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FLEXIBLE EXCHANGE RATES AND INTERDEPENDENCE

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ABSTRACT

The paper was prepared for the NBER-IMF conference on Exchange Rate Policy and Interdependence. It reviews the experience with flexible exchange rates and the main policy alternatives that have been suggested. The theoretical part develops a modern open economy macro model with an emphasis on capital mobility, real and nominal wage stickiness and expectations. The impact of disturbances is discussed in terms of the underlying structure, in particular, the relative role of real and nominal inflexibility.

Among the main policy alternatives the paper reviews the McKinnon proposal for world monetarism, and the band proposal. Both of these schemes are found unsatisfactory in coping with the chief problem of the current system, namely how to cope with the transition to low inflation. The alternative of capital controls, likewise, would not avoid the adverse consequences of monetary stabilization; it would only influence the particular details of the international transmission.

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FLEXIBLE EXCHANGE RATES AND INTERDEPENDENCE*

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> "The fundamental argument for flexible exchange rates is that they would allow countries autonomy with respect to their monetary, fiscal and other policy instruments... The argument for flexible rates can be put more strongly still: flexible exchange rates are essential to the preservation of national autonomy and independence consistent with efficient organization and development of the world economy."
>
> Harry G. Johnson, 1969.

In moving from exchange control and trade discrimination of the 1950s to the open economic system of the 1960s, the world economy had a brief return to the liberal order, credited with economic progress of the 40 years period prior to World War I. There can be little doubt that the 1960s were the best ten years span the world economy has experienced in this century. But the very source of the success--an actively managed macroeconomy where the monetary and fiscal mix was directed to achieve satisfactory, sustained growth--also brought the disintegration. Inflation preferences were

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irreconcilable between the US and Europe and productivity growth differentials were too large to accommodate a world economy on fixed exchange rates.

Harry Johnson's perceptive assessment quoted above, as seen from the perspective of the late 1960s, was shared widely. Flexible exchange rates were then seen as an essential further step toward a liberal world system, allowing countries to have the advantages of free markets in goods and assets and yet enjoy domestic macroeconomic independence. Now, after ten years of experience with flexible exchange rates there is much less confidence that flexible rates and domestic policy autonomy are reconcilable. Quite on the contrary, exercise of policy autonomy becomes near impossible because many countries are too small and open to accept the exchange rate variations induced by policy. Alternatively, in the case of large countries, the effects of policy are exported abroad and come to interfere with foreign internal stability. What is left of flexible exchange rates is an ability to isolate a country from the world inflation trend, but not from the effects of policies that initiate a change in trend, nor from any other disturbances.

The traditional argument against flexible exchange rates, coming from the experience of the interwar period, is that flexible rates are unstable, move about erratically, and often aggravate the macroeconomic stability problem. The experience of the last ten year would certainly lead an observer to endorse that view. Anytime there is monetary and fiscal dislocation in a major country, as has certainly been the case in the U.S., flexible rates perform poorly because they lead to excessive real exchange rate changes and to the export of inflation or deflation abroad. Flexible rates leave us with as much interdependence, or even more, as does a fixed

rate regime. This paper reviews the channels of interdependence and asks in what directions we should look for a system that maintains an open world economy but more effectively comes to terms with the priority of national policy autonomy that is accepted as a fact.

There are broadly three avenues: we can make exchange rates more fixed, we can make them less flexible, or we can take the route suggested by Modigliani and Tobin in limiting the incentives for shortrun capital mobility permanently or on an ad hoc basis. It seems certain that free market economics bar consideration of a capital account tax as embodying a wicked infringement on individual freedom. It is also likely that US macroeconomic policies, and policies abroad, remain unpredictable and uncoordinated to an extent that precludes establishment of an exchange rate band or even fixed rates. What is left then is the spirit of Versailles; that there may be circumstances where it is not impossible that there might be intervention which could turn out not to be small. In the meantime, in a more constructive direction, there is a strong case for a different domestic policy mix to go with flexible rates.

1. The Channels of Interdependence

In this part we sketch a model of interdependence on the aggregate demand and supply side. The purpose of the model is to draw attention to distinct channels and to identify the parameters that are of relevance in assessing the importance of these sources of interdependence. We first consider a standard macroeconomic model, focussing on prices, aggregate demand, perfect asset substitutability and rational expectations. Extensions follow in subsequent sections.

Exchange Rates, Employment and Wages[1]

To study cyclical interdependence we take the perspective of a country that faces a given world rate of interest given import prices, and a given world demand (except for real exchange rate effects) for its exports. The log linear model is presented in equations (1) and (6):

$$(1)\quad y = a\theta - br + f \qquad ; \theta \equiv e+p^*-w$$

$$(2)\quad m-q = hy - ci$$

$$(3)\quad q \equiv \beta w + (1-\beta)(e + p^*)$$

$$(4)\quad r \equiv i-\dot{q}$$

$$(5)\quad i = i^* + \dot{e}$$

$$(6)\quad \dot{w} = \gamma y + \alpha(q-w)$$

Equation (1) is the IS schedule with θ the real exchange rate, and f a domestic or foreign shift variable. The real interest rate is r. The LM schedule is represented in equation (2) where the price level is given by q. The price level is a weighted average of domestic prices, which are set equal to wages, and of import prices. Equation (4) defines the domestic real interest rate and (5) expresses the assumption of perfect asset

[1] This section combines sticky price, rational expectations models of exchange rate dynamics and the sticky real wage literature. See Sachs, (1979), Branson and Rotemberg (1979), Dornbusch (1980), Argy and Salop (1979), Buiter and Miller (1981, 1982), Marston (1982), Modigliani and Padoa Schioppa (1978) and Obstfeld (1982).

substitutability with an adjustment made for anticipated depreciation. Wage dynamics are specified in (6) and are linked to the GNP gap, y, and to the level of real wages. The term q-w represents a rigid real wage effect.[2]

This model is appropriate to shortrun, cyclical issues. It neglects trend inflation, foreign inflation, productivity growth and the impact of capital formation. It concentrates on aggregate demand and the cyclical interaction between wages, interest rates and exchange rates. At any point in time, given home wages, money, and fiscal policy there is a level of the exchange rate and a rate of depreciation that satisfies the international interest rate relation. The level of wages and the exchange rate determine the external competitiveness and hence aggregate demand and employment. The system can be simplified by noting the relation between home and foreign interest rates:

$$(7) \quad r \equiv r^* + \beta\dot{\theta} \; ; \quad i = r^* + \dot{\theta} + \dot{w}$$

The model is slightly more complex than the extended Mundell-Fleming model because of two modifications. On one hand care is taken to allow an impact of import prices on the price level used to deflate real balances, real wages and to define the real rate of interest. On the other hand the domestic producer price index (which here is the wage) responds not only cyclically but also in reaction to the level of the real wage.

The role of wage behavior can be appreciated by looking at the longrun behavior of the system as shown in Figure 1. For a given world

[2]By choice of units the foreign price level and the level of full employment output are equal to one and thus their logs are zero.

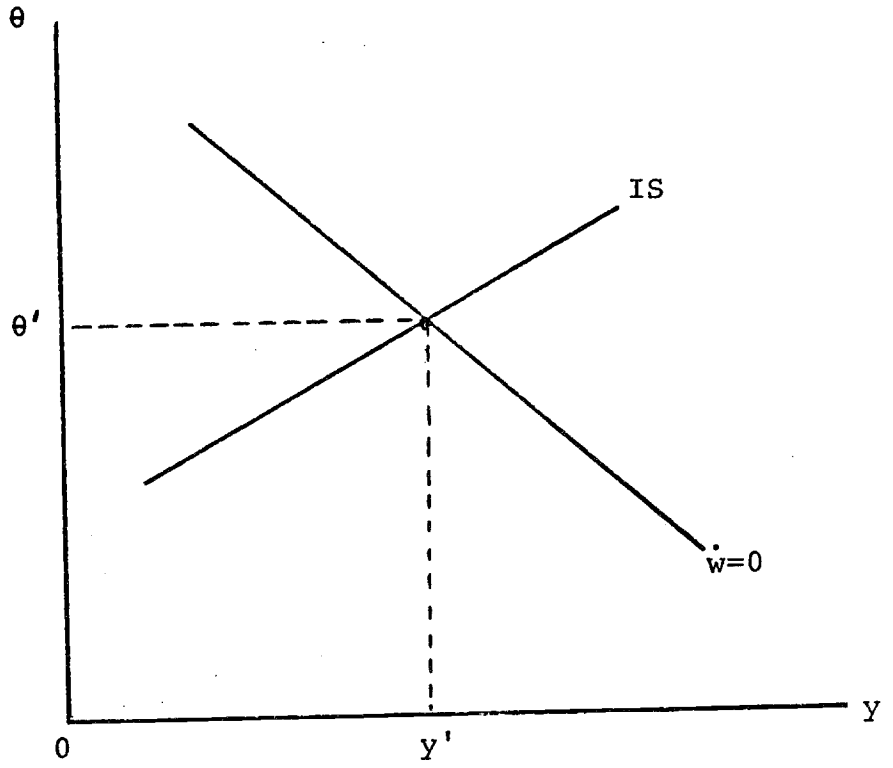

FIGURE 1

interest rate the IS schedule shows equilibrium in the domestic goods market. A real depreciation creates excess demand that is met by an increase in output. Along $\dot{w}=0$ money wages are constant. A real depreciation, because it reduces real wages, leads to wage increases. To keep wages constant the reduction in the standard of living due to depreciation must be offset by unemployment that dampens wage demands. Hence $\dot{w}=0$ is downward sloping. The slope of the constant wage schedule is determined by the relative response of wages to the cyclical position and to the standard of living via the real exchange rate:

$$(7)\quad \left.\frac{d\theta}{dy}\right|_{\dot{w}=0} = \frac{\gamma}{\alpha(1-\beta)} \equiv \lambda$$

The pattern of wage response will determine the longrun effects of disturbances on output and the real exchange rate. A reduction in foreign demand or a rise in world interest rates, for example, will shift the IS schedule up and to the left. The decline in employment is larger the flatter the $\dot{w}=0$ schedule or the smaller the cyclical responsiveness of wages relative to the real wage stickiness as measured by the parameter λ. If the wage is cyclically highly responsive and real wage rigidity is near absent, λ tends toward infinity and the economy behaves as one with full wage and price flexibility which ensure rapid adjustment to full employment. Conversely, when cyclical flexibility is small and real wage resistance operates strongly, λ tends toward zero. Adverse disturbances then can lead to a large impact on the price level combined with unemployment.[3]

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[3] From equations (1) and (6), setting $\dot{w}=\dot{\theta}=0$ we obtain:
$y = (f-br)/(1+a\lambda)$

The model in equations (1) to (6) can be reduced to the behavior over time of money wages and of the real exchange rate. (See the Appendix.) In Figure 2 we show the dynamics by reference to the loci along which wages and the real exchange rate respectively are constant. Moving up and along the $\dot{w}=0$ schedule an increase in the wage raises the price level and thus reduces real balances and exerts a deflationary pressure that causes wages to be falling unless a cut in the real wage due to real depreciation exerts an offsetting impact. The schedule FF represents the stable trajectory under perfect foresight. Given any initial money wage the corresponding point on FF shows the equilibrium level of the nominal and real exchange rate such that the economy converges to longrun equilibrium at point A.

At a point like B, for example, the wage is low and thus the price level tends to be low making for high real balances, and low nominal interest rates. To maintain international interest parity the exchange rate must be appreciating, but that means the real exchange rate is above the steady state level. At a point like B, as we can verify from the Figure, the real exchange rate favors the home country and by (7), because of real appreciation, the real interest is below the world level. Thus aggregate demand and employment are high. High employment and the high real exchange rate or low real wage exert upward pressure on the wage pushing the economy toward point A.

The framework can now be used to investigate the impact of foreign disturbances on home wages and employment. In Figure 3 we study the effect of an increase in foreign interest rates. The case we analyze is that where wages in the longrun increase, and the exchange rate depreciates. As the

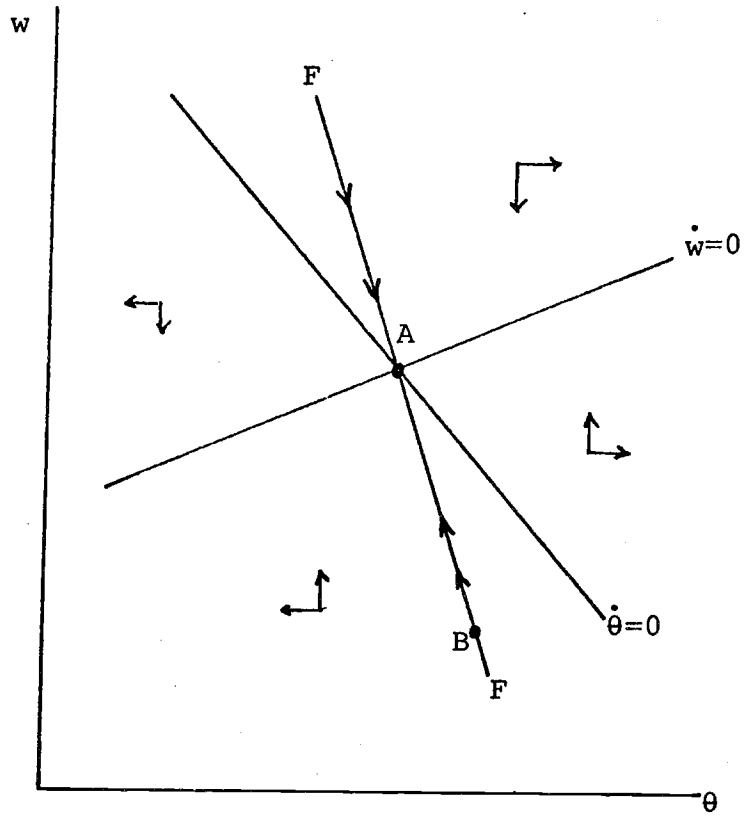

Figure 2

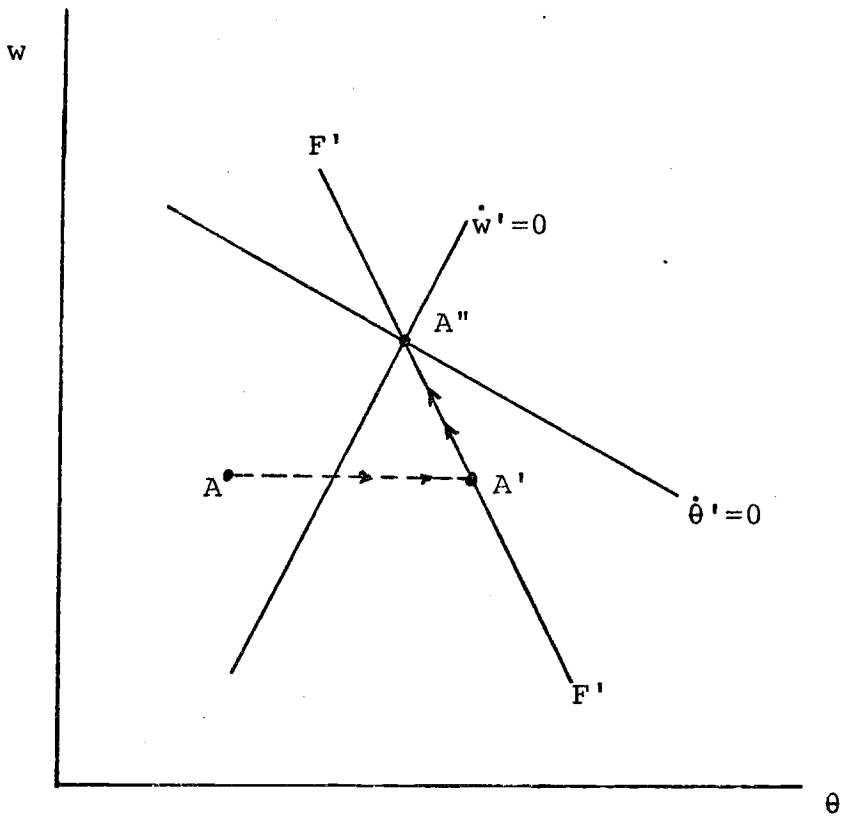

Figure 3

Figure shows the exchange rate will overshoot, moving immediately from the initial equilibrium at point A to a shortrun equilibrium at A'. The rise in foreign interest rates creates an incipient capital outflow that leads to exchange depreciation. At point A' home interest rates will have risen somewhat and there is now expected appreciation thus assuring a sufficient return on domestic securities. Changes in employment and in the standard of living combine to generate wage pressure that moves the economy over time to A". In the longrun, of course, there will be some unemployment.

The adjustment pattern is shaped by all the parameters including in particular the dynamics of wages, income and interest responses of money demand as well as the price elasticity of demand for goods. What is crucial to the initial behavior of the exchange rate is the longrun adjustment of money wages. If wages, increase in the longrun then the exchange rate must overshoot in the shortrun as shown in Figure 3. By contrast, if in the longrun wages decline, then there will be an immediate depreciation of the nominal and real exchange rate, but a more moderate one. In the subsequent adjustment process the exchange rate will continue to depreciate. This case is shown in Figure 4.

It is interesting to note now that one of the two--exchange rates or unemployment--must overshoot. In the case of Figure 4 unemployment must overshoot because at point A" the real exchange rate is depreciating, which means that real interest rates are above the world level, and the real exchange rate is below its longrun level. For both reasons demand and hence employment at A' will be less than at A" the final equilibrium. Exactly the opposite occurs at A' in Figure 3 where employment is above the new longrun

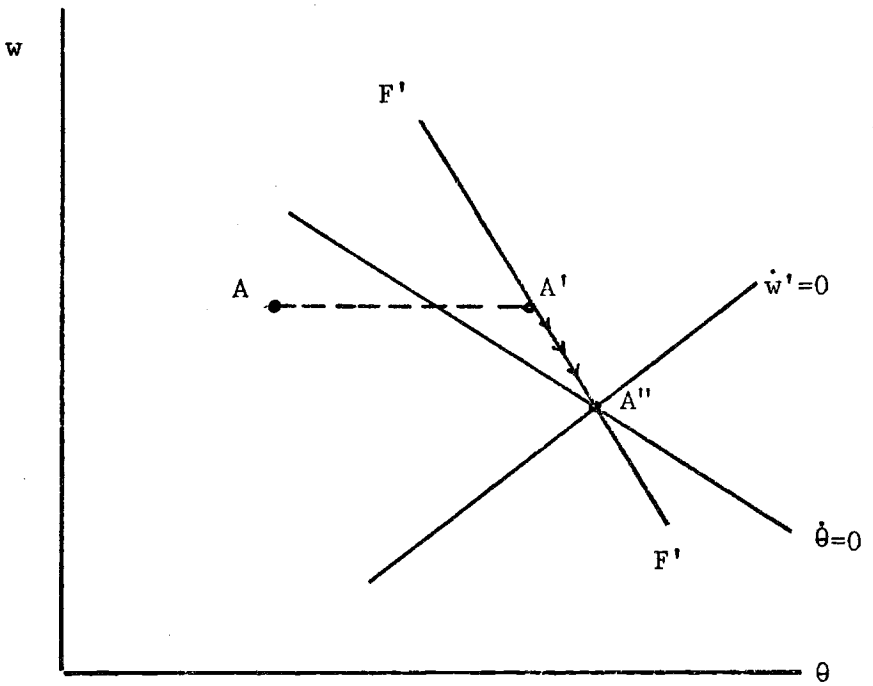

Figure 4

level. It is not certain, though, whether it is possible for employment to actually rise relative to the initial equilibrium at A.

The overshooting in exchange rates or employment makes it interesting to ask what factors would make one or the other case more likely. As noted the outcome depends on the longrun adjustment of wages and that in turn depends on several parameters. A high price elasticity of demand implies small changes in equilibrium real exchange rates and therefore relatively little pressure on wages and output. A high price elasticity thus implies a longrun increase in wages to accommodate the reduced demand for real balances and therefore exchange rate overshooting as shown in Figure 3. A high interest rate elasticity or income elasticity of money demand works in the same direction. By contrast, a high cyclical relative to real wage response of wages, implies the possibility that wages could fall in the longrun.[4] In the same way we can analyze the impact of foreign demand disturbances or changes in domestic fiscal policy. Again we find the possibility of employment or exchange rate overshooting depending on the pattern of wage flexibility relative to the parameters of aggregate demand.

The effects of disturbances on domestic employment, and wages will presumably differ depending on the direction of change. We would expect an asymmetry in the real wage resistance in that workers accept gains in real wages but resist cuts. This extends also to the cyclical behavior of wages; wages rise more rapidly in a boom than they fall in a recession. In terms of the model this amounts to saying that the coefficient of wage flexibility, λ,

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[4] See the appendix for the longrun solutions to w and θ.

depends on the cyclical and real wage position. Specifically, starting from full employment a fall in foreign demand or higher world interest rates will lead to unemployment and to a decline in real income. But a rise in foreign demand or a fall in rates brings about a real appreciation at full employment rather than a lasting real appreciation beyond capacity.

The asymmetry issue is of relevance once we consider transitory disturbances. Suppose, for example, that a transitory rise in world demand, because of a boom abroad, leads to a real appreciation at full employment. Once the boom abroad subsides the issue arises whether workers are willing to accommodate themselves to a cut in real income as is brought about by the ensuing real depreciation. There is no reason to dismiss the possibility of a ratchet effect in the operation of real wage resistance.

But if ratchet effects are present the cyclical variability of real exchange rates, as occurs under flexible exchange rates, brings with it the necessity of considering an incomes policy that accommodates the changes in the standard of living associated with real exchange rate movements. Alternatively, active fiscal policy needs to be used to stabilize real exchange rates over the cycle to avoid the real appreciation that cannot, afterwards, be undone without adverse effects on employment. But that, of course, raises the question whether there is more fiscal resistance than real wage resistance. In any event, the point is that transitory disturbances abound, that transitory real appreciation because of high demand raises the standard of living cyclically and that instruments are necessary to dampen or to accommodate the subsequent decline.

So far we have taken the case of a country that takes as given world demand and interest rates. It is worth commenting briefly on the changes

brought about by repercussion effects. Without going into details we remember the Mundell-Fleming results that with prices given, a monetary expansion in one country has adverse employment effects abroad. Conversely, a fiscal expansion spills into increased employment abroad. These results depend critically on the behavior of the real money stock in each country. They are not sturdy the moment import prices enter the real balance deflator. Specifically, as a fiscal expansion spreads abroad through real appreciation it reinforces the expansion in the initiating country but it reduces real balances abroad, thus tending to confine the expansion. If real wage resistance is an issue this adverse effect of depreciation is strongly reinforced. By contrast a monetary expansion now may raise income abroad.

Interest Rates and Risk Premia

The discussion in the previous section was based on the assumption that securities are perfect substitutes once anticipated exchange depreciation is taken into account. Under that assumption real interest rates are equalized in longrun equilibrium and in the shortrun can only differ by an amount equal to the rate of change of the real exchange rate. But the assumption of perfect asset substitution is not warranted once real exchange rates fluctuate.

Movements in real exchange rates introduce negative correlation in the real returns of domestic and foreign securities and thus create an incentive for portfolio diversification. Only in a very special case, with relative asset supplies matching the minimum variance portfolio shares and with identical consumption baskets across countries will there be no risk premium. In general, there is a risk premium which is related to relative asset supplies and to the distribution of world wealth.

In the presence of a risk premium the interest rate relationship becomes:

$$(8) \qquad i = i^* + \dot{e} + \rho(V/E\tilde{W}, W/E\tilde{W}) \; ; \quad \rho_1 > 0 \quad \rho_2 < 0$$

where V and W denote respectively domestic outside debt and domestic wealth each measured in home currency and $\tilde{W}$ denotes world wealth measured in foreign currency. Equation (8) thus introduces a relationship between interest rates, expected depreciation, the level of nominal exchange rates, nominal wealth and asset supplies. Where in the earlier model nominal money was the only asset to play a role, now the supply of domestic outside nominal assets appears.[5] An increase in the relative supply of domestic assets, $V/\tilde{W}E$, must be accommodated by a more rapid rate of appreciation or by a higher nominal interest rate differential or else must be offset by depreciation of the level of the exchange rate.

The link between exchange rates and portfolio balance can be inferred from (8) taking the case of a small country so that the level of world wealth, $\tilde{W}$, is taken as given. Furthermore assuming given interest rates and a given rate of depreciation, $i-i^*-\dot{e}$, we can find the relation between changes in domestic currency asset supplies, changes in wealth and the corresponding changes in equilibrium exchange rates:

$$(9) \qquad \hat{E} = \hat{V} + \frac{\rho_2}{\rho_1+\rho_2}(\hat{W}-\hat{V})$$

[5] For references to the extensive risk premium literature see the review in Dornbusch (1982) and Krugman (1980).

Equation (9) shows that for a given depreciation adjusted interest differential an increase in domestic currency assets and wealth, in the same proportion, leads to equi-proportionate depreciation. An increase in wealth, given assets leads by contrast to appreciation. An increase in wealth, via domestic habitat effects reduces the risk premium and thus brings about appreciation; an increase in domestic currency asset supply, on the contrary, leads to a higher risk premium and thus leads to depreciation.

The risk premium introduces two important considerations. The first is that the composition of domestic assets between money and debt (money being the medium of exchange with a specific demand) matters and that therefore open market operations exert an effect on exchange rates independently of the change in money. We can think of this point in the following manner: The macro-model sketched above determines interest rates as functions of the real money stock and real income. The model is closed by finding an exchange rate that satisfies the macromodel and the risk premium equation. An increase in debt, or in home relative wealth, then must affect both interest rates and exchange rates.

The second role of the risk premium is to introduce a link between wealth distribution in the world, interest rates and the exchange rate. A rise in home wealth leads to changes in both interest rates and exchange rates. Interest rates at home decline and/or the exchange rates appreciates. This effect is added to the macromodel and provides a channel through which dynamic effects associated with the current account and the budget have implications for the exchange rate.

Intervention policy must be considered in relation to the risk premium. Intervention in that perspective takes one of two forms: if purchases of

foreign exchange are allowed to change the home money stock we have one set of results where intervention will be effective. But if there is sterilisation there is an implication for the relative supply of domestic debt and thus for the risk premium. Sterilized intervention, as has been argued, is simply a reshuffling of the composition of domestic government liabilitites. It has an effect on exchange rates only through the impact on the risk premium. Thus it can work only under the conditions in which a risk premium exists. Moreover the effectiveness--bang per buck--depends on risk aversion being high and variability of real interest differentials being large. Thus intervention policy works well when uncertainty is large and risk aversion is pervasive.

The risk premium has been singled out as an important channel through which the current account has effects on the exchange rate. While the current account thus qualifies in principle as a determinant of exchange rates it stands to reason that changes in wealth from sources other than the current account should really move to the center of attention. In particular capital gains from movements in the stock market certainly have an overwhelmingly larger impact on relative wealth than does the current account. In addition to the stock market, we would think of total domestic saving as a source of changes in relative wealth. Again as a share of saving the current account is typically, though not necessarily, small. Except in those particular cases a special role for the current account, via the risk premium, seems a largely exaggerated source of exchange rate movements.

Third Country Effects

The perspective so far has been that of a country faced with external shocks. We now move to the perspective of the system to recognize another

important cyclical source of interdependence that arises from the behavior of materials prices and import demands of peripheral countries. These countries are predominant exporters of materials and importers of manufactures. They are also debtors.

Table 1 reports regressions of various measures of the real prices received by LDCs as they are affected by the world business cycle, the real price of oil and the real U.S. dollar exchange rate. The cyclical variable is the OECD unemployment rate and the real exchange rate is measured by the IMF relative wholesale prices in manufacturing of the U.S. relative to trading partners. In equation 1. we show the export relative to import prices of non-oil LDCs. The real oil price and the real dollar exchange rate are significant explanatory variables: a dollar appreciation or a rise in real oil prices deteriorate LDCs' terms of trade. So does a rise in OECD unemployment although here the coefficient is not precisely estimated. Equation 1. shows that a one percent real dollar appreciation would deteriorate LDC terms of trade by one-third of a percent. This is, of course, a very sizeable effect.

In equation 2., the dependent variable is the IMF index of the prices of all commodities deflated by the dollar price of manufacturers exports of developed countries as reported by the UN. Again we see a significant adverse impact on the real prices of materials for real dollar appreciation. For this measure of the real price, a one percent real dollar appreciation leads to a nearly proportional deterioration in real commodity prices. In equations 3. to 5. we show that the results are not altogether sturdy but differ significantly across commodities. Equation 3. reports the results for

the index of 33 commodities of the World Bank deflated by the dollar prices of manufactures as in 2. The results are substantially the same as in 2. The index is made up of agricultural commodities (70.6%), metals and minerals (24.3%) and timber (5.1%). Equation 4. and 5. show that real dollar appreciation leads to an increase in the real price of minerals and metals, but to a decline in the real price of agricultural commodities. The latter, presumably because of their large weight, carry the results in the regressions for the total commodity group. The difference in the more disaggregated results suggest that the whole question is in need of more study including the important issue of using alternative cyclical variables.[6]

[6] In using residuals from a regression of the OECD industrial production index on two time trends as the cyclical variable regressions performed more poorly in establishing significant determinants of the lefthand side variable.

Table 1 Real Commodity Prices and the Dollar
(Annual data, 1964-1981)

	Constant	OECD Unemployment	Real Oil Price	Real $ Rate	R^2	DW	Rho^1	Rho^2
1. Terms of Trade	1.64	-0.01	-0.0001	-0.31	.76	1.79		
	(.70)	(.02)	(.0004)	(.14)				
2a. Real Materials Price (IMF)	9.04	-0.06	--	-0.88	.39	1.94	.07	
	(1.58)	(.028)		(.32)				
2b. Real Materials Price (IMF)	2.96	-0.15	0.16	-0.78	.68	2.17	.28	-.73
	(1.31)	(.03)	(.05)	(.26)				
3a. Real Materials Prices (Bank)	2.22	-0.05	--	-0.64	.25	1.81		
	(1.63)	(.023)		(.34)				
3b. Real Materials Prices (Bank)	-1.18	-0.16	0.19	-0.49	.66	2.02	.29	-.59
	(1.36)	(0.03)	(.05)	(.27)				
4. Real Minerals & Metals Prices	-4.53	-0.20	0.22	0.78	.89	1.97		
	(1.30)	(.027)	(.05)	(.26)				
5. Real Agricultural Prices	3.71	-0.04	--	-0.98	.28	1.85	.15	
	(2.0)	(.03)		(.41)				

Note: Standard errors in parenthesis. For data description see text and appendix. The left-hand side variable and the real $ exchange rate are expressed in logs. So is the real oil price except in equation 1. Rho^1 and Rho^2 are the coefficients for correction of first and second order serial correlation corrections.

Consider now how these third country effects operate in the case of, say, a US tightening of monetary policy. Tightening of money would lead to an increase in nominal and real interest rates in the US and to a slowdown in demand. The dollar would appreciate in nominal and real terms. We have already seen the direct effects on industrial countries of higher interest rates and reduced exports: they unambiguously translate into unemployment unless there is no real wage rigidity. But now we have additional effects that arise from the impact of US events on the material producing, debtor countries. Higher real interest rates worsen those countries' current accounts. This is reinforced by the decline in industrial countries demand for both manufactures and materials. Finally this is reinforced by the effect of the dollar appreciation on the real prices of materials. The combination then is quite devastating for material exporting debtor countries. Typically they will require to confine their own growth because of balance of payments constraints.

As seen from the perspective of industrial countries the adjustments in material exporting debtor countries have two sides. For industrial countries as a group there is a direct terms of trade improvement relative to material exporters, both cyclical and because of dollar appreciation. This gain may, however, be dampened in part and perhaps substantially by the decline in LDC imports of manufactures.

Changes in the real price of commodities in the cycle or as a by product of changes in key exchange rates play an important role in relation to real wage rigidity. The deterioration in the LDCs' terms of trade may well be an offset to some of the real income loss an individual industrial country experiences as a result of say higher US interest rates.

Bubbles, Pesos and Runs

The preceding sections focussed on actual changes in exchange rate fundamentals, cyclical or permanent, that affect goods or asset markets and from there spill to the rest of the world through asset demands, goods demands, exchange rate movements and prices. But many of the disturbances in the world economy are not the result of actual changes in fundamentals but rather of changes in expectations about the future course of these fundamentals. These revisions in expectations exert as powerful effects on interdependence as do actual changes in fundamentals.

When asset markets are dominated by expectations about the future course of fundamentals, exchange rates may move in ways that do not promote macroeconomic stability. Three prospects of this possibility deserve special attention. The first is familiar from the recent literature on financial markets and concerns the possibility that exchange rates, in part, are determined by irrelevant information. Market participants may have the wrong model of fundamentals and their expectations, based on the wrong model, will affect the actual exchange rate. If there is sufficiently high serial correlation in the irrelevant variables it may be impossible to discern the systematic forecast errors by convential efficiency tests. But it is also the case that the exchange rate would be significantly more volatile than is warranted by the true model.

This point is important because market participants may be impressed by one or the other plausible fundamentals variable, attribute explanatory power to it and, through their expectations, make their expectations actually come to be true. Then, when some other variable moves, attention shifts to different "main factor" which in turn comes to dominate the exchange rate for

a while. Exchange rates carried by irrelevant beliefs are troublesome not only because of the excess variance but also because the shifting from one irrelevant factor to another will precipitate major exchange rate collapses. The possibility that exchange rates are sometimes far off fundamentals cannot be discounted. It is important to recognize because we may have given excessive weight to the notion that the market knows "the model" and at the same time is rational. It is quite conceivable that a number of fashionable factors such as "fiscal discipline," "basic monetary control," "longrun strength in manufacturing," "Angebotsfreundliche Gesellschaftspolitik" all play their role, one at a time.

The second source of disequilibrium exchange rates arises from expectations about the possibility of regime changes and has been called the "peso problem." In this perspective exchange rates are influenced by current fundamentals but also by agents' expectations that these fundamentals may change, with given probabilities, in specific directions. If market participants have sufficiently strong beliefs that a given course of policy will not be followed they may, in fact, make it impossible to follow that course. Under flexible exchange rates this problem is acute because the exchange rate is so flexible a price and so much governed by expectations. It may well be argued, as have been indeed in the discussion of the French stabilisation experience under Poincare, that speculators are the true judges of fundamentals and that a collapse of the exchange rate brought about by adverse capital flows is irrevocable evidence of a program of stabilisation that lacked in fundamentals. But that view is certainly simplistic once it is recognized that stabilisation policy has a wide range of indeterminacy.[7]

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[7] See Flood and Garber (1982, 1982b), Salant and Henderson (1978), Lozondo (1980) and Blanchard (1982) for discussions of regime change.

The third way in which exchange rates can deviate from equilibrium corresponds to the notion of bubbles. Here holders of an asset realize that the asset is overpriced, but are willing to hold it in the expectation that there will only be some probability of a collapse to fundamentals within a given holding period and that there is an expectation that the asset can be passed on with capital gains sufficiently large to reward the risk of a collapse.[8] Bubbles correspond to a situation where a currency has appreciated beyond what can be considered fundamentals, where an overvaluation is widely thought to prevail, but where continuing appreciation is underway until some disturbance causes the crash. There are no models of the crash as yet but it must be clear that an essential ingredient is the arrival of new information that diverts a sufficient number of speculators from keeping the bubble growing.

Bubbles, peso problems and irrelevant information all have in common that they take the exchange rate way from the particular equilibrium implied by current fundamentals. In each of these cases there is a reevaluation of the beliefs and when this occurs exchange rates move a lot, move a lot relative to fundamentals, and therefore may force an accommodating change in policies. Unless policies are very exogeneous, instability of policies may be provoked by instability of expectations. That means flexible exchange rates may require as an institutional setting much more exogeniety of policies than in fact exist today. Without such an anchor flexibility of exchange rates may aggravate macroeconomic instability.

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[8] See Tirole (1982) and Blanchard (1979).

II. Coping With Interdependence

In the late 1960s discussion of international monetary arrangements centered on the idea of "flexing" the system. Exchange rates were too fixed to be compatible with an overvalued dollar and the one-way street that overvaluation created for internationally mobile, speculative capital. Today much of the debate starts from the recognition that it is desirable to reduce the excessive fluctuations in exchange rates that exert undesirable interdependence effects. The quest then is for flixed exchange rates: the optimal exchange rate regime would prevent persistent overvaluation or undervaluation of a currency which would ultimately lead to protection or an undesirable monetary-fiscal policy mix. The rate system would also have to be flexible enough to yield longrun inflation autonomy. But at the same time shortrun real exchange rate variability should be reduced and export of inflation through appreciation would be limited. There is little question that a flexible exchange rate system has desirable longrun features and that these should not be easily sacrificed. But at the same time the shorturn implication of dissynchronised policy actions are suffficiently severe to raise the question whether exchange rates are too flexible at present. That question of course can be answered only relative to a set of alternative arrangements.

Among alternatives to the present system there are three lines of reform: a return to fixed or quasi-fixed rates, limitations on the incentives to move capital, and limited exchange rate flexibility. We comment briefly on aspects of each of these.

A return to outright fixed exchange rates appears adventurous. It would be rendered difficult because of large discrepancies in inflation rates among

key industrial countries. The willingness to impose trade restrictions seems striking confimation that there is no disposition among major industrial countries to abide by rules. An outright commitment to peg would yield at best a variety of EMS. The difficulties in a fixed rate system are aggravated by the instability in at least two key-countries, the U.S. and the U.K.

An alternative to fixed rates has been proposed by McKinnon (1982). He argues that exchange rate instability and instability of world inflation are the outgrowth of misconceived monetarism. The right kind of monetarism would look at the world quantity of money. Specifically he argues (p. 331):

> "... the solution to international currency instability is straightforward: the Federal Reserve System should discontinue its policy of passively sterilizing the domestic monetary impact of foreign official interventions. Instead, a symmetrical non-sterilisation rule would ensure that each country's money supply mutually adjusts to international currency substitution in the shortrun without having official exchange interventions destabilize the world's money supply."

The basic premise of this prescription, and its flaw, is that it assumes that exchange rate instability is induced by shifts in the currency denomination of the public's money holding, i.e. currency substitution. But surely international currency speculation is not carried out by shifts between different country's Ms, but by shifts between interest bearing assets. The proposal also encounters the non-negligible issue of the transition to low inflation in the U.S. It certainly does not help to overlook that inflation today, in the U.S., is significantly higher than it is in Japan and in

Germany. As noted above, however, monetary policy seeks to achieve a transition to low inflation and it is the byproduct of that transition which causes the real exchange rate havoc.

Proposals for more limited exchange rate flexibility take the form of intervention rules. They may either involve an exchange rate band (fixed or moving) with full intervention at the margin and none in between, or they involve an intervention rule that seeks to dampen exchange rate movements relative to some notion of a fundamentals-rate.

Proponents of band-proposals are reluctant to specify how it is that the band would actually be set. They emphasize, as does Bergsten (1982, p. 11):

> "there is no suggestion here of a return to fixed exchange rates, nor even to seeking "correct rates" with narrow margins. It should be possible, however, to reach international agreement on the existence of "wrong rates"--as was done in November 1978, and seems largely possible today. Rates could then be pushed back toward appropriate zones through direct intervention, alterations in domestic policies and public announcements."

One objection to an exchange rate band is that such an arrangement actually promotes exchange rate instability within the band. The presence of a band reduces risk to portfolio holders and therefore increases portfolio shifts in response to perceived changes in mean returns. Thus given random movements in mean return expectations there will be more exchange rate variability within the band than would be the case without such limits and the larger risk of speculation. Moreover, it is not clear why a rate should be allowed to go too far, only to be pushed back afterwards. If there

can be agreement on what is too far then there can be agreement on a limiting point. But of course that is precisely where national interests may differ as the case of the U.S. dollar throught the 1960s has shown so clearly. It also stands to reason that authorities who take a view on what is a rate that has gone too far will take a view on what is too rapid a return. Thus intervention might dampen the correction of exchange rates and in this way too reduce the risk of speculation, thus enhancing actual capital flows.

The basic objection to a band proposal is that it makes no sense to set limits for exchange rates and not for other key macroeconomic variables. Exchange rate targets without an accompanying, well understood macroeconomic support program can hardly be accepted to be effective. Macroeconomic policies geared exclusively to exchange rate targets rather than a broader range of targets including real interest rates, the real value of the stock market, inflation and unemployment, may well deteriorate macroeconomic performance. In the absence of such a broader spectrum of targets one can only expect the poor results from intervention policy observed, for example, in the 1979 Carter period of overexpansion.

An alternative approach to limited exchange rate variability is based on the idea that it is possible to extract, at least approximately, from market data the sources of disturbances in the exchange rate. To the extent that these disturbances are portfolio shifts between currency denominations they should be accommodated by intervention. This is the standard argument known from the literature about interest rate versus money stock targets. In that context the rule is to peg interest rates, allowing money to vary, if disturbances are primarily financial. In the present context the rule is to stabilize exchange rates if disturbances are primarily portfolio shifts rather than events that call for changes in the equilibrium real exchange

rate. Specifically, if disturbances can unambiguously be identified as shifts between domestic and foreign currency debt, the appropriate policy is sterilized intervention keeping the exchange rate as well as interest rates fixed. The same would be the case for portfolio shifts between home money and home securities although this would not require intervention.

Once, however, disturbances are both real and financial and identification becomes ambiguous the case for rigid intervention disappears. Formal models, in these mixed cases, suggest that managed floating becomes the optimal exchange rate regime.[9] The extent to which the exchange rate would be more nearly fixed depends on the relative variability of real and financial shocks, the authorities' concern with the composition of aggregate demand as well as the level of activity and the certainty about the structure of the economy. The strong case for sterilized intervention that arises when all disturbances are pure portfolio shifts disappears and leaves little in terms of sturdy rules.

Intervention policy cannot cope with the main source of exchange rate movements, namely divergent national monetary policies. When money is tightened in one country to reduce inflation, the financial disturbance is in fact deliberately produced by the govenment in the hope of reducing inflation. Moreover, the initial real appreciation, because it reduces inflation, is a welcome part of the disinflation process. Intervention would mean forcing the monetary contraction on the rest of the world even though cyclical conditions abroad may not call for tight money. Of course, the rest of the world might pursue tight money to stabilize the exchange rate but at the same time implement a fiscal expansion to maintain aggregate demand in

[9] See Henderson (1982) and Frenkel (1976).

the face of higher interest rates and lower net exports. This policy is open to the objection that fiscal policy is overused and that cyclical expansions can rarely be undone.

III. Concluding Remarks

The preceding discussion argues that active policy measures, as much as the business cycle itself, cannot fail to spill from one country to another, whatever the exchange rate regime. What the exchange rate regime does determine is the particular shape of the spill-over, namely whether it takes the form primarily of a decline in employment with relatively unchanged competitiveness and inflation, or whether there are large changes in inflation and real exchange rates (and therefore in real income) but relatively smaller changes in employemt. It is in this area that fixed and flexible rates differ sensitively and interact with the domestic structure, in particular real wage rigidity. It is here that one has to recognize Mundell's (1968) point that the case for flexible exchange rate rests fundamentally on money illusion, in the sense that there is an absence of real wage rigidity.

Flexible exchange rates can work well when financial disturbances are identifiable and can be accommodated by the appropriate sterilized intervention and when, in addition, real disturbances can be met by changes in real exchange rates that do not conflict with full employment. Failing these two requirements there are longrun advantages of a flexible rate system. But there are also shortrun costs, possibly high, that come from the very fact that the exchange rate is too flexible. These shortrun costs in turn are higher the more policymakers, mistakenly, believe that flexible rates are tantamount to macroeconomic independence. If this is the case,

flexible rates may well be a disintegrating force in the world economy. This was recognized already in the 1960s when the German government noted:

> "Fixed exchange rates are an indispensable element in a world committed to integration; with a system of flexible rates the existing readiness to cooperative and integrate might be destroyed at the first appearance of serious difficulties since flexible rates would offer such an easy opportunity for isolated action."[10]

If flexible exchange rates, in the course of stabilisation policy, lead to excessive real exchange rate changes, and if these are the source of adverse spill-over effects, a reduction in the incentives to move capital international may be a remedy. The case for restrictions on international capital flows of one kind or another is old. Specifically, Modigliani (1972) argued:

> "...there may arise a need, at least in the shortrun, for holding private capital movements in line with the achievable transfer of real capital. To achieve this goal, without outright limitation on the freedom of capital movements, countries could rely on general fiscal policy as one of the possible devices for influencing incentive to capital movements. But they should also be allowed to opt, just as freely, for the alternative approach relying on specific tax and related incentives, which, we have argued, is likely to be superior under most circumstances."

The same view has been articulated by Tobin (1978) and Liviathan (1979).

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[10] Quoted in Cooper (1968), p. 223.

The argument for specific taxes to reduce the incentives for international capital flows has been objected to on three grounds. The first, and most serious, is that they limit exchange rate movements and therefore imply a transmission of macroeconomic disturbances through the current account. A tight money policy in a large country would lead to a decline in real income world-wide as would be the case under a regime of fixed exchange rates thus avoiding the effects of exchange rate movements on real wages and on the price level. The second objection argues that taxes on capital flows cannot work because they lead rapidly to all kinds of evasions including offshore markets. There is no doubt truth to that objection, although its force is limited in the case of transitory taxes, as would be appropriate during a period of divergent policy in a particular country.

The last objection to interest equalization taxes is that they interfere with the efficient operation of the world capital market. This argment, I believe, is actually wrong. It mistakes the shortterm money market rate for the social productivity of capital. Suppose a country reduces money growth and this leads to an increase in the interest rate on financial assets, as it will. Incipient capital flows will lead to currency appreciation and a current account deterioration financed by borrowing abroad.[11] It is hard to argue that the current account deficit is a reflection of enhanced investment opportunities or increase time preference that, in an efficient and integrated capital market, would call for redirection of lending toward the home country. On the contrary, the decline in demand will have reduced the profitability of domestic real capital. It therefore would not be optimal

[11] See Dornbusch (1980) or Buiter and Miller (1981, (1982).

for capital to flow toward the country practicing a monetary tightening. A policy intervention, in these circumstances, could well enhance the efficiency of capital allocation in the world. Needlesss to say this is an area where not much research has taken place to date.

But even if restrictions on capital flows were imposed, and as a consequence less of the adjustment took place through relative prices and adverse spill-over effects on inflation, there would still be transmission of disturbances through the current account. The simple fact is that, whatever the exchange rate regime, there will be transmission of real disturbances in some form. This suggests that the proper search might be for a policy mix that makes disinflation less of a real disturbance. The answer that is being widely suggested in this respect is incomes policy combined with a monetary rule. Experience with incomes policy is not encouraging by any means, but there is also a wide belief that a flexible exchange rate system without a firm anchor both in monetary rulers and effective supply side policies is proving severely disruptive to the established liberal world order of growth and open trade and capital markets.

APPENDIX

Combining (1) and (2), and using (3)-(5) as well as (7), leads to the following system of equations:

A-1 $$m-w - (1-\beta)\theta = h(f+a\theta-br^*-b\beta\dot{\theta}) - c(r^*+\dot{\theta}+\dot{w})$$

A-2 $$\dot{w} = \gamma(f-br^*-b\beta\dot{\theta}+a\theta) + \alpha(1-\beta)\theta$$

which defines the rates of change of wages and of the real exchange rate:

A-3 $$\dot{w} = [((1-\beta)(b\beta(\gamma-\alpha h)-\alpha c) - a\gamma c)\theta - \gamma cf - \gamma b\beta(m-w) + \gamma cb(1-\beta)r^*]/\Delta$$

A-4 $$\Delta \equiv b\beta(c\gamma-h)-c < 0 \text{ by assumption.}$$

A-5 $$\dot{\theta} = [(m-w) + (a(c\gamma-h) + (c\alpha-1)(1-\beta))\theta + (c(1-b\gamma)+hb)r^* + (c\gamma-h)f]/\Delta$$

The slopes of the schedules in Figure 1 are given by:

A-6 $$\left.\frac{dw}{d\theta}\right|_{\dot{w}=0} = \frac{(1-\beta)\ [b\beta(\gamma-\alpha h)-\alpha c] - a\gamma c}{\gamma b\beta}$$

and

A-7 $$\left.\frac{dw}{d\theta}\right|_{\dot{\theta}=0} = a(\gamma c-h) + (c\alpha-1)(1-\beta)$$

The longrun solutions for wages and the real exchange rate are:

A-8 $\theta = [b\lambda r^* - \lambda f]/(1 + \alpha\lambda)$

and

A-9 $w = m + (c + b(h - \gamma/\alpha)/(1+a\lambda))r^* - ((h-\gamma/\alpha)/(1+a\lambda))f$

and are obtained by setting $\dot{w}=\dot{\theta}=0$ in A-1 and A-2.

Data

In Table 1 the cyclical variable is the OECD unemployment rate which is available only since 1964. The real oil price is measured as the dollar price of oil deflated by the U.S. GNP deflator. The non-oil LDC terms of trade are measured by the ratio of export to import prices reported in the International Financial Statistics 74d/201 and 75d/201. The real exchange rate for the dollar is reported in the same source in the section "Cost and Price Comparisons in Manufacturing" where we have used the measure "Relative Wholesale Prices."

The real material price in equation 2. is the index of the prices of all commodities in line 76ax of the International Financial Statistics deflated by the dollar export price of manufactures of industrialized countries reported in the U.N. Monthly Bulletin of Statistics. In equation 3. an index of 33 commodity prices is used. The index is prepared by the Commodities and Export Projections Division of the World Bank and the most recent data are contained in Table 15 of the July 1982 Update. The indices for agricultural prices and the prices of the group metals and minerals are contained in the same source.

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