Exchange rates and the European business cycle

An application of a quasi-empirical two-country model

Pieter J F G Meulendijks and Dick B J Schouten

A quasi-empirical symmetric two-country model is used to analyse the case in which country A, as an anchor country, pursues price stability as its main priority, whereas country B stresses exchange rate stability. Problems will arise, in particular for the latter country, when in country A contractionary tax and monetary policy measures are taken after expansionary wage impulses have occurred. In addition, the analysis should shed light upon the recent problems of a European stagnation within an unstable European Monetary System. The model, presented as an exempli gratia in order to promote quasi-empirical modelling, integrates the q theory of investment with the approach of a portfolio choice in which both domestic and foreign agents spread their non-human wealth over imperfectly substitutable domestic and foreign share capital, domestic and foreign government bonds, domestic and foreign treasury bills, domestic and foreign time deposits and domestic and foreign money. Within the framework of fixed or floating exchange rates, rigid labour markets, sticky price and/or flexible price regimes in the goods markets, due account is taken of capital accumulation, government debt and current account dynamics. The analysis shows why politicians have fundamental reasons to question the usefulness of a European Monetary Union within a framework of fixed exchange rates. The pros of the latter system are probably outweighed by the cons.

Keywords: Exchange rates; European business cycle; Quasi-empirical two-country model

In this paper a quasi-empirical symmetric two-country model is used to analyse the case in which country A, as an anchor country, pursues price stability as its main priority, while country B stresses exchange rate stability. Problems will arise, in particular for the latter country, when in country A contractionary tax and monetary policy measures are taken after expansionary wage impulses have occurred. In addition, the present article should shed light upon the recent problems of

European stagnation within an unstable European Monetary System.[1]

The organization of the paper is as follows. The next section introduces a symmetric two-country model. In the quasi-empirical case in question it represents two composite countries (regions) into

The authors are with the Department of Economics, Tilburg University, PO Box 90153, 5000 LE Tilburg, The Netherlands.

[1] For some years now growing attention has been paid to quasi-empirical modelling for policy analysis; see for instance van Els ([13], pp 133–47) and Meulendijks ([7], pp 1–28). In spite of the fact that literature and conferences pay more attention to quasi-empirical models, this method of modelling still meets criticism because 'there seems to be no attempt at estimation'. Instead, as is argued, 'the approach taken is one of imposing plausible values on the parameters of a theoretical model. While this approach can be used to generate useful insights into the operation of that particular model it gives no clue as to how well this model fits the historically generated data, or how well it performs relative to alternative non-quasi-empirical models'. An adequate response to such criticism

which the European Community is hypothetically divided. Country A represents the composite anchor country and is called 'Germany'. Country B represents the other composite country and is called 'the UK'. The third section falls into six parts. One contains the formulation of the three aims of this article (1) to analyse the theoretical case in which country A, as an anchor country, pursues price stability as its main priority, while country B stresses exchange rate stability; (2) to shed light upon the complex case of the recent downswing of the European business cycle; and (3) to offer a theoretical solution for the necessary upturn of the European business cycle in the near future. Attention is then focused on the downswing of the European business cycle initiated by German economic policy within the framework of fixed exchange rates. The UK is then introduced as a traditional trading partner of Germany, and it is explained why the policy measures, initiated by Germany, will also cause recessive effects for the UK, with the latter country becoming a victim of the German policy. We then describe why and how a devaluation of the UK pound sterling, whether or not consciously effectuated by monetary policy making, may stop the process of negative growth. Two possibilities for effectuating a devaluation of the English pound are discussed. One of them consists of a successful speculative action against the UK pound. The policy

scheme for an upturn of the European business cycle is then discussed.

The last part first describes the long-term effects of a permanent (too) high level of the labour income share in the case of rigid labour markets in Germany and in the UK. Within the framework of flexible exchange rates it will be shown how the central banks in both countries may successfully take price stabilization policy measures. However, both countries will remain confronted with equally negative extra rates of growth of production and employment. Thus, the UK will not be in a position to protect itself from the negative effects of the German policy measures, in spite of a flexible exchange rate system.

Second, the long-term effects of a permanent low level of the labour income share in the case of rigid labour markets are discussed. Under these circumstances, both countries will still be the gainer by a deliberate policy mix of moderated wages, tax decreases and M1 expansions, initiated by the German authorities. Within the framework of flexible exchange rates the central banks in both countries may take price-stabilization policy measures successfully once again. But in the latter case they will remain confronted with equally positive extra rates of growth of production and employment.

The fourth section concludes the paper and stresses the benefits of a flexible exchange rate system in the case of rigid EC labour markets. Flexible exchange rates can play a very useful role in mitigating the downward movement of real welfare in the downswing of the European business cycle. Moreover, they may play a useful role in lowering the EC inflation rates in the event of an upturn of the European business cycle.

Appendix 2 deserves special mention. For, in spite of the fact that literature and international conferences pay more attention to quasi-empirical models (see also note (1)), this method of modelling still meets criticism because 'there seems to be no attempt at estimation'. However, in the present paper, in particular in Appendix 2 and notes 1 and 2, efforts are made to gain more sympathy for the relatively strong legitimacy of quasi-empirical modelling.

Nevertheless, the main aim of the present analysis is to show why politicians have fundamental reasons to question the usefulness of a European Monetary Union within a framework of fixed exchange rates. The pros of the latter system are probably outweighed by the cons.

---

is that, in comparison with econometric models, quasi-empirical models are more efficient tools for medium- and long-term policy analysis but, of course, not for short-term forcasting purposes. The quasi-empirical framework should enable its users to simulate values for instrumental variables or impulses and for target variables or effects which have only to be 'acceptable' fits of the historically generated data in the qualitative sense of the word. It appears that, apart from forecasting purposes, quasi-empirical models are useful alternatives to traditional macroeconometric models for policy analysis. As has already been stated, this is particularly true for medium- and long-term analysis because little attention is paid to lag structures. Therefore the quasi-empirical models are small, transparent and allow for an easy interpretation and comprehensibility of the results. Besides, when the basic version of a quasi-empirical model is relatively large it can easily be reduced to a relatively small one, as we will show in the present paper. The reason is that the analytical structure of the quasi-empirical model heavily draws on Tinbergen [10] with the exception that this author and his followers merely formulate their endogenous and exogenous variables in absolute terms, whereas in the present quasi-empirical model variables are formulated as deviations from a trend. Moreover, in general, the quasi-empirical models show a large feasibility to investigate alternative economic mechanisms and/or model structures. Last, but not least, quasi-empirical models show a high degree of flexibility for theoretical innovations without firm empirical representation, exactly because these models are calibrated and not estimated (see the incorporation of Brainard–Tobin's [1] portfolio/*q*-investment approach in the present paper). Due to their strong empirical content relating to specific economies, a sensitivity analysis of the major coefficients of the quasi-empirical models cannot be avoided. Therefore we will discuss in Appendix 2 the robustness of the qualitative results of the presently used two-country model.

The symmetric two-country model

The basic version of the model to be applied in the following section consists of over a hundred equations

and endogenous variables and has been evolved in Meulendijks's Dutch-language study [5]. The symmetric model is at present significantly reduced. The theoretical basis of the model links more closely to a mix of Meade's [4] traditional capital-immobility and Mundell–Fleming's [3,9] perfect capital mobility approaches as well as to Brainard-Tobin's [1] portfolio/ *q*-investment approach. Moreover, Miller–Salmon's [8] idea of the Stackelberg leader framework to model the interaction of economic policies between two countries has been used.[2]

---

[2] In Meulendijks's [5] study economic modelling of various concepts of openness and mobility plays a dominant role. The author's approach stands at the crossroads of two lines of thought. Following the first line, he questions the significance of the degree of integration of international goods markets by a comparison of the spillover effects of unilaterally taken policy actions in large open countries (for instance Germany) and in small open economies (for instance the Netherlands), respectively. Following the second line of argument, the author examines the impact of a lower versus higher degree of financial integration on the effects, particularly the 'spillover' effects of unilateral policy actions. For both purposes, alternative closed economy, small open economy, and symmetric two-country models are used. All of them incorporate alternative possibilities for the saving assumption, price regimes in the home and foreign goods markets, government debt and balance of payments dynamics, capital accumulation, perfect and imperfect substitutability between home and foreign goods as well as between home and foreign assets, labour market rigidity and fixed as well as floating exchange rates. The author confirms the significance of a higher versus lower degree of international capital mobility, but this conclusion only holds in the short term and in the event of imperfect substitutability between home and foreign assets as described, for instance, in Tobin's portfolio balance framework. In addition to Meade's capital immobility [4] approach, the Mundell-Fleming assumption of perfect international financial capital mobility has been investigated. However, both these approaches should be rejected because the capital-immobility assumption as well as the assumption of perfect substitutability between domestic and foreign assets are in flagrant contradiction with day to day reality. From the foregoing review it will be clear that the theoretical basis of the Dutch-language study and the present paper link closely to the mainstream literature on international economics and the strategic interaction of interdependent economies. In particular Meade [4], Mundell [9], Miller and Salmon [8] were main source of inspiration. Besides this, the present paper incorporates a number of financial assets into the theoretical framework and draws very strongly on Tobin's *q*-investment theory. In particular two papers were helpful: Brainard and Tobin [1] and Tobin [11]. For some people the model used may seem overly complicated, because these innovations may seem to play almost no role in deriving the central results of the present paper. Perhaps, these results can be demonstrated easily using less complicated models including Mundell's two country version of the IS-LM model. So, why complicate the model unnecessarily? First, in a main part of the meanstream models like Mundell's two-country IS-LM model the microeconomic foundation of the investment and interest equations is rather primitive. If these less complicated models had been used various medium- and long-term results obtained would be quite different from those which have been derived in the present paper. In particular, significantly different results are obtained with respect to capital accumulation, government debt, current and capital account dynamics. The validity of the latter conclusion has been proved in the Dutch-language study. Second, the 'qualitative' simulations reported in the present paper are entirely compatible with the recent day to day data with regard to the economic performance of Western Europe after the German reunification; see the conclusion of Appendix 2.

Variables are formulated as deviations from a trend. This trend should not be considered as being a random average path of the economy in the period under investigation. On the contrary, the initial situation of the trend obeys the rules of real and monetary growth theory. Whereas Meulendijks's version follows the rules of a positive steady-state growth, in the present model the case of a stationary state is postulated. Using the latter situation as a point of reference, the model at hand stays close to what is common in the international literature.[3]

Before engaging in a short discussion of some particular characteristics of the model at hand, a few additional remarks are in order.

The two-country model can be split up into the country A model and the country B model. Impulses and effects are measured in percentages as deviations from a stationary equilibrium; $\underline{X}_g$ and 'balance-variables' are measured in percentage-terms of equilibrium gross value-added in enterprises at equilibrium market prices (*GVAE*). By definition, $\bar{Y} = Y^a - Y^b$; $\bar{E} = E^a - E^b$ etc holds. Upper case letters denote nominal values, lower case letters denote volumes, prices and other variables.

The following definitions are also important for understanding the meaning of the variables in the model:

$\hat{x}$ = actual absolute value

$\hat{x}_0$ = absolute value on stationary trend path

$x = 100 \dfrac{(\hat{x} - \hat{x}_0)}{\hat{x}_0}$

  = percentage of the cumulated extra rate of growth

$\dot{x}$ = actual rate of growth

$\dot{x}_0$ = (zero) trend rate of growth

$\Delta x = (x - x_{-1}) \approx \dot{x} - \dot{x}_0$ = extra rate of growth

Appendix 1 contains the numerical assumptions about the ratios and elasticities for the reference situation of the postulated stationary equilibrium. Insofar as the symbols used are not explained in the present section, they are interpreted in this appendix.

It goes without saying that the complexity of the model used in this paper makes an analytical solution almost intractable. Nevertheless, in Appendix 2, we will establish the most relevant final equation of the symmetric two-country model in order to perform a

---

[3] The (inter)national accounting identities (balance sheets) of the reference situation, including the non-monetary sector as well as the financial relationships between the banks, the central bank, the government and the private non-banking sector are stated for both countries in Meulendijks and Schouten [6]. By aggregating the two-country model the closed model of the European economy can be derived together with the numerical values of its accounting identities and its ratios for the reference situation of the postulated stationary equilibrium.

sensitivity analysis for the short-term elasticity of a wage change with respect to the rate of unemployment (β_k). In order to parry other objections to the coefficient specific characteristic of the present exercise, Appendix 2 also discusses the sensitivity results with regard to the capital–labour elasticity of substitution coefficient (ϕ) and the behavioural parameter of the competitive price elasticity (η).

The country A model

a suffixes are omitted; the country B model is analogous to the country A model.

Gross value-added in enterprises (GVAE)

$$Y = \hat{\gamma} C + \hat{\sigma}_{i_b} I_b + \underline{X}_a + S_b \tag{1}$$

where (C), (I_b), $(\underline{X}_a)$, and (S_b) are private consumption, gross investment, autonomous public sector expenditure (percentage of *GVAE*) and the balance on current account at current prices (percentage of *GVAE*) respectively.

Private consumption:

$$C = \hat{\lambda}_n (Y + w' - t_l) + (1 - \hat{\lambda}_n) Y$$

or

$$C = \frac{8}{9} (Y + w' - t_l) - \frac{1}{9} \frac{r_0}{\hat{r}} \tag{2}$$

in which (w'), (t_l), $(r_0/\hat{r})$ are the labour income share, the additional tax rate on wage income and the long-term real interest rate respectively.

Consumption is determined by disposable wage and transfer income $(Y + w' - t_l)$ and by consumption by non-wage income earners $(C_R = Y = -r_0/\hat{r})$. Apart from other social benefits, disposable transfer income consists of disposable unemployment payments and disposable civil service wages. They are received from the public sector but implicitly paid by wage tax revenues from the private sector. The additional wage income tax rate (t_l) explicitly depends on rational tax-policy measures with respect to the public sector financial deficit: see Equation (16). As regards the non-wage income earners, the underlying assumption is that they spend more on consumption (C_R) if national welfare (Y) increases (or if the long-term real interest rate $(r_0/\hat{r})$ decreases).

Gross investment = Stock value of share capital

As we suppose for simplicity's sake $\zeta = \hat{\sigma}_{i_b}/\hat{\kappa}$, it follows from Equations (4) and (5) that

$$I_b = K^* \tag{3}$$

where

$$K^* = \frac{\varphi}{1+\varphi} \left(Y - \frac{\hat{\lambda}_n}{(1-\hat{\lambda}_n)} w' \right)$$

$$+ \frac{a}{1+\varphi} [2(\bar{E} - p_w) - (\bar{Y} - p_w)]$$

$$+ \frac{1}{1+\varphi} [2(E^b - p_w^b) - (Y^b - p_w^b)]$$

is the reduced-form equation of the monetary sector in which $(\bar{E} = E^a - E^b)$ and $(\bar{Y} = Y^a - Y^b)$ are M1 stock of money and *GVAE* differences between the two countries. (p_w) and (p_w^b) are the nominal exchange rates of country A and country B respectively. Note that $(p_w) = -(p_w^b)$.

The latter two equations integrate the *q* theory of investment with the approach of a portfolio choice between imperfectly substitutable financial assets within each country as well as across countries. The first equation simply expresses the main channel of monetary transmission to the real sector. The second equation draws on Meulendijks [5] and implies the reduced form of the asset demand and supply equations of the monetary sector. It explains the stock value of share capital ie the capital stock market value (K^*). Domestic agents implicitly spread their non-human wealth over imperfectly substitutable domestic and foreign share capital (K^*), domestic and foreign government bonds (O), domestic and foreign treasury bills (Q_a), domestic and foreign time deposits (Q) and domestic and foreign money (E). Foreign agents behave like domestic agents. (Note that suffixes are omitted.) Asset demand decisions depend on the various rates of return, on the income/non-human wealth ratio as well as on a certain degree of home preference $(a = 0.5; \varphi = 1)$.

Accumulation of capital goods

$$\Delta k = \frac{\hat{\sigma}_{i_b}}{\hat{\kappa}} (I_b - k_{-1} - p_x) \tag{4}$$

By definition the extra rate of growth of the stock of capital goods is positively related to the difference between the cumulated extra rates of growth of gross investment and the actual stock of capital goods (at the beginning of the current period = at the end of the foregoing period (k_{-1})) respectively. The actual stock of capital goods will rise when actual gross investment exceeds the volume of the scrapping of technically obsolete capital goods.

Tobin's q type of gross investment

$$\Delta k = \zeta(K^* - k_{-1} - p_x) \tag{5}$$

The main channel of monetary transmission to the

real sector is Tobin's q, which means that in the present model the difference between the capital-stock market value and its replacement value is an important determinant of gross investment. There are many ways to explain the Tobin's q transmission (Meulendijks [5]). Besides, as is mentioned in the literature (see for instance, van Els [13]), there is as yet very little empirical knowledge about the accelerator (ζ). This is probably due to a lack of information from the National Office of Statistics. In order to justify the use of Tobin's q in the present model where it has a clear impact on the analysis results, we may quote a recent Dutch study in which the empirical actuality in the Netherlands of the q-theory of investment has been confirmed (Driehuis and Mulder [2]).

Balance on current account and at current prices (percentage of GVAE)

$$S_b = -\hat{\mu}\mu_y \bar{y} - (2\eta - 1)\hat{\mu}(\bar{p}_y - p_w) \tag{6}$$

where ($\bar{y}$) and ($p = \bar{p}_y - p_w$) are production differences between the two countries and the terms of trade respectively.

Total balance of payments (percentage of GVAE)

$$\begin{aligned} S_u = 0 = (2a-1)S_b - (1-a)(\hat{\kappa} + \hat{\omega})\hat{r}(\bar{Y} - p_w) \\ + (1-a)(\hat{\kappa} + \hat{\omega} + \hat{\chi} - \hat{\kappa}\delta)2a \\ \times [-2(\Delta\bar{E} - \Delta p_w) + (\Delta\bar{Y} - \Delta p_w)] \end{aligned} \tag{7}$$

The latter equation draws on Meulendijks [5]. In the present case, however, the yield on share capital ($\hat{r}_i^*$), the real interest rate on public sector debt ($\hat{r}_o$) and the short-term real interest rate ($\hat{r}_q$) are assumed to be equal in absolute value on the stationary trend path. Thus, the average rate of return ($\hat{r} = \hat{r}_i^* = \hat{r}_o = \hat{r}_q$).

International capital movements are free, but international capital mobility is imperfect because of a certain degree of home preference. The nominal exchange rate is flexible and follows from the foreign currency market equilibrium of the non-monetary sectors ($S_u = 0$). Even so, its value can be stabilized by the monetary authorities to a certain degree by influencing the M1 stock of money; see Equation (21). Thus, under certain circumstances, the nominal exchange rate may be fixed.

Price of output enterprises

$$p_y = \xi(y - y') \tag{8}$$

in which (y') is production capacity.

In the goods market we distinguish two alternative regimes, the sticky price regime ($\xi = 1$) and the flexible price regime ($\xi = \infty$). In both cases price of output of enterprises depends on the utilization rate of production capacity. In the sticky price model, production may deviate from the level of production capacity. In

the flexible price model, production instantaneously equals production capacity.

Volume of output enterprises is by definition

$$y = Y - p_y \tag{9}$$

(Inefficient) employment in enterprises:

$$l = y \tag{10}$$

where (l) is employment. For simplicity's sake, labour productivity ($y - l$) is assumed to remain unchanged.

Production capacity of enterprises

$$y' = k_{-1} - \phi \frac{\hat{\lambda}_n}{1 - \hat{\lambda}_n} w' \tag{11}$$

On the supply side of the goods market, productive capacity is positively related to the stock volume of capital goods (at the beginning of the current period = at the end of the foregoing period) and negatively related to real labour costs per unit of output in enterprises (w'). Imperfect substitution between the two factors of production is postulated.

Price of expenditure categories

$$p_x = p_y - \hat{\mu}(\bar{p}_y - p_w) \tag{12}$$

The price of commodities is homogeneous with respect to the output price and the price of imports (in domestic currency terms).

Yield on share capital

$$\frac{r_i^*}{\hat{r}} = Y - \frac{\hat{\lambda}_n}{1 - \hat{\lambda}_n} w' - K^* \tag{13}$$

By definition yield on share capital equals the difference between nominal profits in enterprises and the capital stock market value.

Long-term real and short-term real interest rates

$$\frac{r_o}{\hat{r}} = [O - a\{2(\bar{E} - p_w) - (\bar{Y} - p_w)\}$$

$$- 2(E^b - p_w^b) + (Y^b - p_w^b)]:\varphi$$

$$\frac{r_q}{\hat{r}} = [Q - a\{2(\bar{E} - p_w) - (\bar{Y} - p_w)\}$$

$$- 2(E^b - p_w^b) + (Y^b - p_w^b)]:\varphi \tag{14}$$

where (O) and (Q) are the stocks of government bonds and time deposits respectively. These two equations draw on Meulendijks's portfolio subsystem [5]. The long-term real interest rate equals the real interest rate on public sector long-term debt (government bonds). The short-term real interest rate equals the real interest rate on the public sector short-term debt

(Treasury bills). It also equals the real interest rate on time deposits.

Public sector financial deficit including interest payments on public debt (percentage of GVAE)

$$-F_g = \hat{\omega}\Delta O + \hat{\chi}\Delta\underline{Q}_a = \underline{X}_a - \hat{\lambda}t_1 - (\hat{\kappa}+\hat{\omega})\hat{r}t'_R$$
$$-\hat{r}_R\hat{\kappa}\hat{r}'\left(Y - \frac{\hat{\lambda}_n}{1-\hat{\lambda}_n}w'\right) + \hat{\omega}\hat{r}\left(O + \frac{r_o}{\hat{r}}\right) \quad (15)$$

This relation implicitly states that short-term lending by the public sector $(\underline{Q}_a)$ is by balance for nothing.

If rational tax policy is defined as keeping the financial deficit on a constant level

$$-F_g = 0$$

the additional tax functions read as follows.

The additional tax rate on wage income (percentage of private sector primary wage income)

$$t_l = 0.5w' + \frac{1}{\hat{\lambda}}\underline{X}_a \quad (16)$$

The additional rate of taxes on non-wage income (percentage of disposable non-wage income)

$$t'_R = -\frac{4}{3}w' - \frac{2}{3}E \quad (17)$$

Originally, only the autonomous expenditure impulses initiated by the public sector are financed by the additional wage-income tax rate:

$$t_l = \frac{1}{\hat{\lambda}}\underline{X}_a$$

whereas interest payments on public debt as well as a fall in non-wage taxes, in consequence of a rise in real labour costs per unit of output in enterprises, are financed by the additional non-wage tax rate:

$$t'_R = \frac{8}{3}w' - \frac{2}{3}E$$

However, the latter tax policy would not be rational because it would imply a double non-wage-income squeeze in the event of a rise in the real labour-income share. Therefore we introduce $(0.5w')$ in the additional wage-tax-rate function in order to change the sign of the labour-income-share variable in the additional non-wage-tax-rate function.

Wage and salary bill per worker in enterprises

$$\Delta p_l = \Delta p_y + \Delta y - \Delta l + \varepsilon\Delta t_l + \Delta\underline{p}_l$$
$$+ 0.7(\Delta p_l - \Delta p_y - \Delta y + \Delta l)_{-1} + \beta_k l_{-1}$$
$$- 0.7(\varepsilon\Delta t_l + \Delta\underline{p}_l)_{-1} \quad (18)$$

where β_k is the short-term elasticity of a wage change

with respect to the rate of employment. Assuming a rigid labour market at home and abroad by setting $(\beta_k = 0)$, this augmented Phillips-curve relation is reduced to

$$p_l = p_y + y - l + \varepsilon t_l + \underline{p}_l$$

or, by definition, to

$$w' = \varepsilon t_l + \underline{p}_l = \underline{p}'_l = \frac{2}{7}w' + \frac{5}{7}\underline{X}_a + \underline{p}_l = \underline{X}_a + \frac{7}{5}\underline{p}_l$$

Nominal wages are determined by output prices, labour productivity, shifting effects of the burden of an additional wage taxation and an autonomous wage term, which represents the influence of wage policy adopted by the labour market parties. Apart from the latter three determinants, this equation implicitly states that the price of expenditure categories and the terms of trade are absorbed in the nominal wage formation.

Labour income share equals real labour costs per worker in enterprises

$$w' = p_l - p_y - y + l = w_y \quad (19)$$

This is because labour productivity does not change; see Equation (10). Moreover, by definition, it reads:

Real wage per worker in enterprises

$$w_x = w_y + \hat{\mu}(\bar{p}_y - p_w) \quad (20)$$

M1 stock of money (E) is made up of speculative money:

$$(E_s)$$

and transaction money:

$$(E_T)$$

Thus:

$$E = \underline{BEL} + Q_a + Speculative \ profits$$
$$= \frac{1}{2}E_s + \frac{1}{2}E_T = \frac{1}{2}E_s + \frac{1}{2}Y \quad (21)$$

where $(\underline{BEL})$ and (Q_a) are the central bank M1 policy and the public sector short-term lending policy respectively. Transaction money equals gross value-added in enterprises. Thus, the velocity of circulation of transaction money remains constant.

(M2-M1) stock of money consists in time deposits (Q)

$$Q = \underline{Q}_a + Speculative \ profits \quad (22)$$

Note that time deposits (Q) are influenced by the total short-term lending to the public sector $(\underline{Q}_a)$ and by the speculative profits, but not by the central bank M1 policy $(\underline{BEL})$.

Importance of exchange rates to the European business cycle

Formulation of the problem

In an earlier study on the European integration process from EC to EMU a centralization of EC policy making was recommended (Meulendijks [5]). Fully autonomous national policy making should be forbidden. However, there are practical as well as theoretical reasons why a national policy decision unit of an EC country will take unilateral wage, budgetary or monetary policy measures, notwithstanding their disastrous effects on the economic performance of other EC countries.

What may happen if this recommendation of cooperation cannot be pursued by the different national decision making authorities will be demonstrated by analysing the recent problems of a European stagnation within an unstable European Monetary System. During the last two years this instability came to the surface: the European foreign currency market was in severe turmoil. Germany and the UK played leading roles in this economic political drama. Speculative agents were given a great deal of room on the exchange markets and, as usual, politicians and bankers viewed this situation as an immoral one. One of the questions to be discussed concerns the appropriateness of this point of view.

In the following parts of this section, an analysis will be given of the complex case of the recent downswing of the European business cycle, in which two large open countries, namely Germany and the UK have probably played a dominant part. Using the symmetric two-country model above, results will be derived which correspond strikingly with the poor economic performance Western Europe has recently been confronted with (see Tables 1 and 2). Theoretically speaking, the EC decision units concerned can be offered a solution in order to create the necessary upturn of the European business cycle in the near future. At least politicians can learn from what the reversed signs of the expansionary impulses and their negative results have to tell (see Tables 3 and 4).

The downswing of the European business cycle

The attention is focused on a (large) open country and for the quasi-empirical case in question this composite country is called 'Germany'. As is usual in capitalist countries, in this economy the wage, budgetary and monetary policy measures are uncoordinated. Any of the three important decision units has its proper responsibility. The two unions of the labour market decide on the levels of (collectively agreed) nominal wage contracts. The government consequently decides on the tax rate levels aiming at a desired level of expenditures by the public sector and the desired financial deficit. Finally, the German Bundesbank takes monetary policy measures aiming at stable production prices.

Starting, for the present analysis, from a stationary state of the German economy, nominal wages are increased as a consequence of German unification. If the nominal wage is increased in Germany while the price of production and labour productivity are maintained at a constant level, this implies an increase of the real labour costs per unit of output in enterprises. Thus, Germany is confronted with an autonomously induced wage impulse (see Table 1, Germany, column (a)). It will affect the production capacity of enterprises negatively.[4] If production were also lowered (or perhaps maintained at a constant level), but initially at a lower speed as production capacity is decreasing, prices would tend to rise. However, an actual rise of prices is prevented by contractionary monetary policy measures. The M1 contraction, which aims to maintain price stability, will cause higher interest rates. Moreover, the profitability of enterprises will be lowered by an increase of the real labour costs per unit of output and will affect the level of investment.

At unchanged tax rates, this policy would imply a higher financial deficit of the German government, because non-wage tax revenues will decrease whereas interest payments on public debt will increase. Higher non-wage tax rates are irrational because they also affect the profitability of enterprises. Therefore a rational tax policy is likely to imply lower non-wage tax rates if the labour income share of enterprises increases.

Because the German government is aiming at a constant financial deficit of the public sector, raising the rate of taxes on wage income is the only rational way to realize this. The possibility of lowering the necessary government expenditures needed for the German unification is excluded. Thus, the extra burden of taxation on wages will imply that disposable wage income does not increase, in spite of the initial rise in the nominal wage level. All in all, the level of consumption from wage income will scarcely be affected because of the lower prices of imports inducing a lower price of expenditure categories. Higher interest

---

[4] The same kind of consequences, and probably more realistic ones, could be obtained if it was postulated that the German unification implied extra governmental expenditures to be covered by extra wage taxes. These wage tax rate increases would set the shifting-process machine in motion which ultimately would be harmful to the profits of German enterprises. The latter possibility will not be considered explicitly in the present article. Nevertheless, financing the costs of the German unification provoked shifting processes leading to too high nominal wage levels.

Table 1. The downswing of the business cycle.[a]

In Germany: wage impulse, tax increase and M1 contraction
In the UK: (a) M1 contraction aiming at exchange rate stabilization of the UK pound
          (b) and subsequently depreciation of the UK pound by using money creation

	Germany		UK (sticky price model)	
	(a) (%)	**(b) (%)**	**(a) (%)**	**(c) (%)**
Instrumental variables or impulses				
Nominal wage impulse	5/7	0	0	0
Autonomous expenditure impulse of the public sector (in percentage points of *GVAE*)	0	0	0	0
Rate of taxes on wage income in % of private sector primary wage income	0.5	0	0	0
Rate of taxes on non-wage income in % of disposable non-wage income	−0.8	0	1.6/3	−1.6/3
Money creation by the central bank	−0.8	0	−0.8	(0.8)[b]
Money creation by speculation	0	0	0	0.8
Target variables or effects				
Production and employment in enterprises	−0.8	0	−0.4	0.4
Price of output enterprises = price of exports	0	0	−0.4	0.4
Nominal exchange rate	0	−0.8	0	0.8
Volume of private consumption	−2.3/9	0.1	−4.5/9	0.3
Public sector financial deficit including interest payments on public debt in % *GVAE*	0	0	0	0
Remaining variables				
Wage and salary bill per worker in enterprises	1.0	0	−0.4	0.4
Real labour costs per unit of output in enterprises = labour income share in terms of *GVAE*	1.0	0	0	0
Real disposable wage and salary bill per worker in enterprises	−0.2	0.1	−0.5	0.3
Price of imports in terms of domestic currency	−0.4	−0.4	0	0.8
Price of expenditure categories	−0.1	−0.1	−0.3	0.5
Terms of trade in % of *GVAE*	0.1	0.1	−0.1	−0.1
Volume of exports of goods and services	−0.8	0	−0.4	0.4
Volume of imports of goods and services	−0.4	0.4	−0.8	0
Balance on current account at constant prices in % of *GVAE*	−0.1	−0.1	0.1	0.1
Balance on current account at current prices in % of *GVAE*	0	0	0	0
Volume of gross investment	−4.7	0.1	−0.5	0.3
Stock of capital goods (volume at the end of the period)	−0.235	0.005	−0.025	0.015
Production capacity of enterprises	−0.8	0	0	0
Nominal value of *GVAE*	−0.8	0	−0.8	0.8
Nominal market value of the stock of share capital	−4.8	0	−0.8	0.8
Nominal market value of long-term public debt	0	0	0	0
Nominal value of time deposits	0	0	0	0.8 (0)[b]
Real interest rate on long-term public sector debt	0.8	0	0.8	−0.8
Yield on share capital	−4.0	0	0	0
Real interest rate on time deposits and commercial bank loans	0.8	0	0.8	0 (−0.8)[b]
Private sector disposable nominal income	−0.52	0	−0.92	0.72
Private sector savings in % of *GVAE*	−0.2	0	−0.2	0
Net investment in % of *GVAE*	−0.4	0	0	0
Balance on capital account on account of share capital in % of *GVAE*	−0.2	0	0.2	0
Balance on capital account on account of public sector bonds in % of *GVAE*	0	0	0	0
Remaining balances on capital account in % of *GVAE*	0	0	0	0
Balance on capital income account on account of share capital yields and real interest revenues of public sector bonds	0.2	0	−0.2	0
Total balance of payments of the non-banking sector	0	0	0	0
Utilization rate of production capacity of enterprises	0	0	−0.4	0.4
Balance sheet control: by definition financial components of the relationship between the banks, the central bank, the public sector and the private sector sum up to zero	0	0	0	0

[a] Period 1; impulses and effects are extra rates of growth measured in percentages.
[b] Effects given in brackets concern % changes in consequence of a deliberately expansive M1 policy.

Table 2. The long-term effects of too high a level of the labour income share, a rigid labour market and a price-stabilization policy in both countries.

	Germany Period		UK	
	1 (a)+(b)	∞ (a)+(b)	1 (a)+(b)	∞ (a)+(b)
Variables	%	%	%	%
Impulses	%	%	%	%
Nominal wage impulse	5/7	0	0	0
Money creation by central banks	−0.8	−0.12	0	−0.12
Effects	%	%	%	%
Production and employment in enterprises	−0.8	−0.12	0	−0.12
Price of output enterprises	0	0	0	0
Nominal exchange rate	−0.8	0 (−9.6)[a]	0.8	0 (9.6)[a]
Stock of capital goods (volume at the end of the period)	−0.23	−0.12	−0.01	−0.12
Labour income share	1.0	0 (1.0)[a]	0	0 (0)[a]
Terms of trade in % of GVAE	0.4	0 (4.8)[a]	−0.4	0 (−4.8)[a]

[a] The results given in parentheses are the cumulated extra rates of growth and explain the ultimate level as a deviation from initial trend value of the corresponding variable.

rates and the lower profitability of enterprises certainly affect the level of consumption from non-wage income. However, its relatively small importance for the total level of private consumption will imply that private consumption is hardly affected in a downward direction.

Only two expenditure categories remain for matching demand and supply in the goods market: gross investment and the balance on current account (at constant prices). Higher interest rates on commercial loans and a lower profitability of enterprises will lower the level of investment. The balance on current account will also be affected in a downward direction because of a deterioration in German competitiveness, and of course because the rate of decrease in the German level of domestic expenditures falls short of the rate of decrease in production capacity. At current prices, however, the balance on current account is not affected. A lower balance on current account at constant prices is fully compensated for by the improved terms of trade.

Unemployment in Germany will increase to a significantly higher level and will continuously rise as a consequence of too low a level of investment.

A low level of domestic investment also affects the German balance on capital account in a downward direction. However, the reverse development can be recognized with respect to the balance on capital income account.

The total balance of payments (of the non-monetary sectors) will, of course, be in equilibrium in the event of flexible exchange rates.

The UK as a victim

A traditional trading partner of Germany has been introduced and for the quasi-empirical case in question this composite country is called 'the UK'. It represents all other countries in Western Europe in so far as they were or still are confronted with exchange rate difficulties. In this composite country the social partners effectuate a normal wage level that corresponds with the developments of average prices, labour productivity and terms of trade. Besides, the 'UK' monetary decision unit has made a deal with the German authorities to peg the pound sterling to the mark by using monetary policy measures. This is because the UK is a member of the EMS in which the deutschmark plays the role of an anchor currency. Thus, UK monetary policy does not target output price stabilization, as German policy does, but reasonably aims at stabilization of the nominal exchange rate of the pound with respect to the deutschmark.[5] Consequently, if the Bundesbank takes contractionary monetary policy measures, the Bank of England has to adopt a contractionary monetary policy which matches the constant ratio requirement of its currency with respect to the mark. It will also cause higher interest rates in the UK (see Table 1, the UK column (a)).

The UK government tries to stabilize its financial deficit, in spite of the higher burden of interest

[5] Note that in an open economy the two monetary targets of price stabilization and nominal exchange rate stabilization can never be reached simultaneously.

Table 3. The upturn of the business cycle.[a]

In Germany: negative wage impulse, tax decrease and M1 expansion
In the UK: (a) M1 expansion aiming at exchange rate stabilization of the UK pound
         (b) and subsequently appreciation of the UK pound by using money contraction aiming at price stability

	Germany		UK (flexible price model)	
Instrumental variables or impulses	(a) (%)	(b) (%)	(a) (%)	(b) (%)
Nominal wage impulse	−5/7	0	0	0
Autonomous expenditure impulse of the public sector (in percentage points of *GVAE*)	0	0	0	0
Rate of taxes on wage income in % of private sector primary wage income	−0.5	0	0	0
Rate of taxes on non-wage income in % of disposable non-wage income	0.8	0	−1.6/3	1.6/3
Money creation by the Central Bank	0.8	0	0.8	−0.8
Target variables or effects				
Production and employment in enterprises	0.8	0	0	0
Price of output enterprises = price of exports	0	0	0.8	−0.8
Nominal exchange rate	0	0.8	0	−0.8
Volume of private consumption	1.4/9	0	1.8/9	0
Public sector financial deficit including interest payments on public debt in % of *GVAE*	0	0	0	0
Remaining variables				
Wage and salary bill per worker in enterprises	−1.0	0	0.8	−0.8
Real labour costs per unit of output in enterprises = labour income share in terms of *GVAE*	−1.0	0	0	0
Real disposable wage and salary bill per worker in enterprises	0.1	0	0.2	0
Price of imports in terms of domestic currency	0.8	0	0	−0.8
Price of expenditure categories	0.2	0	0.6	−0.8
Terms of trade in % of *GVAE*	−0.2	0	0.2	0
Volume of exports of goods and services	0.8	0	0	0
Volume of imports of goods and services	0	0	0.8	0
Balance on current account at constant prices in % of *GVAE*	0.2	0	−0.2	0
Balance on current account at current prices in % of *GVAE*	0	0	0	0
Volume of gross investment	4.6	0	0.2	0
Stock of capital goods (volume at the end of the period)	0.23	0	0.01	0
Production capacity of enterprises	0.8	0	0	0
Nominal value of *GVAE*	0.8	0	0.8	−0.8
Nominal market value of the stock of share capital	4.8	0	0.8	−0.8
Nominal market value of long-term public debt	0	0	0	0
Nominal value of time deposits	0	0	0	0
Real interest rate on long-term public sector debt	−0.8	0	−0.8	0.8
Yield on share capital	4.0	0	0	0
Real interest rate on time deposits and commercial bank loans	−0.8	0	−0.8	0.8
Private sector disposable nominal income	0.52	0	0.92	−0.72
Private sector savings in % of *GVAE*	0.2	0	0.2	0
Net investment in % of *GVAE*	0.4	0	0	0
Balance on capital account on account of share capital in % of *GVAE*	0.2	0	−0.2	0
Balance on capital account on account of public sector bonds in % of *GVAE*	0	0	0	0
Remaining balances on capital account in % of *GVAE*	0	0	0	0
Balance on capital income account on account of share capital yields and real interest revenues of public sector bonds	−0.2	0	0.2	0
Total balance of payments of the non-banking sector	0	0	0	0
Utilization rate of production capacity of enterprises	0	0	0	0
Balance sheet control: by definition the financial components of the relationship between the Banks, the Central Bank, the Public Sector and the Private Sector sum up to zero	0	0	0	0

[a] Period impulses and effects are extra rates of growth measured in percentages.

payments on government debt, using non-wage tax policy measures. The latter policy actions are also taken in Germany. But in this country, wage tax policy measures are preferred because the non-wage income share has already been decreased.

Two possibilities can now be discussed. The first case concerns the sticky price regime in the goods market of the UK and the second case is referred to as a dominant flexible price regime in this country. The first possibility implies that the degree of utilization of profitable production capacity may be lower than 100%; this is because prices are not flexible enough. In the flexible price case, prices are flexible and in the present paper they are even instantaneously flexible.

Table 4. The long-term effects of a low level of the labour income share, a rigid labour market and a price stabilization policy in both countries.[a]

	Germany Period		UK	
	1 (a) + (b)	∞ (a) + (b)	1 (a) + (b)	∞ (a) + (b)
Variables	%	%	%	%
Impulses	%	%	%	%
Nominal wage impulse	−5/7	0	0	0
Money creation by central banks	0.8	0.12	0	0.12
Effects	%	%	%	%
Production and employment in enterprises	0.8	0.12	0	0.12
Price of output enterprises	0	0	0	0
Nominal exchange rate	0.8	0 (9.6)[a]	−0.8	0 (−9.6)[a]
Stock of capital goods (volume at the end of the period)	0.23	0.12	0.01	0.12
Labour income share	−1.0	0 (−1.0)[a]	0	0
Terms of trade in % of *GVAE*	−0.4	0 (−4.8)[a]	0.4	0 (4.8)[a]

[a] The results given in brackets concern the cumulated extra rates of growth and explain the ultimate level as a deviation from initial trend value of the corresponding variable.

It is easy to understand why the sticky price case is to be preferred to the flexible price regime in the case of a threatening underutilization of production capacity. A lower actual level of production than production capacity would allow is always possible. However, in the second case of impending over-utilization of production capacity, the postulate of the flexible price regime is to be preferred because a higher level of production than profitable production capacity allows is useless.

The positive wage impulse and the subsequent contractionary policy measures initiated by Germany are the main causes of the recessive effects in the UK. Moreover, since the latter country maintains exchange rate stability with respect to the DM, it will be confronted with additional recessive effects. So, it is obvious that the latter country is dealing with the sticky price regime.

The distinction between sticky price and flexible price regimes is not important from the German policy makers' point of view because their monetary policy measures are aimed at stabilization of the domestic prices of production. Together with a lack of wage costs determinants in the price formation equation, it implies that the domestic results of the German policy measures are the same for both alternatives of price formation in the goods market.

The (additional) recessive effects in the United Kingdom can be explained in more detail as follows. The necessary UK contractionary monetary policy implies a significant slowdown of production as a result of the postulated sticky price model. The low value of 1 for the elasticity of the output price with

respect to the utilization rate of production capacity implies, moreover, decreasing nominal wages and prices. In percentage terms, their decreases equal the decrease of production. The latter percentage amounts to half of the M1 contraction percentage effectuated by the UK monetary authorities aiming at exchange rate stabilization of the UK pound.

The UK competitive position improves and the imports from Germany decrease as a result of the slowdown of production. A positive balance on current account (at constant prices) will finally be realized, in spite of decreasing exports to Germany. However, the balance on current account at current prices will be unchanged in consequence of the deterioration of the UK terms of trade.

The combination of a significant slowdown of total demand and production in the goods market and a positive UK trade balance implies that two expenditure categories are seriously affected by the UK contractionary monetary policy ie, those of private consumption and private investment. This is not only due to the higher interest rates. The seriously decreased purchasing power in the UK domestic goods market can be considered as an even more important reason. The latter deterioration has been caused by an insufficient decrease of the price of expenditure categories compared with the significant decreases of the UK nominal wages and non-wages.

The foregoing analysis indicates why the UK has explicitly become a victim of its own political conduct by sticking to the promise of keeping the exchange rate of the UK pound constant with respect to the deutschmark. This is especially true if Germany, as an

anchor country, takes contractionary monetary policy measures exclusively aimed at its national policy targets.

A devaluation of the UK pound

Although the domestic prices of expenditure categories will decrease in both countries (in Germany because of lower prices of imports and in the UK because of lower output prices) the public demand for a devaluation of the UK pound will become louder. The resulting change in the exchange rate may stop the process of negative growth and will surely be a realistic alternative since the UK is confronted with the sticky price regime in the goods market (see Table 1, Germany, column (b) and the UK, column (b)). There are two possibilities for effecting a devaluation of the UK pound with respect to the deutschmark.

The first possibility consists in expansionary M1 policy measures that are consciously taken by the Bank of England. (Note that in the present example these policy measures are taken after the period during which the Bank of England has pursued a contractionary M1 policy aiming at exchange rate stabilization of the UK pound.)

However, in order to realize this possibility, the UK authorities must first convince the German authorities of its profitability for both countries. As stated, it is easy to understand why it may be profitable if the sticky price regime dominates the UK goods market. Under such circumstances, the devaluation of the UK pound will cause higher levels of production in the UK. They are profitable, too, for the private expenditure categories in Germany because they are partially transmitted by an improvement in the German terms of trade. However, it also means that German competitive power decreases again. German exports will initially decline, but afterwards they will return to their initial level since higher UK production levels will induce higher UK imports equalling higher German exports.

There is no need to mention all the reasons why the UK authorities will wait to ask the necessary permission of the German authorities for actually carrying out such a profitable devaluation. If speculative agents consider this waiting period too long, they will aim at speculative profits and may successfully realize them if the Bank of England's foreign reserves fall short of the speculative agents' demand for the deutschmark. This second possibility of the pound's devaluation has been made possible by the Bundesbank authorities. Their lack of sufficient financial help to the Bank of England may be the only reason why the UK foreign currency reserves could be exhausted by speculation. Under these circumstances, speculative actions are morally allowed. This conclusion certainly holds if the

UK monetary authorities wait too long before acting in order to change the exchange rate. If a fixed exchange rate causes a heavy stagnation, a flexible change of this rate can be a useful (partial) solution for all partners.

Apart from expansionary M1 policy measures taken by the central banking authorities (or an extra short-term lending policy by the governmental authorities), speculation can be a proper source of money creation.

The percentage rate with regard to successful 'speculative' devaluation equals that of its money creation. Even so, their values are essentially unknown. For convenience sake, they could be fixed on the same level as one could derive from the depreciation percentage of the UK pound in the event of a deliberate UK policy of non-monetary intervention as a direct response to the Germany policy action. If immediately (and, of course, in the absence of a speculative intervention) the earlier promise to peg the pound to the deutschmark is broken, the results of a non-monetary intervention would equal those which can be derived by adding up the 'two-step' results of the present active monetary intervention as denoted in the (a) and (b) columns of Table 1.

The two (a) columns of Table 1 show why a fixing of nominal exchange rates will be unprofitable for the UK as well as for Germany. What will happen if the UK monetary authorities still decide to change their earlier course and consciously effect a devaluation of the UK pound is shown in the two (b) columns of Table 1. The effects of various impulses on endogenous variables in period 1 correspond strikingly with the recent downswing of the European business cycle. It is not the percentage values of the variables which are important, but their signs. Our qualitative way of arguing depends on these signs. They may be positive, negative or zero.

Moreover, the results roughly indicate why under specific circumstances a successful devaluation by speculative operations on the foreign exchange market can also be profitable for both countries.

It is noteworthy that the aforementioned possibilities of the pound's devaluation and the subsequent money creation in the UK ultimately do not affect the quantity of money in Germany. Thus, the usual Bundesbank inflation arguments for refusing the necessary credit facilities to the Bank of England do not hold.

Obviously, the central banks' weakness is the only reason why they have to take their losses when a devaluation occurs due to the speculative agents on the foreign exchange market.

Nevertheless, a devaluation only appears to be a partial solution for the European troubles, as we have observed.

The policy scheme for an upturn of the European business cycle

Now that the causes of the downswing of the European business cycle have been discussed, the reversed signs of the impulses and the results shown in Table 1 may roughly outline the necessary policy measures to be taken for an upturn of this business cycle. In addition they also indicate what would have happened if market forces had not failed to function in the event that unemployment was increasing. However, unlike policy measures, market forces obviously need a longer period of time to effectuate an upturn of the European business cycle.

Table 3 provides a policy scheme that is probably useful for an integral European solution. It denotes the necessity of a strong coordination of price, wage, budgetary and monetary policy by the EC authorities. In particular, the combination of moderated nominal wages, lower tax rates, unchanged financial deficits of the EC governments and expansionary monetary policy measures seems to be the only realistic policy-mix in order to initiate the necessary upturn of a European business cycle.

The impulses and results denoted in Table 3 are only partially mirror images of the Table 1 figures. In the present case it is assumed that the UK again participates in the European exchange rate system. Furthermore, a switch has been made from the sticky price regime to the flexible price regime in the goods market. Consequently, as early as the first moment of period 1, the UK production capacity is fully utilized as a result of previous devaluations of the UK pound. From the moment the German authorities start carrying out their policy scheme for recovery, the UK authorities will initially react by taking expansionary monetary policy measures, aiming at a decrease of interest rates, in order to maintain exchange rate stability. However, lower interest rates will cause a still higher demand for goods and services, which does not match the UK capacity of production. Thus, prices and nominal wages tend to increase in the UK, which can be prevented by an appreciation of the UK pound. To this end, the UK will break the fixed exchange rate arrangement once again.

The necessary appreciation of the UK pound can easily be effectuated by cancelling the planned expansionary money creation. Insofar as extra money has been created already, contractionary monetary policy measures are taken in order to neutralize the initial money creation. From column (b) of Table 3 it can be seen that neither in Germany nor in the UK will volumes change and, thus, contrary to nominal values, volumes will keep their original favourable levels, as denoted already in column (a) of Table 3. It goes

without saying that in the present example a flexible exchange rate arrangement is useful because inflation can be brought down, whereas volumes are not affected in the UK.

Thus, after a downswing, the effectuation of an upturn of the European business cycle is a genuine chance for European policy makers. Admittedly, of course, even imperfectly functioning labour markets will eventually be able to realize a similar upturn. However, this will only happen if the rate of unemployment reaches a sufficiently high level.

From a theoretical point of view, a quick recovery will be possible by carrying out the policy-scheme of Table 3. However, from a practical point of view, policy makers only take action with a certain delay when market forces are sluggish. When an upturn has been set in motion, it will remain difficult afterwards to identify its initiator: was it the autonomous policy-decision unit or was it the endogenous market mechanism?

The long-term effects in the event of a rigid labour market

The long-term results of the analysis, as shown in Table 2, indicate what will happen in Germany and the UK if both labour markets permanently remain rigid. In addition, from a qualitative point of view the same figures also indicate the fate which other EC countries will have to share with them. Rigid labour markets imply sustained excessive labour income shares from the initial period in which these excessive shares are effected. In spite of the continuously rising unemployment rates, they will remain unchanged.

In the present example a flexible exchange rate system is postulated which allows the two central banks to stabilize their domestic prices of production, regardless of the consequences for the nominal exchange rate of their domestic currencies. In the latter case and as a consequence of a continuously decreasing capacity of production, the monetary policy has to be a permanently contractionary one. The initial high negative rate of growth of the German production capacity will gradually adapt itself to its trend value, whereas the reverse development takes place in the UK. Ultimately, in the very long run of course, both countries will be confronted with the same negative rate of growth of their capacity of production.

In the present example, German positive wage impulses have initiated this overall process of stagnation. The UK will not be able to protect itself against this development, in spite of its rational wage policy. In the long term the nominal exchange rates will stabilize and imply an ultimate depreciation of the UK pound, whereas the deutschmark will ultimately appreciate.

Between the initial and the final periods of analysis, the process of adaptation shows a continuously depreciating UK pound at a rate which corresponds with a lower UK speed of monetary contraction compared with that of the Germans. This process of adaptation can be understood by pointing out again that the UK negative rate of growth of production falls short (in the short and the medium term) of the corresponding negative rate in Germany.

The consequences of these events ultimately imply definitively deteriorated terms of trade for the UK and, of course, the reverse situation is true for Germany. Because these terms of trade will compensate the balances on current account at constant prices for both countries, the corresponding balances on current account at current prices will always remain constant.

All in all, the foregoing analysis should make it clear that the EC countries are confronted with very poor prospects for the future if the European markets and/or coordinating EC authorities fail to operate alternatively in the way denoted in Table 4, in which the long-term effects of a permanently low level of the labour income share in case of rigid labour markets are considered. Under the latter circumstances, both countries will still be the gainer by a policy-mix of moderated wages, tax decreases and M1 expansions, deliberately initiated by the German authorities.[6] Within the framework of flexible exchange rates the central banks in both countries may successfully take price-stabilization policy measures once again. But, in this case, they will remain confronted with equally positive extra rates of growth of production and employment.

However, it goes without saying that both possibilities of a persistent increase or a persistent decrease of the rate of unemployment will never be accepted, neither by the authorities nor by the market forces. Thus, day to day reality provides for the natural rule to the effect that a downswing has to be followed unavoidably by an upturn of the business cycle. The

downswing will normally be caused by an unexpected historical event that has taken place. In the present analysis the German (re)unification is considered as such an unexpected historical event. The oil crises in the 1970s represent other examples of how other downswings in the European business cycle have been caused.

In conclusion, attention has to be paid to the first-period scheme of Table 4, with respect to Germany, as a clever way of action for a small open country (eg the Netherlands) aiming at a recovery on its own force. In the Netherlands a similar policy scheme was launched 12 years ago under the name of the Schouten Plan [12]. Contrary to this old version, the present version of the Schouten Plan also implies a depreciation of the domestic currency to be effectuated by a deliberately expansionary monetary policy. Moreover, this way of policy making will not have 'beggar thy neighbour' effects, as we have seen already in the large open country case. Contrary to the two-country results, the active small open country will only be able to realize higher absolute levels of economic activity, but not higher levels of its rates of growth. However, if a sufficiently high number of (small) European countries simultaneously pursue the Schouten Plan, extra rates of growth can still be realized to the same extent as they are observed in the present two-country case.

Concluding remarks

The central issue in this paper concerns the influence of exchange rates on the European business cycle. Using a quasi-empirical two-country model, results have been derived which correspond strikingly with the poor economic performance Western Europe has shown since the early 1990s. The analysis started by elucidating why the European foreign currency market was in severe turmoil for the last two years and, perhaps, will also stay within the framework of an unstable European Monetary System in the future. Financing the costs of German (re)unification provoked too high nominal wage levels. In order to protect price and governmental financial deficit stability, German tax increase and M1 contraction policy measures had been taken. This combination of an autonomously induced positive wage impulse and the consciously taken tax increase and M1 contraction policy measures set the recessive movement of the German economy in motion. The analysis also showed how the downswing of the European business cycle was initiated by this German policy. Consequently the Bank of England had to take monetary policy measures that matched the constant ratio requirement of its currency with respect to the Germany currency and actually

---

[6] In the Netherlands a similar idea was launched twelve years ago under the name of the *Hollands Glorie Scenario* or the Schouten Plan (Schouten [12]). This was a combination of moderated nominal wages, lower tax rates and an unchanged financial deficit of the public sector and must be considered as a supply-side policy mix causing a significant upturn as from the first period it has been applied. However, in view of the fact that the latter policy mix may cause an initial excess of capacity of production, a simultaneous demand-side policy of money creation has to be pursued. In view of the fact that permanently higher rates of growth of investment and production capacity are effectuated, continuously increasing and, eventually, permanently higher rates of growth of production and employment will be realized. What is more, the volume of disposable wage income does not change in the initial situation, despite the negative nominal wage impulse. Indeed, shortly thereafter, the volume of disposable wage income will continuously increase.

implied that the UK had to follow the German contractionary monetary policy. In the case of the postulated sticky price regime in the UK goods market, the UK was also confronted with stagnation and became a victim of its own political conduct by sticking to the promise of keeping the exchange rate of the UK pound on a par with the deutschmark.

The analysis first suggested a partial solution for the European troubles by consciously effecting a devaluation of the UK pound or, under specific circumstances, by a successful devaluation caused by speculative operations against the UK currency. However, an integral solution, aiming at an upturn of the European business cycle, will consist of a strong coordination of moderated nominal wages, lower tax rates, unchanged financial deficits of the EC governments and expansionary monetary policy measures taken by the EC authorities. If this coordination does not materialize and/or the European markets, in particular the labour markets, fail to function properly, the EC countries will be confronted with very poor economic performances in the future.

Finally, the analysis showed the benefits of flexible exchange rates in the case of rigid EC labour markets. They could play a very useful role in hampering the downward movement of real welfare in the downswing of the European business cycle. Moreover, the analysis indicated that the flexible exchange rate system could play a useful role in lowering the EC inflation rates in the case of an upturn of the European business cycle. The last-mentioned conclusions remain true in the event of EC labour markets permanently staying rigid.

All in all, the analysis elucidates why politicians actually have fundamental reasons to question the usefulness of a European Monetary Union within a framework of fixed exchange rates. The pros of the latter system are probably outweighed by the cons.

References

1 Brainard, W C and Tobin, J 'Pitfalls in financial model building' *American Economic Review, Papers and Proceedings* 1968 **58** (2) 99–122

2 Driehuis, Wim and Mulder, Rob J 'De q-theorie van het investeringsgedrag' [The q-theory of investment] *Maandschrift Economie* 1993 **57** (6)

3 Fleming, J M 'Domestic financial policies under fixed and under floating exchange rates' *IMF Staff Papers* 1962 **9** 369–379

4 Meade, J E *The Theory of International Economic Policy* Vol 1: *The Balance of Payments* Oxford University Press, Oxford (1951)

5 Meulendijks, Pieter J F G *De betekenis van reëelen financiële internationalisatiegraden voor volkschuishoudingen* [On the significance of varying degrees of international economic and financial integration for economies] Wolters-Noordhoff, Groningen (1992)

6 Meulendijks, Pieter J F G and Schouten, Dick B J 'De monetaire inflatietheorie versus de reële stagflatie-theorie' [Monetary inflation versus real stagflation theory] *Maandschrift Economie* 1992 **56** (5)

7 Meulendijks, Pieter J F G and Schouten, Dick B J 'How flexible exchange rates can play an important role in the downswing and the upturn of the European business cycle: an application of a "quasi-empirical" two-country model' Paper presented at the International Symposium on Economic Modelling, University of Piraeus, Greece, 2–4 June 1993, pp 1–28

8 Miller, M and Salmon, M 'Dynamic games and the time inconsistency of optimal policy in open economies' *Economic Journal Supplement* 1985 **95** 124–137

9 Mundell, R A *International Economics* Macmillan (1968)

10 Tinbergen, Jan *On the Theory of Economic Policy* 2nd edn, North Holland, Amsterdam (1955)

11 Tobin, J 'A general equilibrium model to monetary theory' *Journal of Money, Credit and Banking* 1969 **1** 15–29

12 Schouten, D B J 'Het Plan-Schouten: Een positief oordeel' *ESB* 1982 **67**

13 Van Els, P J A 'Econometric versus quasi-empirical models: macroeconomic policy analysis in the Nethernds *Economic Modelling* 1990 **7** (2) 133–147

Appendix 1

Ratios and elasticities of the stationary equilibrium state

Ratio of private consumption to GVAE

$$\hat{\gamma} = 0.9 \tag{23}$$

Ratio of gross investment to GVAE

$$\hat{\sigma}_{i_b} = 0.1 \tag{24}$$

Labour income share (ratio to NVAE)

$$\hat{\lambda}_n = \frac{8}{9} \tag{25}$$

Labour income share (ratio to GVAE)

$$\hat{\lambda} = 0.8 \tag{26}$$

Substitution elasticity with respect to speculative money

$$\varphi = 1 \tag{27}$$

Ratio of imports or exports to GVAE

$$\hat{\mu} = 0.25 \tag{28}$$

Expenditure elasticity of imports

$$\mu_x = 1 \tag{29}$$

Substitution elasticity of foreign produced goods with respect to home produced goods

$$\sigma = 1 \tag{30}$$

Competitive price elasticity belonging to (29)

$$\eta' = \sigma(1-\hat{\mu}) = 0.75 \qquad (31)$$

Output elasticity of imports

$$\mu_y = \frac{\mu_x}{1-2\hat{\mu}\mu_x} = 2 \qquad (32)$$

Competitive price elasticity belonging to (32)

$$\eta = \frac{\eta'}{1-2\hat{\mu}\mu_x} = 1.5 \qquad (33)$$

If we postulate

$$2\eta - 1 = \mu_y$$

it is true that

$$S_b = \hat{\mu}(-2\bar{y} + p_w)$$

If we also postulate

$$\varphi = 1$$

the reduced form of a few fundamental equations can be expressed in a very simple way.

Actual stock-value of share capital

$$K^* = E - 4w'$$

Yield on actual stock-value of share capital:

$$\frac{r_i^*}{\hat{r}} = -4w'$$

Real interest rate on public sector debt

$$\frac{r_o}{\hat{r}} = -E$$

The GVAE-value:

$$Y = E$$

Accelerator

$$\zeta = 0.05 \qquad (34)$$

Shares of domestic and foreign holdings of financial assets in total domestic financial assets respectively

$$a = 0.5$$
$$(1-a) = 0.5 \qquad (35)$$

Capital output ratio

$$\hat{\kappa} = 2 \qquad (36)$$

Ratio of total long-term lending to the public sector to GVAE

$$\hat{\omega} = 1 \qquad (37)$$

Ratio M1 to GVAE

$$\hat{\chi} = \frac{1}{3} \qquad (38)$$

Ratio of scrapping of technically obsolete capital goods to GVAE

$$\hat{\kappa}\hat{\delta} = 0.1 \qquad (39)$$

Elasticity of the output price with respect to the utilization rate of production capacity

$$\xi = 1; \infty \qquad (40)$$

Yield on share capital and real interest rate on public sector debt, after tax

$$\hat{r} = (1-\hat{t}_R)\hat{r}' = \frac{1}{30} \qquad (41)$$

Rate of taxes on non-wage income

$$\hat{t}_R = \frac{1}{3} \qquad (42)$$

Yield on share capital and real interest rate on public sector debt

$$\hat{r}' = 0.05 \qquad (43)$$

Ratio of taxes on non-wage income to GVAE

$$\hat{t}_R\hat{\kappa}\hat{r}' = \frac{1}{30} \qquad (44)$$

Ratio of interest payments on public debt to GVAE

$$\hat{\omega}\hat{r} = \frac{1}{30} \qquad (45)$$

Effect of the burden of taxation on wage formation

$$\varepsilon = \frac{4}{7} \qquad (46)$$

Elasticity of production capacity with respect to real labour costs per unit of output in enterprises

$$\phi \frac{\hat{\lambda}_n}{1-\hat{\lambda}_n} = 0.8 \qquad (47)$$

Ratio of disposable non-wage income to GVAE = ratio of consumption of non-wage income earners to GVAE

$$(\hat{\kappa} + \hat{\omega})\hat{r} = 0.1 \qquad (48)$$

Appendix 2

Sensitivity analysis with regard to three major coefficients of the two-country model

The wage-formation coefficient β_k and the final equation of the symmetric two-country model

If country A and country B are governed by the same price regime in their goods markets (for instance by the flexible price regime ($\xi = \infty$) in the long-term cases of Table 2 and Table 4), the final equation in terms of the two-country sum (total) of real production reads

$$(y^a + y^b) - [2 - 0.8\beta_k](y^a + y^b)_{-1}$$
$$+ (y^a + y^b)_{-2}$$
$$= -0.8(\Delta\underline{p}_L^{a'} + \Delta\underline{p}_L^{b'})$$
$$+ 0.56(\Delta\underline{p}_L^{a'} + \Delta\underline{p}_L^{b'})_{-1}$$

As a second-order linear difference equation, its characteristic equations or rather its inherent stability, periodicity and amplitude (damping characteristics) may differ along with a sensitivity analysis (numerical variation) of the wage-formation coefficient (β_k). Setting its value equal to 1.25, a regular business cycle movement will be obtained, with a periodicity of six years. If $0 < \beta_k < 1.25$ this periodicity will increase. In all these cases labour-market rigidity does not exist. Note that country B is eventually confronted with the same business cycle movement as will be the case with

country A in consequence of the unilateral wage impulse initiated by the latter country.

However, for the European case, the present paper deals with rigid labour markets ie $\beta_k = 0$. Therefore, the model can be reduced to a first-order linear difference equation and reads

$$(\Delta y^a + \Delta y^b) = -0.8(\underline{p}_L^{a'} + \underline{p}_L^{b'})$$
$$+ 0.56(\underline{p}_L^{a'} + \underline{p}_L^{b'})_{-1}$$

The latter equation indicates a persistent and negative extra rate of growth of real production at the value of 0.24% in the long term. It can be effectuated by a

positive wage impulse at the value of 5/7% or by a positive budgetary impulse of the public sector at the value of 1%. These alternative impulses are supposed to have been caused simultaneously by the authorities of the two countries. (For both countries the definition of

$$\left(\underline{p}'_l = \underline{X}_a + \frac{7}{5}\underline{p}_l \right)$$

under (18) holds. In the long term $\Delta y^a = \Delta y^b = -0.12$ in Table 2. Note that country B will also be confronted with the same persistent and negative extra rate of growth of production as will be the case with country A in consequence of a unilaterally initiated wage impulse by the latter country. But, of course, the same authorities will never accept such, probably unexpected, long-term results. Hence, when the labour markets refuse to function, the authorities will eventually take contractionary wage or budgetary policy measures. Thus, in spite of the fact that $\beta_k = 0$, the growth rates of production, employment etc will change their course in an opposite direction within the not too distant future by intervention of the policy-makers. (In the long term $\Delta y^a = \Delta y^b = 0.12$ in Table 4). However, as we have explained above, it goes without saying that, likewise the former possibility, the latter possibility of a persistent extra increase of production (= a persistent extra decrease of unemployment) can never be maintained by the policy-makers. Thus, day to day reality provides for the natural law-abiding rule to the effect that a downswing has to be followed unavoidably by an upturn of the business cycle and vice versa.

Sensitivity results with regard to the capital–labour elasticity of substitution coefficient ϕ

The table results in 1–4 have been based on a relatively low value (0.8) of the elasticity of production capacity with respect to real labour costs per unit of output in enterprises in consequence of a relatively low value (0.1) of the capital–labour elasticity of substitution (see (47) in Appendix 1). An exercise with nominal wage impulses and using still lower values for these elasticities will deliver less pronounced effects with regard to the levels of production and

employment. Contrary to the latter result, more pronounced effects with respect to the level of real disposable labour income per worker in enterprises will be realised. And, of course, in the event that higher values are attached to the aforementioned elasticities the reverse conclusions can be drawn.

Sensitivity results with regard to the competitive price elasticity parameter η

The results, illustrated in the four tables, have also been based on a relatively low value (1.5) of the competitive price elasticity and can be justified by postulating low value (1.0) attached to the home produced-foreign produced goods elasticity of substitution (see (33) and (30) in Appendix 1). However, simulations to be based on higher absolute values for these parameters do not change the signs of the results. In short, the quality of the former conclusions can be maintained but the magnitude of the results will change. In particular, smaller (positive or negative) deviations of the terms of trade, which operates as a key variable in the two-country model, will occur. Generally speaking, when country A is unilaterally causing a recession it will suffer more whereas country B will suffer less under this misery. The reverse case is also true: when home country A is causing a recovery it will gain more whereas the foreign country B will benefit to a lesser extent from this profitable situation. An examination in more detail of the main sensitivity results shows the following.

In the event of a recession caused by a wage explosion in country A, under the regime of fixed exchange rates, smaller positive deviations of the terms of trade in country A (in comparison with the corresponding result in the a column of Table 1) will now be obtained. Substituting P_y by P_x in Equation 18, subsequently larger negative effects on potential and actual employment and production will be obtained. In comparison with Table 1, the initial decrease of the real disposable wage and salary bill in enterprises will, in spite of a nominal wage-explosion, be larger. The reverse situation applies for country B. Note that, under similar conditions of course, all the results of the present two-country case will

correspond more strongly with those of a closed economy for which, by definition, the variable of the terms of trade does not exist.

When a devaluation in country B occurs, the smaller terms of trade deviation (in comparison with the corresponding result in the (b) column of Table 1) implies a smaller devaluation percentage of the B currency in order to attain full capacity utilization. A smaller terms of trade loss will imply a smaller loss of potential employment. Thus, the positive effects on actual employment and production will also be larger. The terms-of-trade gain in country A will become smaller and so the increase of real disposable wage and salary bill per worker in enterprises will be smaller. So these two-country results will again correspond more strongly with those of the closed economy case in which an expansionary monetary policy might be used aiming at a full capacity utilization under similar circumstances.

In the event of a recovery caused by lower nominal wages in country A, under the regime of fixed exchange rates, the terms of trade loss will be lower (in comparison with the corresponding result in the first (a) column of Table 3). So, employment and production gains will become higher in country A. The increase of real disposable wage and salary bill per worker in enterprises will, in spite of a negative nominal wage impulse, also be higher in this country. Country B will be confronted with a lower terms of trade gain and lower price increases. Thus, the increase of real disposable wage and salary bill in enterprises will also become smaller.

When, in the event of a full utilization of production capacity, the authorities in country B take contractionary monetary policy measures, aiming at price stability, the lower revaluation percentage (in comparison with the corresponding result in the second (b) column of Table 3) will not affect the terms of trade. Thus, under this circumstance, country A does not suffer from a terms-of-trade loss because its lower devaluation percentage will be compensated by a lower price decrease of imports in terms of foreign currency.

In conclusion, it must be noted that in addition to the foregoing sensitivity results with respect to three major

coefficients, a lot of alternative sensitivity exercises with respect to other coefficients of the presently used two-country model have been carried out. All of them confirm a high degree of robustness of the model's qualitative results. Besides, the presently reported as well as the alternative qualitative results remain entirely compatible with the recent day to day data with regard to the economic performance of Western Europe after the German reunification, as reported in the recent OECD and IMF economic surveys. So, despite the simulations reported being of the quasi-empirical kind, it appears that they fit the historically generated data quite well in the qualitative sense of the word. The latter conclusion remains true within a broad range of compatible parameter values to be imposed on the two-country model.