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DOMESTIC MACRO POLICY UNDER  
DIFFERENT EXCHANGE RATE REGIMES

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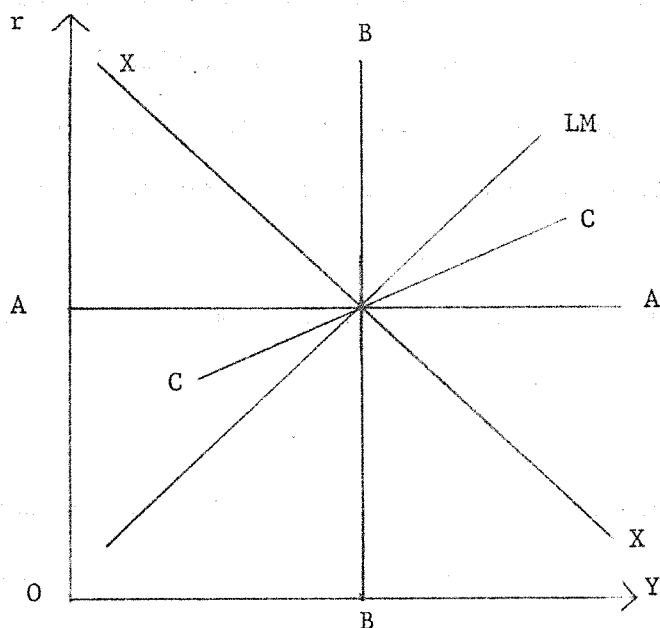
R. A. Mundell (1) has demonstrated that, given the assumption of perfect international mobility of capital, if a country's spot exchange rate is fixed monetary policy cannot affect that country's equilibrium level of income, while if the exchange rate is freely floating fiscal policy is the impotent tool. These results have recently been extended by Swoboda (2, 3), who showed that, even if capital were imperfectly mobile internationally, monetary policy could have no lasting effect on the level of income in an economy with a fixed spot exchange rate.

This short paper has three objectives. First, the taxonomy of combinations of exchange regime and domestic policy will be completed - that is, the equilibrium effect of fiscal policy under a fixed spot rate, of monetary policy under a floating spot rate, and of fiscal policy under a floating spot rate, will be deduced - under the assumption of imperfect international mobility of capital. It will be also shown that under that assumption it is worthwhile considering, from the viewpoint of the effectiveness of domestic policy tools, regimes intermediate between absolutely fixed and freely floating spot rates. Finally, it will be considered why capital might be imperfectly rather than perfectly mobile internationally, and how this may affect the analysis will be set out.

#### The Framework for Policy Analysis

It is worthwhile setting this framework out at some length, as once it has been established the taxonomy of results can very readily be drawn from it. The model can be shown in the usual interest rate/income level space used for IS/LM analysis. It is for the moment assumed that the income is real income; the problem of price level flexibility is best considered once reasons for imperfect capital mobility have been discussed. Consider diagram 1.

1.



Along LM the demand for real cash balances equals the supply. This schedule is the conventional macro LM schedule. Along XX the supply of domestic output equals the demand for it, the demand being the sum of domestic demand and the balance of trade. (The latter of course adding to total demand if it is in surplus and subtracting from it if it is in deficit). This XX schedule is the open economy counterpart of the conventional IS schedule, and represents the locus of points which produce equilibrium in the goods market. There is of course an XX schedule to every exchange rate. As the exchange rate (measured as number of, say, dollars to the pound) rises, so does foreign demand for domestic goods decline, and domestic demand for foreign goods rise. This will reduce demand for domestic goods, by worsening the balance of trade, so that at any interest rate the level of domestic income will be lower. Thus as the exchange rate rises, so does XX in diagram 1 shift to the left. (One can also think of this shift as occurring because, with demand for domestic goods reduced by the exchange rate rise, for any level of income to be maintained the interest rate must be lower). Similarly, as the exchange rate falls, XX shifts to the right. (It should perhaps be recollected at this point that the price level is for the moment assumed

constant, so no price level change can lead to the exchange rate change being offset without a shift in XX being required).

So far only the balance of trade has been considered. It is necessary also to introduce the capital account. Capital can be internationally mobile to various degrees. If it is perfectly mobile, the domestic interest rate must equal the world interest rate; the schedule along which the capital account is equal, but opposite in sign to, the current account is then the horizontal straight line AA. OA is the level of the world interest rate. If capital is perfectly immobile, the schedule is the vertical straight line BB, showing that no interest rate movement can affect the flow of capital. Imperfect mobility is represented by CC. It is necessary to show why CC must have a positive slope. As we move down XX income rises, so imports rise, but exports do not increase; this is by assumption. Therefore for payments balance, as the trade surplus falls and then changes to a deficit, a continually increasing net inflow of capital is required. This can only be produced, on the assumption of imperfect capital mobility, by raising the domestic interest rate relative to the world rate.

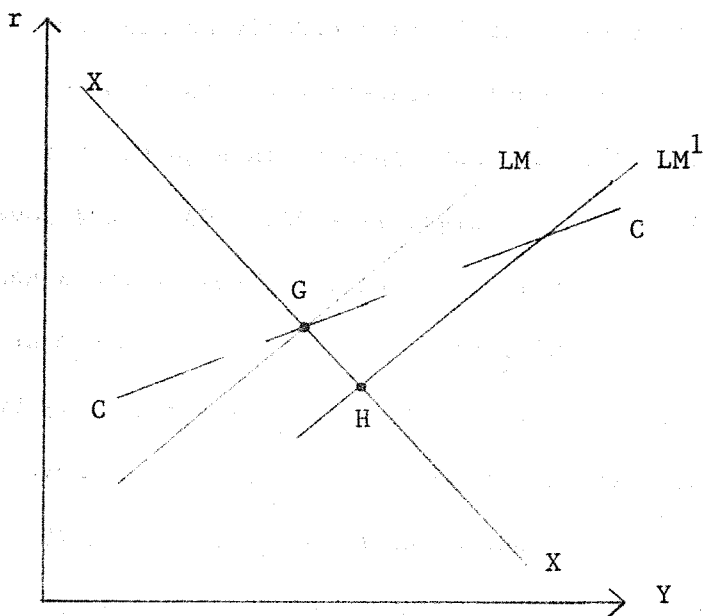
The diagram has been drawn such that the CC schedule always cuts both the XX and LM schedules at these schedules' point of intersection. This is a requirement of equilibrium; there can be only one interest rate in the market, and that must be consistent with both internal and external balance.

#### The Analysis of Policy Effectiveness

It is now possible to compare the effectiveness of policies under different exchange rate regimes. For this purpose diagram 2 is used.

It is a simplified version of diagram 1, with only the external balance schedule corresponding to imperfect capital mobility shown.

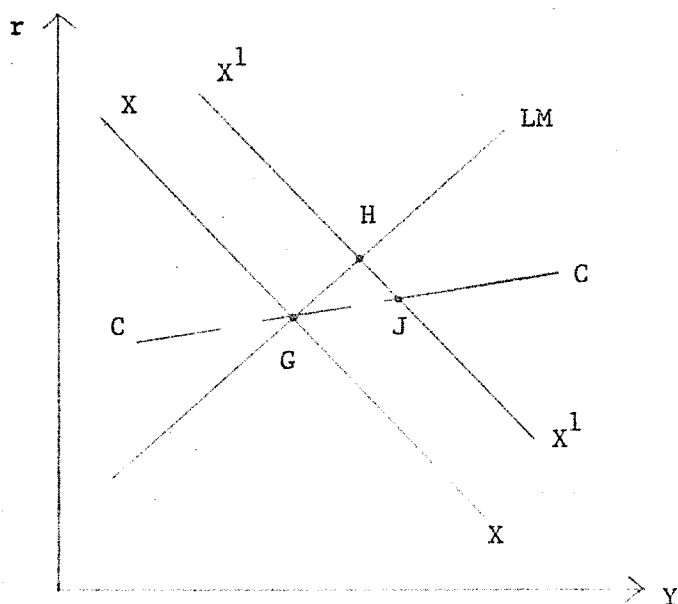
2. The Fixed Rate Case



To briefly recapitulate Swoboda, consider first an expansion in the reserve base of the banking system. LM shifts, to  $LM^1$ . Income rises, and we appear to be at H, the intersection of  $LM^1$  and XX. But at H, the interest rate is too low for payments balance, so the country is in deficit. Reserves fall, and the money supply contracts (as the exchange authorities take in domestic currency and in exchange supply foreign currency). This process must continue until the domestic interest rate is again consistent with external balance - that is, until we are back at G, with  $LM^1$  shifted back to LM. There has been only a temporary increase in income, and the only permanent result of the monetary expansion is a decline in the country's foreign exchange reserves.

That case was covered by Swoboda (3). A fiscal expansion can equally readily be dealt with. Consider diagram 3.

3.



Let the fiscal expansion shift  $XX$  to  $X^1X^1$ . We appear to be in equilibrium at  $H$ . But at  $H$ , the domestic interest rate is above that required for external balance. Hence there is a capital inflow, which expands the money stock and shifts  $LM$  to the right. Again, equilibrium is only restored when the interest rate for domestic equilibrium equals that for external equilibrium, which given  $X^1X^1$  is at  $J$ . Exactly as in the case of perfect capital mobility analysed by Mundell, the power of fiscal policy is actually augmented when the openness of the economy is considered, if the exchange rate is fixed.\*

The results of the floating rate case, however, are slightly more novel. This novelty arises because in this case monetary policy shifts  $XX$ , and fiscal policy, which directly shifts  $XX$ , is inevitably accompanied by further shifts in  $XX$ , because the exchange rate changes as a consequence of

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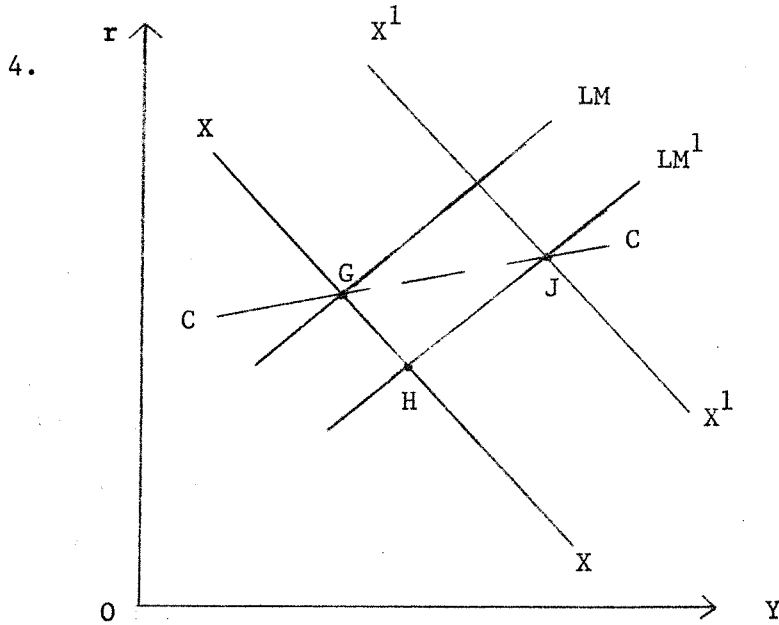
\* At this point it is worth noting that in diagram 3  $CC$  is flatter than  $LM$ . If it is steeper, it can be readily shown that with a fixed spot rate monetary policy is still impotent in the long run, and that fiscal policy remains effective (though does not have its power augmented). The one exception is of course the limiting case of perfect immobility of capital, when  $CC$  is vertical. Then capital flows cannot be altered to maintain payments balance, so only one level of income is consistent with overall equilibrium.



either type of policy.

The Floating Rate Case

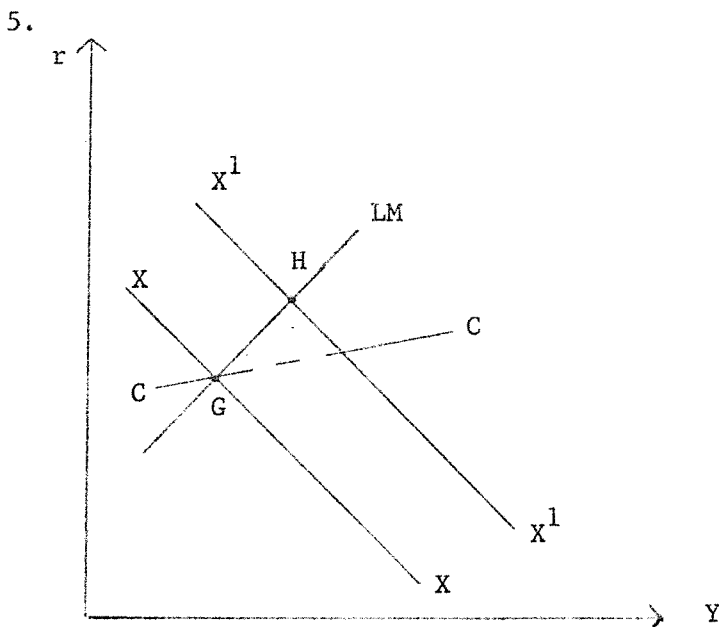
Consider first a monetary expansion (diagram 4)



LM shifts to  $LM^1$ . As the domestic interest rate is below that required for external balance, the exchange rate depreciates and, as described earlier,  $XX$  shifts to the right. It will continue to do so until it has reached  $X^1X^1$ , when the level of income and rate of interest have both risen, and we are at  $J$ . In this case it is to the intersection of the money market equilibrium schedule and  $CC$  that the goods market equilibrium schedule must accommodate, since with a floating exchange rate no money can flow over the exchanges and the domestic money stock is determined domestically. This result is of course exactly the same as that reached under the assumption of perfect capital mobility - monetary policy remains powerful, and indeed in the case in diagram 4 has its power augmented. If, instead of being flatter than  $LM$ ,  $CC$  is steeper than  $LM$ , monetary policy still has a long-run effect on real income, but a lesser one than in the closed economy case. This is the first qualification to the perfect capital mobility results,

and it is a minor one.

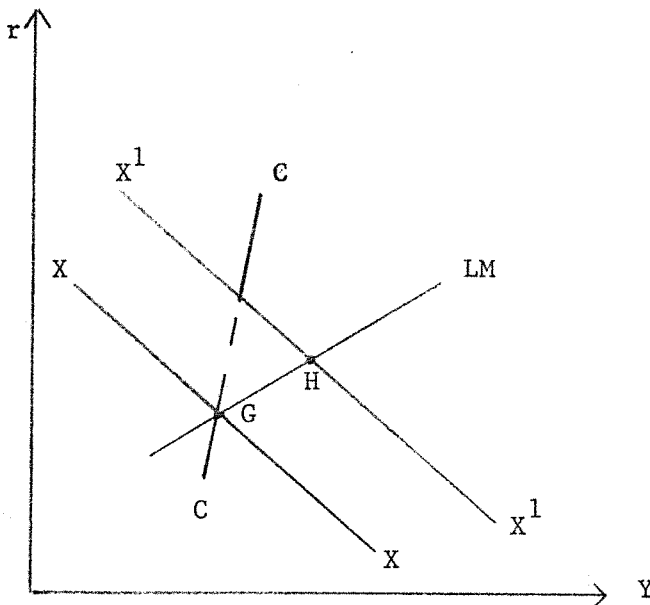
Now consider fiscal policy. Here the results are strikingly different from the perfect capital mobility case. It will be useful to recollect the definition of CC. CC is the locus of interest rates which will produce the net capital flow required for payments balance, given income and the exchange rate. Ceteris paribus, then, a depreciation in the exchange rate will shift CC downwards, and an appreciation raise it. This is because a depreciation reduces the capital inflow (or increases the outflow) required for payments balance, at every level of income. A lower interest rate than before is therefore required, at every income level, for payments balance. Then converse holds for an appreciation. This is sharply distinct from the infinitely elastic capital flows case; there CC does not shift with the exchange rate, since varying domestic interest rates relative to the foreign interest rate immediately produces an "infinitely large" flow - that is, it is impossible to move away from the foreign interest rate, and any attempt to do so will produce a capital flow which fully frustrates the attempt. Bearing in mind that a change in the exchange rate shifts CC, we consider fiscal policy (diagram 5).



XX is by a fiscal expansion shifted to  $X^1X^1$ . There is excess demand for real cash balances at the old interest rate. As the spot exchange rate is floating, this cannot be satisfied by drawing in funds from abroad. The attempt to do so, however, shifts the exchange rate - the rate appreciates.  $X^1X^1$  starts to shift back to the left because the exchange rate appreciation reduces total demand for domestic goods. But simultaneously CC starts to shift upwards because of the exchange rate appreciation. Now LM does not shift, for there has been no domestic monetary action, so the new equilibrium must be on LM. This of course means that it is at a higher income level than before, for CC has shifted up. The new equilibrium will lie on LM, somewhere between G and H. Fiscal policy has retained some power in this case.

A similar result is obtained if CC is steeper than LM. Here, (diagram 6) the domestic interest rate is below that for external balance when XX is shifted by fiscal policy to  $X^1X^1$ . There is a depreciation and CC shifts down. Again we end on LM, somewhere between G and H, with both

6.



both income and the interest rate higher than before.\*

This concludes the first section of this paper. It has so far been shown that the assumption of imperfect rather than perfect capital mobility, while having no significant effect on the equilibrium effect of monetary policy in an open economy, does have a significant effect on that of fiscal policy - it does, to some extent at any rate, restore it.

### Intermediate Exchange Rate Regimes

The importance of exchange rate regimes of a type intermediate between rigidly pegged and freely floating arises because some proposed regimes (Williamson's "Crawling Peg" (4) and Cooper's "Gliding Parities" (5) for example) set maximum speeds at which the exchange rate can move. This means that any shift in CC which has to occur as a consequence of a policy which shifts the exchange rate is constrained to a certain maximum speed (it can of course proceed at less than that speed) because the shift in the exchange rate is itself constrained in speed.

The importance of this is obvious for the transition; the slower is the maximum rate of crawl, the longer is the period before full equilibrium is reached, and thus of course the longer is the period before which the power of fiscal policy is dampened.

The equilibrium solution is not, however, affected, for the relative speeds of adjustment are affected proportionally. That is to say,

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\* A change in the exchange rate of course changes the real value of the given stock of nominal cash balances. A depreciation will shift LM to the left, and an appreciation will shift it to the right. These shifts are of second order, and are ignored; but they will have a slight offsetting effect on the above results. The magnitude of the shift depends on the share of imports in the price index.

the rate of shift of CC depends on the rate of shift of XX. If the speed of shift of XX is constrained, then the required rate of shift of CC will fall exactly *pari passu*, as nothing has occurred which might affect the interest elasticity of capital flows or the marginal propensity to import, and hence the slope of CC. It should be reiterated, then, that the choice of exchange rate regime, although it does not affect the long run solution, does affect the length of the long run; that may be important for policy.

### The Reasons for Imperfect Capital Mobility

These are not mentioned in either of Swoboda's (*op.cit*) papers, but they are worth pursuing. One reason is that is plainly not behind the assumption is that capital movements are stock adjustments rather than flows. Were the movements stock adjustments, interest rates would have to rise through time to produce a continual inflow at a constant rate by promoting continual reallocation of portfolios. What is observed here is that the interest rate has to rise to increase the size of the inflow, but once the rate appropriate to the inflow has been reached it does not have to rise further to maintain the inflow as time passes.

Much more plausible is that foreigners have to be tempted to place their funds in the home country, and the more funds are required the greater must be the temptation. There is, however, a difficulty with this interpretation also. The main risk - indeed the only risk if the foreign country is a developed financial centre - of placing funds abroad rather than at home is the exchange risk. (It is assumed that home currency certainty is always sought). This can however be insured against by selling the investment and its proceeds forward for one's own currency. When this is to be done, it is the covered return that investors will look at - the return after taking account of the gain (or loss) on the forward sale. In the Swoboda analysis (and in this note so far) investors have been treated as looking

at the uncovered return.

We thus have the paradox that investors do not seem to care about exchange risk, but still have to be paid increasing amounts to induce them to place increasing portions of their portfolios in one asset. Exchange risk seems to be the only risk they are unconcerned by. That is, rather an odd assumption, and if that assumption had to be made to permit the analysis then it could very reasonably be said that the analysis was not very interesting. It is possible, however, to save the analysis from that criticism.

Investors can be thought of as looking at the covered return. Then the slope of CC depends on how this covered return moves as the domestic interest rate is increased. The various possibilities are discussed elsewhere (6 and 7) and can be briefly summarised. The covered return will tend to increase more than the interest rate if the interest rate rise produces expectations of a rise in the exchange rate, and conversely if it produces expectations of a fall; both these effects are, certainly quantitatively, hard to predict. Even in the absence of an effect on expectations of the future spot rate, the covered return will move to the same extent as the domestic interest rate only if the elasticity of supply of forward cover is infinite; except in this special case, the effect on the covered return will be somewhat dampened. This dampening is reasonably predictable in magnitude for the kind of policy considered in this paper, policy undertaken for purely domestic purposes.\*

It is accommodated diagrammatically by a steepening of CC, since

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\* This is implied by recent empirical work as well as being consistent with a priori expectations.

to raise the rate of return to foreign investors by a given amount, domestic interest rates have to rise by somewhat more than that amount.

Of course, the fiscal policy case analysed in this paper automatically has consequences for the exchange rate; it will be recollected that if CC is steeper than LM, the rate depreciates, and if CC is flatter than LM the rate appreciates. Now, market operators do not observe CC and LM; but they will come to anticipate the exchange rate consequences of a fiscal action. If CC is steeper than LM, the interest rate will have to rise by more than if the policy did not affect the expected spot rate, and if CC is flatter then the interest rate will have to rise by less.

To summarise this section, we can say that capital may be imperfectly mobile because of risk aversion, and that the slope of CC embodies forward covering to insure against this. The imperfectly mobile capital analysis can in this sense be seen as more empirically relevant, though less clear-cut in its answers than Mundell's.

Two points remain; the question of whether the "income" in the analysis is real or nominal, and to consider whether anything, other than the factors already discussed, depends on whether CC is steeper or flatter than LM.

Swoboda (3, op.cit) says that the income can be thought of as real or nominal; that it does not matter for this analysis. That is slightly too simple. If the LM curve is drawn against nominal income, then the (nominal) income elasticity of the underlying demand for money function must be unity, no such constraint applies if the income is real. In itself, that is not important for the analysis. Indeed, the government can if we wish be thought of as engaging in fiscal policy to vary the price level,

and the analysis would still appear to hold. There is, though, a problem. If the price level changes, this will affect the exchange rate, in turn affect forward covering behaviour, and thus, as described above, affect the interest elasticity of CC. This could be fairly readily incorporated to the analysis in principle, but little would be gained by doing so - the taxonomy would be multiplied while the postulated relationships between a change in the domestic interest rate and the covered rate of return could no longer be reasonably argued to be stable. The income is best thought of as real income, and price level variability introduced when it seems necessary in a particular case; the analytical framework can readily handle it. In the absence of a stable relationship between real income and the rate of change of prices, and between that and the slope of CC, there is no gain in dealing with a large number of analytically similar possible cases in advance.

Finally, we come to the relative slopes of CC and LM. Swoboda (3 and 4, op.cit) showed that these relative slopes did not matter for the case he analysed. With one minor qualification (page 6 ) the same holds here. Nothing fundamental depends on these relative slopes.

### Conclusions

It has been shown that if capital is imperfectly mobile internationally, fiscal policy retains some power in an open economy with a floating exchange rate. It has also been shown that while the choice of some regime intermediate between floating and fixed does not affect the equilibrium effect of fiscal policy, it affects the length of transition to that equilibrium. It has been demonstrated that a plausible reason for capital's being imperfectly mobile can be readily incorporated to the analysis, and that the framework can handle price level flexibility. The conclusions of the analysis are



much less clear-cut than the perfect mobility of capital case, but they are useful in that they reveal that fiscal measures are still effective under a floating rate. Even under that system, fiscal policy cannot be neglected. Of course, which analysis is empirically more relevant depends on the interest elasticity of international capital flows. On that, no convergence of empirical results has yet occurred.

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