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THE EXCHANGE RATE AND THE RATE OF ECONOMIC GROWTH

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The Exchange Rate and the Rate of Economic Growth*

One cannot help feeling that much of the empirical work which has been done on the effects of exchange rate changes suffers from confusion over the objectives of exchange rate policy. Empirical work - and policy discussions as well - tends to focus on the balance of payments effects of appreciation and depreciation. Yet it will be readily admitted that the balance of payments cannot be the crucial target because many circumstances exist where it may be desirable to run a balance of payments deficit rather than to devalue. Many analysts would agree that a temporary export short-fall or adverse speculation could force the value of a currency 'out of line' and that in such circumstances there is a case for 'defending' the currency rather than allowing its value to change inappropriately.

In order to get around this problem, economists have adopted the notion of a 'fundamental' disequilibrium. A change in the exchange rate should be contemplated only if a country faces a fundamental disequilibrium, and short-run disturbances such as those just mentioned would not qualify under this heading. A fundamental disequilibrium implies that the desired level of spending by the community on foreign goods and services exceeds the expected level of earnings from all foreign sources over some extended period of time. The time period is usually taken to be more than one year. A disequilibrium of this kind is fundamental because it cannot persist; the country will at some time run out of financing and other adjustment will have to take place.

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In arguing for a clarification of exchange rate objectives we say that the rate of growth which the country can attain after adjustment to a fundamental imbalance of payments may be taken as a benchmark. An exchange rate change is justified only if it allows a higher rate of growth than this. Therefore, the crucial question for exchange rate policy is not whether an appreciation or depreciation causes the balance of payments to be in balance. Rather, exchange rate policy must be so designed that, together with the other objectives of the community and the other policies at the disposal of the authorities, it allows the country to maximise its potential for economic growth.

The study explores some of the ways in which exchange rate changes can affect a country's rate of growth. We perform some preliminary tests designed to show how significant these effects can be. We also compare the effects of using exchange rates to satisfy inappropriate balance of payments objectives with results obtained when economic growth is set as the target.

The essay comprises three sections which offer a brief critique of some existing empirical studies, an exposition of the nexus between exchange rates and growth, and some attempts at testing aspects of the way exchange rates have affected economic growth.

Empirical Studies of Exchange Rate Effects

Although there has been continuous debate on effects of exchange rate changes, surprisingly few empirical studies have been reported in the literature. None that we have come across had attempted to measure the effects

of exchange rate changes on the rate of growth. The assumption, usually implicit, is that economic growth rates are determined by other factors and that changes in the exchange rate will not materially affect the outcome. In order to give the flavour of the work which has been done so far we describe briefly some important studies which have recently come to light, placing emphasis on the questions they were intended to answer.

A richly elaborated model for measuring the effects of exchange rate changes on the medium-term balance of payments of several industrial countries has been devised by Artus and Rhomberg at the International Monetary Fund. This 'multilateral exchange rate model' (MERM), described in Artus and Rhomberg (1973), comprises demand and supply equations for imports and exports which allow for the impact of appreciation/depreciation in any one country on all other countries in the system. The equations are based on the elasticities - expenditure approach to balance of payments analysis; demand depends on income levels, relative product prices and exchange rates; supply depends on prices and exchange rates.

A model in a similar vein has been developed for primary producing countries by Bélanger (1974). Bélanger's methodology is similar to Artus and Rhomberg's and his import equations are not much different from theirs. On the export side he is able to devise world market clearing equations on a commodity by commodity basis as a means of establishing the effective price changes which are implied by any level or change in configuration of exchange rates.

Artus (1975) has devised a measure of the effect of exchange rate variation on short-term capital markets, thereby extending empirical analysis beyond the visible trade items in the balance of payments. Artus' model has conventional equations to determine equilibrium in the money market; equilibrium in the balance of payments depends on monetary flows which in turn depend on actual and expected values of exchange rates and interest rates. Functions are included to describe the policies of the monetary authority: their demand for foreign assets depends on relative price changes and their exchange rate target; demand for domestic assets depends, in addition, on the money supply target, fixed with reference to rates of unemployment and inflation.

Artus is also responsible for a pathbreaking study of the results of the 1967 devaluation of sterling in which he attempts to separate out the effects of monetary and fiscal policies occurring at the same time as the exchange rate change. Using historical information Artus determines the effect a devaluation should have on the relative prices of U.K. products and the price elasticities of demand for U.K. imports and exports. From these he calculates impact of devaluation on the 'full employment' current account. This measure assumes that appropriate fiscal and monetary policies will be devised to ensure that GDP remains at the full employment level. Artus then discusses what conclusions can be drawn when this condition is not fulfilled.

Porzecanski (1975) is concerned with the problem of repetitive devaluation. Devaluation always tends to raise the level of domestic prices; when devaluations begin to follow each other in succession, residents begin to build an expectation of continuing price increases into their expenditure plans.

This will put further pressure on domestic prices and the balance of trade. A cumulative inflationary spiral therefore builds up. Porzecanski's model makes expenditure, the demand for money and short-run aggregate supply all functions of price expectations; price expectations depend on last period's prices and last period's exchange rate.

Connolly and Taylor (1976) measure the effect of exchange rate changes on the full balance of payments, including all items except financing out of foreign exchange reserves. Using a simple version of the now familiar monetary model, Connolly and Taylor measure the joint effects of exchange rate changes and changes in factors affecting the money supply. Although the study gains by covering all foreign payments and receipts, it loses as compared to the MERM because it deals only with effects within the current year.

There are other recent studies which have dealt only with exports. Bhagwat and Onitsuka (1974) compared the growth of exports for a number of years before and after devaluation in a large number of countries. They admit that 'the great diversity of circumstances surrounding the individual devaluations' limit their analyses to a 'general view of how exports and imports have fared in the aftermath of devaluations.'

Frankena (1975) limits his attention to one category of imports - non-traditional manufactured goods. His empirical analysis (for India) treats the impact of devaluation along with factors such as availability of intermediate inputs, domestic demand conditions, export subsidies and the availability of excess capacity.

Although empirical studies have been relatively few, considering the immense interest in exchange rate policy, this brief review suggests the rich diversity of interests which have been addressed. This paper hopes to encourage efforts to look at the balance of payments comprehensively (instead of focusing only on trade, the current account or short-term capital) and to reinforce the notion of using a longer-term yardstick for measurement. We also add a new dimension in focusing away from the balance of payments altogether, to place income effects in the spotlight. We now turn to examine what effects this might have on the analysis of exchange rate changes.

The Theory of Exchange Rate Changes and Economic Growth

Current economic theory admits of at least three ways in which exchange rate changes may affect economic growth: one, via induced changes in flows of foreign finance capital; two, via the redistribution of income between sectors of the economy having different propensities to consume; and three, via a shift in resources from the private sector to the government.

Most economists who have looked at the link between exchange rate changes and the capital account have concerned themselves with short-term flows. The phenomenon of large scale speculative movements of financial assets has caused several upheavals on the foreign exchange markets of industrial countries, and this has diverted economists' attention to this area. More important for developing countries is the possibility that exchange rate changes will have an impact on long-term flows of foreign finance capital. Although this possibility is widely recognised by officials and businessmen, it has not hitherto attracted much attention from economic

theorists.

The reason foreign entrepreneurs may accelerate or slow down the rate of their investment in response to exchange rate changes is that appreciation or depreciation alters the rate of return on foreign factors used in the appreciating/depreciating country. This is easily demonstrated for the case of a foreign firm operating in the traded goods sector. If all prices are measured in terms of the foreign currency a devaluation will leave the product price unchanged and lower the prices of domestic inputs. There is therefore scope for the entrepreneur to increase the return on his investment, by absorbing the surplus, employing more of the cheaper domestic inputs, altering his level of production, or engaging in a combination of all three.

If market conditions are sufficiently competitive there will be a tendency for rates of return to increase in the non-traded goods sector as well. For clarity we now measure all prices in local currency. The increase in prices of traded goods may induce firms to switch existing or planned production facilities from non-traded to traded goods. The supply of non-traded goods falls and prices rise. The prices of foreign factors have increased with devaluation, so they tend to absorb the benefit of the price increase. In both traded and non-traded sectors local factors have become cheaper and may therefore be used more intensively, raising their prices except in cases where factor supply is unlimited. This will temper the increased returns to foreign factors somewhat.

There is a tendency for returns to foreign factors to rise throughout the economy. If capital is a significant foreign input and capital flows are sensitive to changes in the rate of return, the devaluation will attract investment. It is still generally believed that scarcity of capital is one factor which sets the upper limit to growth in many countries. Devaluation will permit higher growth rates in such cases.

Some redistribution of income always takes place with a change in exchange rates; this can have an effect on growth rates if income recipients differ significantly in their propensities to save. It has often been suggested that the owners of capital have higher saving propensities than wage earners. A devaluation shifts income in favour of capitalists whenever capital is more intensively used in the traded goods sector or whenever capital is an important foreign input. Whether or not the increased saving allows a higher growth rate depends on the size of the retained portion of foreign capitalists' saving as well as whether the economy is crucially short of domestic finance before the devaluation takes place.

The switch in resources from the private sector to government which results from devaluation is one aspect of income redistribution which deserves special attention because of the role government must play in the growth process. That redistribution in favour of government does take place and may most easily be demonstrated by referring to the national income identity.

1) $I - S + G - T = B$ where I: investment

S: saving

G: government expenditure

T: government revenue

B: deficit on the balance of payments

Any exchange rate change which reduces B without reducing (G - T) must at the same time cause a reduction in (I - S). The saving-investment gap may be closed by an overall increase in saving, a switch in domestic credit from the private sector to government or perhaps an increase in prices and interest rates.

Government will attract additional resources even if the fiscal deficit is reduced, so long as the reduction is by way of increased revenues rather than decreased expenditure (Inflation, for example, may cause revenues to rise). Whether government's increased share of domestic financing will enhance the prospects for growth depends on the role which government has decided to play in building economic infrastructure and in directly productive enterprises, the level of efficiency of government operations and government's technical capacity for expansion.

The Tests

Rigorous and comprehensive tests of the link between exchange rate changes and growth are not yet possible because of the relative under-development of the theory and the difficulty of obtaining some of the data required. We have therefore embarked on the more modest task of testing selected channels of influence chosen

from those described in the last section.

We begin by asking if it makes a difference whether growth or the balance of payments is chosen as the target for exchange rate policy. For this we look at the coefficients of exchange rate changes in equations which make the balance of payments and the growth of income functions of the exchange rate. Then to test whether exchange rate changes affect capital inflows we do a cross-section analysis which makes capital flows a function of exchange rates and other variables. Finally, we test for the effect of exchange rate changes on income distribution.

The equation used to compare the effects of using different objectives is drawn from a model in the tradition of the new monetary approach to the balance of payments. It is a modification of simple models used recently by Zecher (1976), Connolly and Taylor (1976) and others. The money supply (MS) is the sum of foreign exchange reserves (R) and net domestic credit of the banking system (D):

$$2) \quad MS = R + D$$

The demand for money (MD) depends directly on real income (y) and domestic prices (P) and inversely on interest rates (r), with allowance for random influences (e):

$$3) \quad MD = (Py^\alpha e)/r^\rho$$

Domestic prices are determined by world prices (P_w) and exchange rates (ρ):

$$4) \quad P = P_w \rho$$

Solving these equations gives

$$5) \quad R/(R+D) g(R) = \alpha g(y) - \beta g(r) - D/(R+D) g(D) \\ + g(P_w) + g(\rho) + u$$

where $g(x) = dx/x =$ the rate of growth of x

This equation was tested as written, with changes in reserves (representing changes in the overall balance of payments) as the dependent variable. It was then tested using the rate of growth of income as dependent variable. A comparison of the results obtained for three Caribbean countries is given in Table 1. The results are not very satisfactory, with generally low levels of significance. Furthermore, the coefficients of exchange rate changes are all insignificant, suggesting that the exchange rate has had little influence on either income or the balance of payments. The results should be interpreted with caution because, apart from the relatively short time series available, the exchange rate changes during the period may not have been large enough to matter. More importantly, the equation does not measure effects beyond the current year. We therefore move on to test aspects of the longer term impact of exchange rate changes.

In testing for the influence of exchange rate changes on capital flows we should bear in mind that the exchange rate is only one of several factors, not all strictly economic, which contribute to the choice of a particular location for a new plant. We report the results of a test made with a small selection of economic factors, so the explanations we derive will be subject to qualification

The foreign investor's returns will be directly affected by the level of domestic costs and the exchange rate; he will also be concerned about the size of the domestic market and the growth of export markets for the products he hopes to produce. Our analysis tries to assess the combined effects of changes in these factors for a cross-section of countries between 1970 and 1976. Long-term capital inflows are made dependent on exchange rate changes, changes in the consumer price index, changes in domestic expenditure per head and changes in an index of export prices (The last is used to indicate the strength of demand for the country's exports).

The results are given in Table 2. The first equation contains observations for 66 countries; it does not reach a level of overall significance and the coefficient of the exchange rate, though significant, has the wrong sign. We thought that exchange rates might have an effect only if appreciations and depreciations were greater than some minimum. We therefore repeated the test, excluding countries where exchange rate changes in either direction were under five percent, but the results were much the same (See equation II of Table 2). The overall level of significance rose somewhat, but it was still not satisfactory and the exchange rate coefficient still had the wrong sign.

The equations demonstrate the need for a more complete specification of the determinants of capital flows. Some of the variables which should be examined in further work are the existence of mineral and other natural resources, the development of infrastructure, access to major consuming areas, the levels of skill and literacy, the regime of tax holidays and other fiscal incentives, and the political and social environment. These, together with the economic factors, should provide a firmer base for conclusions about the effect of exchange rate changes.

Tests for changes in income distribution were confined to a search for association between exchange rate changes and changes in the ratio of 'compensation of employers' to 'operating surplus' for 32 countries over the period 1970 to 1974. We obtained the result -

$$v = 113.40 + 2.06 \rho ; R^2 = 22.23, D-W = 2.25 \\ (2.93)$$

Where v is the percentage change in the ratio of profits to wages. The level of significance for the equation is low, although the coefficient of exchange rate changes is significant with the right sign.

This is a very rough and ready method; it will have to be refined by including other factors which may simultaneously have affected the distribution of income. The ideal would be to divide the economy into classes distinguished according to their propensity to save; the changes in relative incomes of each class would then be tested for influences originating from exchange rate variations.

Conclusion

Our tests fail to suggest the harm that may result from inappropriate exchange rate policy. The exchange rate emerges as a rather innocuous tool, with appreciations and depreciations failing to influence any of the crucial dependent variables in a consistent fashion. A firm conclusion may be premature, however; all of the tests would benefit from improved theoretical specification and wider coverage of countries and time periods. Efforts to refine the theory must therefore continue, with a view to giving a more definitive assessment of exchange rate effects.

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Table 1

	Dependent Variable	Coeff. of ρ	t	R ² for egn	D-W	n (years)	T ₃
Jamaica	BOP	-1.73	-0.54	50.08	1.69	14	
	Y	0.39	0.59	41.97	2.90	14	
Guyana	BOP	6.12	1.18	74.74	2.40	16	
	Y	3.84	0.84	29.11	3.03	16	
Trinidad & Tobago	BOP	zero	0.02	13.24	2.82	12	
	Y	-0.02	-0.95	51.90	2.57	12	

Table 2

I	$K = - 223.99 - 20.57 \rho + 46.65 P - 0.17 E - 2.07 P_x$ $(-2.31) \quad (2.32) \quad (-2.34) \quad (-0.30)$	$R^2 = 15.79$ D-W = 2.07 n = 66
II	$K = 156.87 - 14.98 \rho + 33.85 P - 0.20E - 1.14 P_x$ $(-1.81) \quad (1.79) \quad (-2.09) \quad (-0.07)$	$R^2 = 40.63$ D-W = 2.04 n = 18

K: avg. long-term capital inflow (BOP)

ρ : % change in exchange rate via US\$

P: % change in CPI

E: latest available GNE p.c.

P_x : % change in index of export prices