would expect that credibility is gained slowly rather than suddenly. Therefore, it looks promising to explore these issues in the framework developed by *Backus* and *Driffill* (1985) which deals with the question of how imperfect information on the preferences of central banks affects the evolution of the rate of inflation.

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[16] See for a more detailed discussion of desirable properties of regional insurance mechanisms *von Hagen* and *Hammond* (1995).

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Summary

Problems in the Transition to European Monetary Union

Three potential problems in the transition to European Monetary Union are analyzed in a three country model of a currency union. The problems discussed are the choice of a misaligned conversion rate at the time of the move to the currency union, the uncertainty with respect to the future stance of monetary policy of the European Central Bank and the risk of an asymmetric real wage push within the monetary union. The macroeconomic implications of these disturbances are analyzed and alternative strategies for monetary and fiscal policy are evaluated. (JEL E 58, F 36)

Zusammenfassung

Probleme im Übergangsprozeß zur Europäischen Währungsunion

Im Rahmen eines Drei-Länder-Modells für eine Währungsunion werden drei potentielle Probleme während des Übergangsprozesses zu einer gemeinsamen europäischen Währung diskutiert. Dazu zählen die Wahl eines verzerrten Konversionskurses beim Eintritt in die Währungsunion, die Unsicherheit über den künftigen geldpolitischen Kurs der Europäischen Zentralbank und die Möglichkeit eines asymmetrischen Reallohnschubes innerhalb der Währungsunion. Aufbauend auf der Analyse der makroökonomischen Konsequenzen dieser Störungen, werden alternative Strategien für die Geld- und Fiskalpolitik entwickelt und bewertet.

Résumé

Problèmes dans la transition vers l'Union Monétaire Européenne

Trois problèmes potentiels lors de la transition vers l'Union Monétaire Européenne sont analysés ici dans le cadre d'un modèle de trois pays d'une union monétaire. Il s'agit des problèmes suivants: le choix d'un taux de change erroné au moment de l'entrée dans l'union monétaire, l'incertitude à propos du cours futur de la politique monétaire de la Banque Centrale Européenne et le risque d'une poussée asymétrique des salaires réels au sein de l'union monétaire. Sur base de l'analyse des conséquences macro-économiques de ces problèmes, des stratégies alternatives pour la politique monétaire et fiscale sont développées dans ce travail.