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DI ECONOMIA POLITICA

VALERIA DE BONIS

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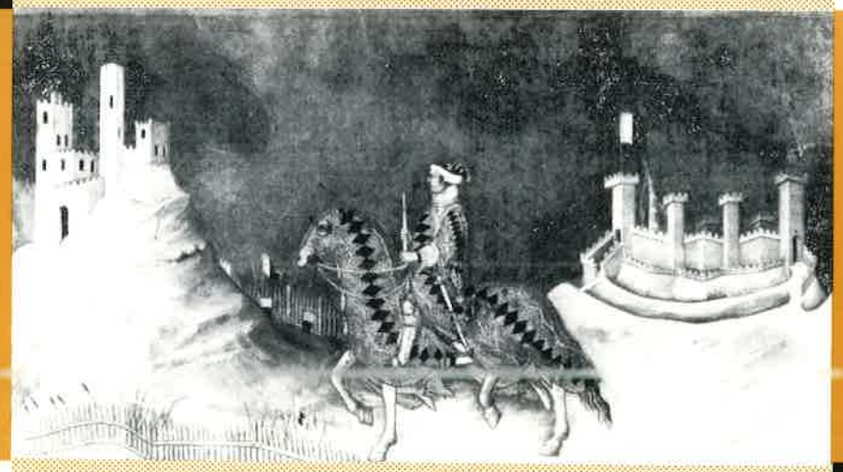

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Valeria De Bonis

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Siena, novembre 1992

ON STABILISATION POLICY IN A SINGLE CURRENCY AREA
AN IS-LM-AS MODEL [1]

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The following is an analysis of stabilization policy in a single currency area and an attempt to link the micro- and macroeconomic aspects of the problem. The role played by the rest of the world is also considered. This is accomplished using an IS-LM-AS three-country model, in which no symmetry in the union member-countries is assumed. This allows the study of the problem of the union cohesion, with respect to the efficacy of policy and its relationships with the mobility of factors and the incidence of economic shocks.

I. An IS-LM-AS Model for a Monetary Union

The essential characteristics of a monetary union are:

(a) the adoption of a single currency for the member-countries, or the fixing of parities at which currencies are mutually convertible;

(b) a common external exchange rate policy, since there can be only a unique exchange rate between a foreign currency and the union one;

(c) the existence of a central monetary authority and the pooling of foreign exchange reserves, which ensures the aim of maintaining fixed exchange rate relationships within the union.

If fixed exchange rates between member-countries are combined with flexible exchange rates towards the rest of the world, the analysis of macroeconomic policies requires the construction of three-component-models, which allow for the study of the relationships between a union member-country, the rest of the union and the rest of the world.

A way of accomplishing this is to modify the basic Mundell-Fleming model, which is formed by a goods market, a money market and an aggregate supply/aggregate demand equilibrium equations for one country.

For simplicity it will be assumed that the union consists of only two countries.

The first step of the modification consists of adding the same equations for a second country, i.e. the other member of the union.

The second step concerns the money market equilibrium equations: given the constraint imposed by the irrevocably fixed exchange rates within the union, the national central banks cannot control

the money supply within their country, and therefore the money market is a single one for the whole union. Consequently, there will be only one money market equilibrium equation.

There are three more qualifications to be considered:

(1) The supply of goods in the union member-countries is assumed to be dependent on the real exchange rate towards the rest of the world. This corresponds to the case when workers take their decisions on the supply of labour with regard to the level of their "consumption wage". Then, an appreciation of the exchange rate makes foreign goods cheaper and increases the purchasing power of the domestic wage, thus leading to an increase in the supply of labour for a given level of the nominal wage. Therefore, the real exchange rate is a shift variable of the aggregate supply curve.

(2) Perfect capital mobility is assumed both within the union and between the union and the rest of the world;

(3) The intra-currency area exchange rate is normalized to unity.

The model is then the following:

1.1 $Y_1 = C_1 (\overset{+}{Y_1}, \overset{-}{r_w}) + G_1 + B_1 (\overset{+}{P_2/P_1}, \overset{-}{Y_1}, \overset{+}{Y_2}, \overset{+}{EP_w/P_1}, \overset{+}{Y_w})$

(IS curve for country 1) [2]

1.2 $Y_2 = C_2 (\overset{+}{Y_2}, \overset{-}{r_w}) + G_2 + B_2 (\overset{+}{P_1/P_2}, \overset{+}{Y_1}, \overset{-}{Y_2}, \overset{+}{EP_w/P_2}, \overset{+}{Y_w})$

(IS curve for country 2)

1.3 $M_1 + M_2 + R = P_1L_1 (\overset{+}{Y_1}, \overset{-}{r_w}) + P_2L_2 (\overset{+}{Y_2}, \overset{-}{r_w})$

(LM curve for the union) [3]

1.4 $Y_1 = Y_1^S (\overset{+}{EP_w/P_1})$

(AS-AD equilibrium equation for country 1; its aggregate supply function is: $Y^S_1 = Y^S_1 (\overset{-}{EP_w/P_1})$

1.5 $Y_2 = Y_2^S (EP_w/P_2)$

(same as above for country 2)

where, for i = 1, 2:

B_i = country i's net exports;

C_i = private expenditure on consumption and investment goods in country i;

E_i = exchange rate towards the rest of the world;

G_i = government expenditure in country i;

L_i = money demand in country i;

M_i = central bank's holding of domestic securities in country i;

P_i = country i's price level;

R = total international reserves held by the central banks of the union;

r_w = world interest rate;

Y_i = country i's output;

Y_w = world output;

and the signs above the arguments of the functions indicate the sign of the partial derivative.

The endogenous variables of the system are: Y_1, Y_2, P_1, P_2, E.

The exogenous variables are: G_1, G_2, M_1, M_2, r_w, Y_w.[4]

If Y_w were not considered exogenously fixed (economic changes in the currency area would then have strong repercussions on the world demand for its exports), the monetary union would be so big in an economic sense as to affect world economic variables and one could integrate the effects of the increased "weight" of the countries when forming a union through making Y_w endogenous.

The complexity of the model suggests to limit the analysis, in a first moment, to the demand side, in order to better understand the mechanisms operating there.
It is then initially assumed that both P_1 and P_2 equal the exogenously fixed P_w.[5]
The later introduction of the supply-side, however, will substantially modify the results obtained in this first part of the analysis.

II. The Short-Run effects of Monetary Policy.

The introduction of the assumption that country 1's price level is equal to country 2's and both are equal to the world one allows for the following simplification of the model (with the price level normalized to unity):

2.1 $Y_1 = C_1 (Y_1, r_w) + G_1 + B_1 (Y_1, Y_2, Y_w, E)$

2.2 $Y_2 = C_2 (Y_2, r_w) + G_2 + B_2 (Y_1, Y_2, Y_w, E)$

2.3 $M_1 + M_2 + R = L_1 (Y_1, r_w) + L_2 (Y_2, r_w)$

The endogenous variables of the system become three: Y_1, Y_2, E.

The effects of an increase in country 1's money stock will now be considered. A particular attention will be given to the influence of the relative size of the union member-countries on the results.

It is possible to study the effects of stabilisation policies through a graphical analysis, adapting the two-country Keynesian model (see Fig. 1).

The EE-schedule in Fig. 1 shows the combinations of Y_1 and Y_2 consistent with the goods market equilibrium in the currency area and is derived varying parametrically the exchange rate between the union and the rest of the world.

The schedule is upward sloping, since an incrase in E improves the union member-countries trade balance, thus increasing Y_1 and Y_2 (the elasticity conditions are assumed to hold); a further increase is induced by the trade linkage effect operating between country 1 and country 2. This can be shown differentiating 2.1 and 2.2 w.r.t. E:

$$dY_1/dE = [B_{1E} (1 - C_{2Y2} - B_{2Y2}) + B_{2E} B_{1Y2}] / |D| > 0$$

where $|D|$ equals $(1 - C_{1Y1} - B_{1Y1}) (1 - C_{2Y2} - B_{2Y2}) - B_{2Y1} B_{1Y2}$.

Dividing through by $(1 - C_{2Y2} - B_{2Y2})$, the numerator becomes B_{1E} (which shows the direct aggregate demand effect) $+ B_{2E}B_{1Y2}/(1 - C_{2Y2} - B_{2Y2})$ (the trade linkage effect for country 1).

The same applies to country 2:

$$dY_2/dE = [B_{2E} (1 - C_{1Y1} - B_{1Y1}) + B_{1E} B_{2Y1}] / |D| > 0.$$

Thus, dividing dY_2/dE by dY_1/dE, one obtains the slope of the EE schedule:

$$dY_2/dY_1 = [B_{1E}(1-C_{2Y2}-B_{2Y2})+B_{2E} B_{1Y2}]/B_{2E}(1-C_{1Y1}-B_{1Y1})+B_{1E}B_{2Y1} > 0$$

It can be noted that the EE curve is downward sloping in the two country Keynesian model, where the schedule is derived through varying parametrically the exchange rate between country 1 and country 2.

The RR-schedule shows the combinations of Y_1 and Y_2 consistent with equilibrium in the financial sector, given that, with perfect capital mobility, the interest rate in country 1 must equal that of country 2 and the world one.

The curve is upward sloping in the two-country case, but downward sloping in this set up: if Y_1 increases, L_1 increases, too, exerting an upward pressure on the currency area rate of interest. To keep it down at the world level, a reduction in Y_2 and therefore in L_2 becomes necessary.

Algebreically, this can be expressed in terms of the characteristics of the demand for money by differentiating eqn. 2.3:

$$dY_2/dY_1 = -L_{1Y1}/L_{2Y2} < 0.$$

Points below and on the left of the RR-schedule correspond to a situation of excess supply of money. The opposite is true for points above and on the right of it.

An increase in M_1 requires a higher Y_1 for any given level of Y_2 to keep the money market in equilibrium. This means that the RR-

schedule has shifted to the right because of this operation (see Fig. 2).

At the initial level of income, Y_1^a and Y_2^a, the supply of money exceeds the demand for money: the downward pressure on the currency area rate of interest causes a capital outflow. The exchange rate thus depreciates to guarantee the financial sector equilibrium. The depreciation causes an increase in Y_1 and Y_2 through the balance of trade effect.

The mathematics of the system yields:

$$dY_1/dM_1 = [B_{1E} (1-C_{2Y2}-B_{2Y2}) + B_{1Y2} B_{2E}] / |D_1| > 0$$

$$dY_2/dM_1 = [(1-C_{1Y1}-B_{1Y1}) B_{2E} + B_{2Y1} B_{1E}] / |D_1| > 0$$

$$dE/dM_1 = [(1-C_{1Y1}-B_{1Y1})(1-C_{2Y2}-B_{2Y2}) + B_{2Y1} B_{1Y2}] / |D_1| > 0$$

where $|D_1| = B_{1E} [B_{2Y1} L_{2Y2} + (1-C_{2Y2}-B_{2Y2}) L_{1Y1}] + B_{2E} [B_{1Y2} L_{1Y1} + (1-C_{1Y1}-B_{1Y1}) L_{2Y2}]$.

It can be noted that the expansionary effect of monetary policy works through the responsiveness of the trade balance to the depreciation of the exchange rate towards the rest of the world, B_{iE}, and does not depend on which country undertakes the operation.

The ratio between the induced increases in Y_1 and Y_2 directly depends on the ratio between B_{1E} and B_{2E}: for instance, as B_{1E}

increases, the expansion in country 1 is higher, given the depreciation of E; therefore, the increase in the exchange rate required for the equilibrium in the financial sector is smaller and, given B_{2E}, the expansion in country 2 is also smaller.

The size of B_{iE} depends, among other factors, on how import-oriented consumption in country i is, which in turn is related to the size of the country: if it is small, it will probably be specialized in the production of a limited number of goods; therefore, a lot of goods in the consumption basket will be imported ones. In addition, the substitution with domestically produced goods may be difficult. The trade balance will then be very responsive to changes in the exchange rate.

Among the two union member-countries, therefore, the one which is more open to foreign trade (i.e. with the rest of the world) and imports goods with a low degree of substitutability is affected to a greater extent by monetary policy.

In the case of identical responsiveness of the two countries trade balances to changes in the exchange rate ($B_{1E} = B_{2E}$), monetary policy has the same effects in both countries, given also that all the other parameters measuring the reactions of the two countries to changes in the relevant variables are equal.

The effectiveness of monetary policy depends on the countries' relative size also for the following reason: if the monetary operation is performed by the "big" country, it will have a noticeable effect on the monetary base of the entire area and

therefore on the level of activity of both countries. The converse is true when the "small" member-country is the one which undertakes the monetary policy operation.

The small country is the one which bears the relatively larger effect of the adjustment process, in terms of induced changes in the level of income.

III. The Long-Run Effects of Monetary Policy

The effects of an expansionary monetary policy in one of the two union member-countries will now be analysed within the framework of the complete model, that is introducing supply-side reactions.

The initial impact of an increase in the money supply in country 1 is as described before: the decrease in the rate of interest in country 1 brings about an expansionary pressure on the demand for goods with consequent higher price and output levels. This induces an increase also in the demands for goods imported from the other union member-country.

Through the trade linkage effect, therefore, the expansionary pressure is partially shifted to the other country: the first country finds itself in a situation of trade deficit; to keep the intra-union exchange rate at the fixed level, money flows out of country 1 towards country 2, with the interest rate thus increasing in the former and decreasing in the latter.

If one additionally considers the security market, there is another and more direct mechanism through which an increase in M_1 causes a decline in the rate of interest also in country 2. If the increase in the money supply is brought about through the purchase of securities held by the private sector and also residents of the

other member-country hold this type of securities, the decrease in the rate of interest will take place in both countries. The expansionary pressure will be the more widespread within the union, the bigger is the market domain (and the integration with other security markets) of the purchased securities.

Through the integration of the goods and security markets, therefore, the interest rate of the union tends to decline. With perfect capital mobility with the rest of the world, this causes a capital outflow, thus inducing a depreciation of the exchange rate and an improvement in competitiveness.

Until this point the same results as before are obtained. However, a second effect of the exchange rate depreciation is now to be considered: foreign goods become more expensive for the union's consumers. Given the assumption that the supply of goods depends on the real exchange rate with the rest of the world, the aggregate supply schedules of the union member-countries shift leftwards. The consequent increase in P_1 and P_2 counteracts the initial expansion.

This can be seen graphically (see Fig. 3 for country 1 and Fig. 4 for country 2).

The increase in M_1 shifts the LM curve of country 1 rightwards to LM'. At the intersection point between IS and LM', the interest rate would be below r_w; consequently E depreciates and IS shifts to IS'. In the (Y,P) diagram, AD shifts to AD'. However, the depreciation of E also causes a leftward shift of AS and the consequent increase in the price level makes IS' and LM' shift back.

As for country 2, IS shifts to IS' because of the trade linkage mechanism and LM to LM' because of the money inflow from country 1, as above described. The other changes are the same as in country 1.

The graphical analysis cannot tell whether the final effect is positive or negative. The mathematical results derived from the system show that monetary policy is ineffective:

$$dY_1/dM_1 = [P_2^2/P_1^2 (B_{11}B_{22}P_1P_2Y^S_{1s} - B_{11}B_{22}P_1P_2Y^S_{1s})] / |D_2| = 0$$

$$dY_2/dM_1 = [P_2^2/P_1^2 (B_{11}B_{22}P_1P_2Y^S_{2s} - B_{11}B_{22}P_1P_2Y^S_{2s})] / |D_2| = 0$$

where $|D_2| = -B_{11}P_2/P_1^2 \{-B_{22}P_1/P_2^2[P_1L_{1Y1}Y^S_{1s} + P_2L_{2Y2}Y^S_{2s}] + L_2 [-B_{2Y1}Y^S_{1s} - Y^S_{2s}(1-C_{2Y2}-B_{2Y2})]\} - B_{22}P_2\{B_{11}P_1[P_1L_{1Y1}Y_{1s}{}^S + P_2L_{2Y2}Y^S_{2s}] + L_2[(1-C_{1Y1}-B_{1Y1})Y^S_{1s} - B_{1Y2}Y_{2s}{}^S - B_{1s}]\} - L_1(B_{11}/P_1 [-B_{2Y1}Y^S_{1s} - Y^S_{2s}(1-C_{2Y2}-B_{2Y2}) - B_{2s}] + B_{22}P_1/P_2^2[(1-C_{1Y1}-B_{1Y1})Y^S_{1s} - B_{1Y2}Y_{2s}{}^S - B_{1s}]\}$

and s is the real exchange rate with respect to the rest of the world.

The level of income does not change in either member-country.

The result depends on two mechanisms: the flexibility of the exchange rate towards the rest of the world and the supply-side reaction to changes in the real exchange rate. The adjustment process is therefore different from the one operating in the two-country fixed exchange rate model, though leading to the same results, and resembles instead the flexible exchange rate and price flexibility case, because of the introduction of the rest of the world as a third component.

Without supply adjustments, in fact, monetary policy would lead to an expansion in the income levels of both countries as analysed above. This differs from the one obtained using two-country models and is determined by the flexibility of the exchange rate towards the rest of the world and the corresponding balance of trade effects.

IV. Effects of Fiscal Policy

The model described by equations 2.1 - 2.3 is also useful in accounting for changes in the union member-countries' income levels induced by a fiscal expansion in country 1.

The corresponding multipliers would be:

$$dY_1/dG_1 = B_{2E} L_{2Y2} / |D_1| > 0$$

$$dY_2/dG_1 = -B_{2E} L_{1Y1} / |D_1| < 0$$

$$dE/dG_1 = -B_{2Y1} L_{2Y2} - L_{1Y1}(1-C_{2Y2}-B_{2Y2}) / |D_1|.$$

The increase in G_1 induces an increase in Y_1 which in turn implies an increase in Y_2 through the trade linkage mechanism. However, given the union money supply, the higher levels of income imply an excess demand for money with respect to the original equilibrium. The upward pressure on the rate of interest and the capital inflow can be offset by an appreciation of the exchange rate towards the rest of the world. Y_1 and Y_2 will therefore decline because of the loss in competitiveness, and the final effect on Y_2 will be contractionary.

The overall effect on the union income level, $Y_1 + Y_2$, will depend on the relative sensitivities of money demand in the two union member countries. If $L_{2Y2} > L_{2Y1}$, total income will expand, and viceversa.[6]

The short-run effectiveness of fiscal policy should then be evaluated with reference to the authorities's objective. If this is to increase the union level of income, an expansionary fiscal policy is not the appropriate instrument when it is applied in the country with a higher sensitivity of money demand to income changes.

However, if the fiscal expansion in country 1 also causes an increase in Y_w, again through the trade linkage mechanism, there

would also be an increase in r_w. This would reduce, if not eliminate, the need for an appreciation of the union exchange rate. Therefore, also Y_2 could eventually expand as a result of an increase in G_1.

One can note that this result, i.e. the increase in the level of income in both the union members due to an expansionary fiscal policy in one country, is obtained also by applying the model of equatios 1.1 - 1.5. In that case, the appreciation of E, making foreign goods cheaper for the union consumers, will bring about an increase in the supply of labour and therefore in the aggregate supply schedules of the member-countries, thus strengthening the expansionary effect of the policy operation in both countries.

In the long-run, therefore, fiscal policy effects are of the same sign in both union member-countries. The force which drives this result is the adjustment on the supply side. One can also notice that, if the countries have symmetric reactions, the multipliers have the same value and therefore the final effect on income is the same in both the members of the union:

$$dY_1/dG_1 = \{[-B_{22}Y^S_{1s}(L_2 + L_1P_1/P_2)]/P_2\} / |D_2| > 0$$

$$dY_2/dG_1 = \{[-B_{22}Y^S_{2s}(L_2 + L_1P_1/P_2)]/P_2\} / |D_2| > 0$$

V. The Model and Some Criteria for the Optimality of a Currency Area

The fact that policy operations affect the union member-countries in a way which depends on their characteristics (i.e. size, responsiveness of the trade balance to changes in the exchange rate, of money demand to changes in income and of aggregate supply to changes in the real exchange rate) shifts the analysis to the problem of the optimality of belonging to a single currency area.

(1) The criterion of factor mobility (R. Mundell, 1961).

Mundell in his 1961 paper on the optimum size of currency areas concluded that regions should be defined on the basis of factor mobility and that single currency areas should correspond to regions, i.e. have internal factor mobility (which allows for the use of a single currency within the region) and external factor immobility (with a corresponding flexible exchange rate regime with the rest of the world).

However, the mobility of factors is not something predetermined with respect to the choice of the exchange rate system. For instance, let us consider the decision process of a labour supplier who has the possibility of changing his location from country 1 to country 2. If the present discounted value of the flow of income in 2 is bigger than that in 1, the agent will be willing to migrate. But the persistence of a positive differential is not certain. As pointed out in Bertola (1989), the higher this uncertainty is, the bigger the difference between remunerations in the two countries must be.

As long as the choice of the exchange rate regime affects the degree of uncertainty, factor mobility is a variable endogenous to the system. In the case of moving to a fixed exchange rate regime, there are two factors to be considered:

(i) the variability of the nominal exchange rate is eliminated: this, of course, acts as a force reducing uncertainty and therefore enhancing mobility;

(ii) the way variability of income is affected is not univocal.

One can first consider the difference between a flexible exchange rate regime and a fixed exchange rate one between two countries, 1 and 2, in the presence of a shock hitting the real sector of country 1, for instance, and shifting its IS curve to the right. The increase in income causes demand for money and therefore the interest rate to go up; it also stimulates the demand for imported

goods. The overall effect on the balance of payments depends on various factors, primarily the degree of capital mobility. Assuming this is perfect, with a flexible exchange rate regime, the incipient capital inflow causes the price of the foreign currency to decrease; the subsequent decline in competitiveness shifts back the IS curve of country 1: income declines and the effect of the initial shock is therefore offset (see Fig. 4).

With a fixed exchange rate regime, instead, the downward pressure on the exchange rate induced by the exchange rate being above the world level is offset by the monetary authority through selling the domestic currency, thus increasing foreign reserves and therefore the money stock: the LM curve shifts to the right and the final effect on income is expansionary (see Fig. 5).

In the presence of a real shock, therefore, fixed exchange rates involve a higher variability of income and therefore a higher degree of uncertainty.

The result is reversed in the presence of a shock to the monetary sector: if the LM curve of country 1 is shifted to the right, its interest rate is below the one in 2; to maintain the balance of payments equilibrium, the flexible exchange rate depreciates, thus leading to an increase in competitiveness and the outward shift of the IS curve: the level of income increases (see Fig. 6).

With fixed exchange rates, instead, the upward pressure on the exchange rate is neutralized, with the consequence of a decrease in the money stock: the LM curve then shifts back and the initial effect of the shock is offset (see Fig. 7).

The variability of income, therefore, depends on the exchange rate system adopted. Flexible exchange rates, which directly affect competitiveness and therefore act on the IS curve, are stabilizing in response to shocks affecting the real sector; fixed exchange rates, the maintainance of which is accomplished by changes in reserves, are stabilizing when the shocks interest the LM curve.

The variability of income and uncertainty in general affects the mobility of factors, which, on its turn, can act like an adjustment mechanism, replacing the flexibility of the exchange rate.

One can integrate this analysis, which considers the "world" as formed by two countries only, with the one of the three component model presented above.

In the case of a real shock which increases Y_1 and decreases Y_2, apart from the direct effect on the level of income, there will be: as for country 1, an increase in L_1, and therefore in the rate of interest, and in the demand for imports, that partially offset the increase in income; the opposite will happen in country 2. There will also be the changes in reserves necessary to keep the intra-union exchange rate fixed, but now one must also consider the total effect on $Y_1 + Y_2$ and the level of the union interest rate.

If $r > r_w$, the (flexible) exchange rate towards the rest of the world appreciates, thus leading to a rightward shift of the aggregate supply curves in the union countries. The union's income increases and, even if the precise effect in the single country is difficult to assess, the initial disequilibrium may be partially overcome also without factor mobility: Y_2 eventually increases and the price level in country 1 decreases.

If the countries have the same parameters appearing in their IS, LM and AS curves and the shocks are of the same magnitudes (with opposite sign) in both countries, then the supply adjustments will offset those effects with no need for factor mobility.

As for the case of a shock in the monetary sector, which shifts LM to the right, e.g. an expansion of the money stock, it has already been shown that, with integration between the security and/or the goods markets of the union member-countries, both Y_1 and Y_2 increase, in contrast with the outcome of the two-country-model, but that, introducing real wage rigidities and changes in the price levels, the shock would have no (lasting) effect.

The other side of this result, however, is that, in the presence of price rigidities, the speed of demand and, especially, supply adjustments might be reduced when moving to a fixed exchange rate system, thus increasing the fluctuations in the level of income.

(2) The Criterion of the Degree of Openess (R. McKinnon, 1963).

Under a flexible exchange rate regime and a high degree of openess to international trade, a shift of demand from non-tradables to tradables causes a devaluation. The price of tradables increases and that of non-tradables decreases by the rate of the devaluation. Since the ratio of the former to the latter is high, the price level increases sharply.

The country under consideration, therefore, had rather adopted a fixed exchange rate regime, which is preferrable in terms of internal price stability.

However, if exchange rates are fixed only with some countries, e.g. the other members of a monetary union, this stabilisation goal might not be reached.

The country's net exports in fact can be decomposed (see note 2) in the net exports towards the other union member-countries and those towards the rest of the world. If the sensitivity of this second part of the trade balance to changes in the exchange rate is relatively high, and goods imported from the countries not belonging to the union are a substantial share of the consumption basket, the flexibility of the exchange rate towards the rest of the world will negatively affect price stability in spite of the establishing of fixed exchange rates with the union countries.

(3) The criterion of the diversification in production (P. Kenen, 1969).

Another aspect which might change during the process of formation of the monetary union, provided that this is accompanied by an economic integration process too, is the production pattern of

each member-country. Regions, in fact, can not be identified only on the basis of factor mobility. Another parameter is that of similarities in the goods they produce. As long as integration implies completely free circulation of goods, specialization in production is a probable outcome. This, however, will act as a factor of differentiation among "regions", and, if these coincide with the original countries, sector specific shocks will also be country specific shocks, thus introducing a disruptive force within the union.

The unification process itself, in conclusion, might bring about impulses which make the cohesion of the union more difficult.

NOTES

[1] I am grateful to Prof. Flavio Casprini, Prof. Carlo Pace and Prof. Manfred Willms for helpful comments.

[2] B_1, country's 1 net exports, can be decomposed in U_1 (P_2/P_1, Y_1, Y_2), net exports with country 2, and T_1 (EP_w/P_1, Y_1, Y_w), net exports with the rest of the world.

[3] Derived from:
$M_1 + R_1 = P_1L_1(Y_1, r_w)$ (LM curve for country 1)
$M_2 + R - R_1 = P_2L_2(Y_2, r_w)$ (LM curve for country 2)
where R_i = international reserves held by country i.

[4] M_1 and M_2 are exogenous variables assuming no sterilization.

[5] For this analysis see J. H. Levin (1983). Another way to simplify the model is the one adopted by Feuerstein and Siebke (1990) by assuming symmetric reaction functions in the member countries.

[6] This is because: $dY_1/dG_1 \;/\; dY_2/dG_2 = L_{2Y2}/L_{1Y1}$; given the monetary base and r_w, money demand within the union must remain at the same level as before the fiscal expansion and therefore the expansion in country 1, $L_{1Y1}(dY_1/dG_1)$, must equal the contraction in country 2, $L_{2Y2}(dY_2/dG_1)$.

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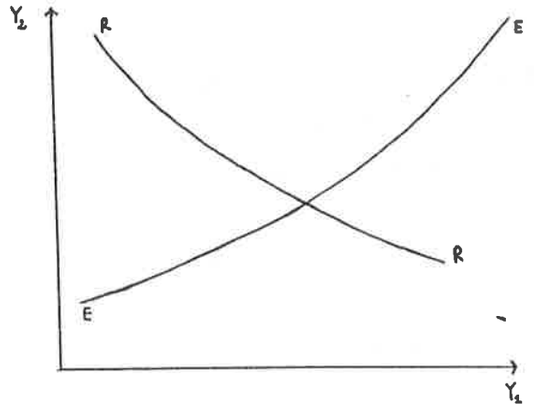

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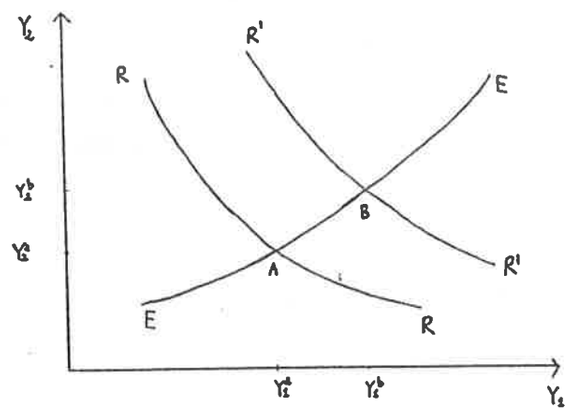

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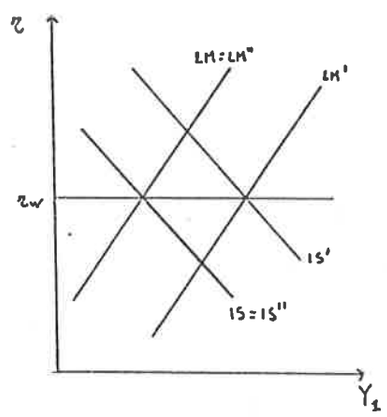

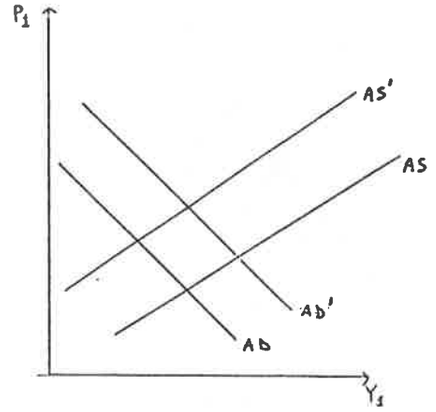

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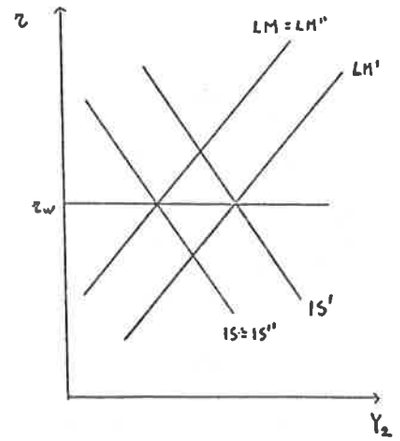

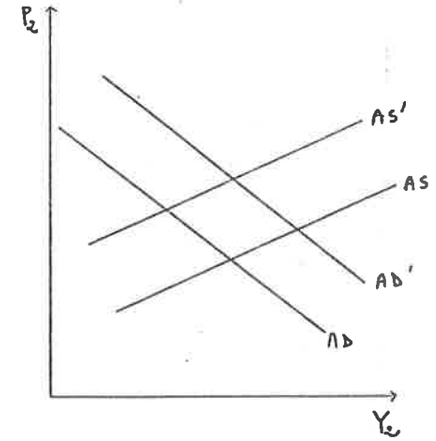

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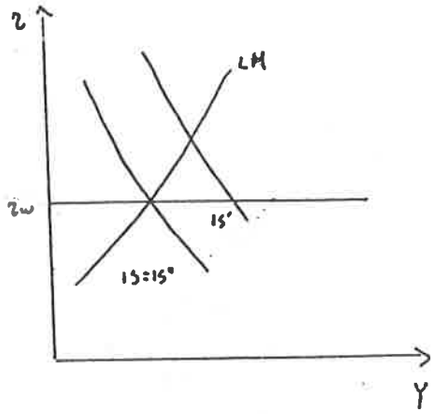

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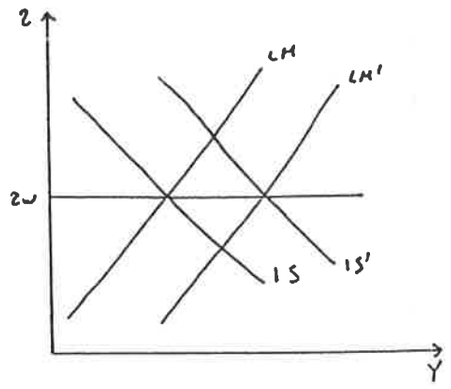

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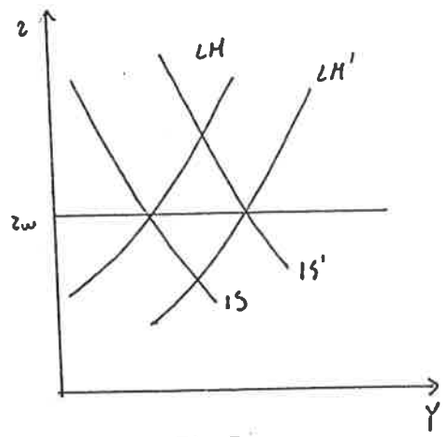

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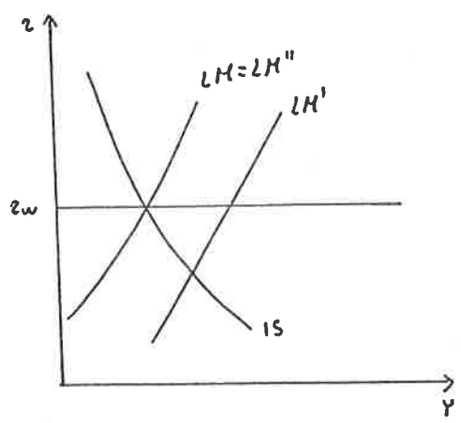

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