Relative Growth Rates: The Experience of the Advanced Economies

This paper tests by simple least squares regression analysis for some of the factors which might explain why growth rates have differed among twenty-two advanced economies.[1] The principal result is confirmation of the very orthodox hypothesis that high rates of growth of exports and imports are necessary, though of course not sufficient, conditions for achieving a high rate of growth of gross domestic product. The policy implications of this result are explored in the concluding section of the paper. Their main thrust is that much greater exchange rate flexibility might be advantageous for economies where low rates of growth of total output have been associated with low rates of growth of exports and imports.

I. The Regression Equations

The principal equation in the system is

$$Y = a + b_1 I + b_2 K + b_3 S + b_4 L + b_5 M \qquad [1]$$

There are 22 observations (one for each country) on each of the variables, where:

Y = rate of growth (percent per annum) of real gross domestic product over the period, 1953-1964.

I = rate of growth (percent per annum) of real gross domestic investment (including investment in inventories) over the period, 1953-1964.

1 Australia, Austria, Belgium, Canada, Denmark, Finland, France, West Germany, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, South Africa, Sweden, Switzerland, United Kingdom, United States of America.

K = ratio of real gross domestic investment, i_o, to real gross domestic product, y_o, at the beginning of the same period.

S = rate of growth (percent per annum) of the total number of students enrolled in all educational institutions over the period, 1948-1961.

L = ratio of the total number of enrolled students, s_o, to the economically active population, l_o, in 1948.

M = rate of growth (percent per annum) of real imports of goods and services (as measured in the national income accounts) over the period, 1953-1964.

Each of the above rates of growth is for each country a single growth rate for the entire period, computed by regressing annual data exponentially on time.

Equation [1] is essentially a production function. The output is gross domestic product. The inputs are capital goods, human capital and imports. It has been assumed that actual output approximated potential output; that productive capacity did not, to any substantial degree, go unutilized because of a deficiency of aggregate demand. However, the United States and Canada were certainly instances where aggregate demand was seriously deficient over much of the period.

The magnitude of the capital good input is measured by I and K. Clearly the greater the rate of growth, I, of the output of new capital goods, the greater should be the rate of growth, Y, of total output. Moreover, for any *given* rate of growth, I, of gross investment, the absolute total of new capital accumulated over the entire period will be greater, the greater the *initial* annual value, i_o, of gross investment; and this accumulated total of new capital should permit a rate of growth of total output which is greater, the smaller the initial annual size, y_o, of gross domestic product. The variable K takes account of both of these effects, since $K = i_o/y_o$. Over a sufficiently long time period the influence on Y of I should swamp the influence on Y of the initial condition, K. But our period, 1953-1964, is short enough so that the influence of K may be significant.

The variable S resembles I. If one year of schooling for one

student creates one unit of human capital,[2] then the rate of growth of the number of students in school is the rate of growth of gross investment in human capital, if we neglect on-the-job training.[3]

The variable L resembles K. The definition of L which would most closely correspond to K would be the ratio in 1948 of total expenditure on education to gross domestic product. Lacking data on educational expenditure, we substitute the ratio of the initial number of students, s_o, to the initial size, l_o, of the "economically active" population.

The last of the explanatory variables in equation [1] is M, the rate of growth of real imports. In the short-run, with a fixed exchange rate and ample balance of payment reserves, Y determines M; a higher rate of growth of total output generates a more rapidly growing demand for, and observed quantity of, imports. But in the long-run it will not be possible to sustain any rate of growth of total output which implies a demand-induced rate of growth of imports greater than the long-run rate of growth of the foreign exchange receipts available to finance imports. A persistent balance of payments deficit will require a restraint of aggregate demand which in effect reduces the rate of growth of total output to that value which is consistent with that rate of growth of imports which can be financed by continuing foreign exchange receipts. Conversely, a rate of growth of total output which implies a demand-induced rate of growth of imports which is less than the long-run rate of growth of foreign exchange receipts available to finance imports, will allow balance of payment reserves to increase. If the economy is not at full-employment, aggregate demand can be expanded, raising the rate of growth of total output to that value which more fully utilizes importing capability. In both of the cases described above the long-run causation is from the rate of growth of importing capacity to the rate of growth of total output rather than the reverse. It is, of course, not impossible that one might observe a persistent accumulation of balance of payments reserves for a country whose importing capacity seemed to be persistently in excess of its import-requirements, so that the balance of payments was not constraining the rate of growth of total output. Among our

2 Total annual expenditure figures for education were not available for all countries.

3 S was computed for the period, 1948-1961, rather than 1953-1964, in order to introduce at least a modest time lag between the school experience and its impact on productivity.

countries only the experience of West Germany seems to conform to this case.

This brings us to the next equation

$$M = a + bX \qquad [2]$$

where X is the rate of growth (percent per annum) of real exports of goods and services (in the national income accounts) over the period, 1953-1964. The rate of growth, M, of sustainable imports is determined by the rate of growth, X, of exports. We assume that export earnings are the dominant long-run source of foreign exchange receipts and that import expenditures are the dominant long-run category of international payments for the countries in our sample. This assumption lacks refinement but it may still capture the crux of the long-term relationship. Even Israel, with its huge capital inflows and its enormous deficit on current account, found it expedient to match its very high rate of growth of imports with an even higher rate of growth of exports, assuming presumably that debts must eventually be repaid and gifts may not flow in forever.

The third equation seeks to explain relative export performance.

$$X = a - b_1P + b_2C + b_3D \qquad [3]$$

The explanatory variables are:

P = the rate of increase (percent per annum) over the period, 1953-1964, of either the consumer price index, P_{CPI}, or of the implicit deflator of gross domestic product, P_{GDP}, adjusted in both cases for any devaluation and for major export subsidy programs. For example, a ten percent devaluation would be equivalent to a ten percent drop in the domestic price level.

C = dummy variable with value of one for members of the European Economic Community and value of zero for other countries.

D = an index of the innovative capability of the export sector. Three alternative indices, D_1, D_2 and D_3, are tested.

D_1 = rate of increase (percent per annum) over the period, 1953-1964, of the degree of diversity of exports. The degree of diversity, d, of exports in a particular year

is measured by the *reciprocal* of $\Sigma\left(\frac{x_i}{x}\right)^2$, where x_i is the total value in that year of a particular three-digit class of exports in the Standard International Trade Classification, and x is the total value of all merchandise exports in the same year.[4] The initial value of d, the degree of export diversity, is its average value for 1953 and 1954. The final value of d is its average value for 1963 and 1964. D_1 is the rate of growth (percent per annum) of d from its initial to its final value.

D_2 = initial level of export diversity, the average value of d for 1953 and 1954.

D_3 = rate of decrease (percent per annum) of the ratio of primary product exports to total merchandise exports over the period, 1953-1964. The initial ratio is the average of its 1953 and 1954 values. The final ratio is the average of its 1963 and 1964 values. D_3 is the rate of decrease from the initial to the final ratio.

The rationale for equation [3] is as follows.

It is hypothesized that the higher the rate of inflation, P, of the general price level, the higher will be the rate of inflation of export prices and the smaller the rate of growth of exports. Some countries, however, partially or wholly offset the adverse effect on exports of a high rate of inflation by devaluation and/or by massive export subsidies. In such cases the value of P was adjusted downward.

The dummy variable, C, membership or nonmembership in the European Economic Community, allows for the possibility that the reduction of trade barriers between members may have increased the rate of growth of their exports between 1958 and 1964.

The variable, D_1, the rate of increase of the degree of diversity of exports is intended to test the hypothesis that, for an advanced economy, comparative advantage at any point in time is the product less of its natural resource endowment than of its past investment in real capital, including individual skills and organizational expertise in both production and marketing; that this investment will be more

4 $\Sigma\left(\frac{x_i}{x}\right)^2$ is the Gini Coefficient and has been employed by Massell [1] and Michaely [2] as a measure of export concentration.

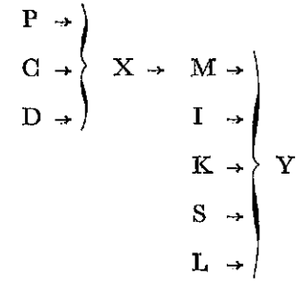
productive of new areas of comparative advantage the more it is associated with innovations which reduce cost, improve marketing organization, improve old products and introduce new ones; and that a good index of this ability to innovate successfully might be the rate at which a country diversifies its exports.

There are certain difficulties with this hypothesis. One is that unusually successful innovations in one or a few product lines might enhance export concentration rather than export diversity. Secondly, comparative advantage arising from economies of scale might also promote export concentration. The rapid expansion of motor vehicle exports during this period may have had this effect.[5]

D_2 is not a rate of change of export diversity. It is simply the initial level. The ability of a country to expand its exports might be correlated with the initial degree of export diversity. Obviously D_2 is a cruder index of innovative capability than is D_1.

D_3, the rate at which the share of primary product exports in total exports has been diminishing is also tested as an index of innovative capability.

Schematically the causal relationships in equations [1], [2] and [3] look like



II. The Regression Results

The regression estimates for equation [1] are displayed in Table 1. The explanatory variables entered stepwise in the order shown by rows one through five. Row 6 shows the simple correlation between each explanatory variable and the dependent variable Y. The figures in parentheses are t-ratios.

5 There is also a deficiency in the statistical data. For computing d, the degree of export diversity, the smaller four-digit commodity classes would have been preferable to the grosser three-digit categories. But the four-digit classification was not available for 1953-1954.

TABLE 1

$Y = a + b_1I + b_2K + b_3S + b_4L + b_5M$

	a	I	K	S	M	L	R^2	F-level
1	1.75	0.48					0.64	35.2
	(3.8)	(6.0)						
2	− 2.61	0.48	0.19				0.84	24.4
	(3.4)	(9.6)	(4.7)					
3	− 2.30	0.50	0.14	0.22			0.88	5.5
	(3.4)	(10.0)	(3.5)	(2.4)				
4	− 2.36	0.37	0.12	0.29	0.14		0.89	1.8
	(1.9)	(3.7)	(3.0)	(2.7)	(1.3)			
5	− 2.93	0.35	0.12	0.29	0.17	0.02	0.90	1.3
	(2.1)	(3.2)	(3.0)	(2.8)	(1.5)	(1.0)		
6		0.80	0.43	0.29	0.72	0.16		

The results look quite good. It is obvious that we should discard the variable L (Row 5). It also seems that M (Row 4) should be discarded but this is not the case. The simple correlation between M and Y is 0.72, and the correlation between M and I is 0.87, which is higher than for any other pair of variables in the system. This extreme collinearity suggests that the value of the I coefficient, prior to the introduction of M, measures the joint effect on Y of simultaneous increases in I and M. I and M appear to be highly complementary inputs in the "production" of Y.

This judgment is confirmed by the results of rerunning the regression with X substituted in the place of M. This is perfectly legitimate because we will see below that X, the rate of growth of exports clearly determines the rate of growth of imports, making X and M essentially interchangeable. In Table 2 X actually enters the regression before I because the correlation between X and Y is even higher than the correlation between I and Y (row 6). Note also that the sum of the coefficients of X and I, as well as their individual sizes, are almost the same as they were for M and I (row 4). It is obvious from Table 2 that it is the sum of the coefficients of X and I, not their individual sizes, which reliably measures their influence on Y, remembering, of course, that causally X is really a stand-in for M.

TABLE 2

$Y = a + b_1I + b_2K + b_3S + b_4L + b_5X$

	a	X	I	K	S	L	R^2	F-level
1	1.02	0.49					0.75	59.2
	(1.9)	(8.1)						
2	0.63	0.34	0.25				0.85	12.2
	(1.0)	(4.9)	(3.6)					
3	− 1.94	0.23	0.32	0.13			0.92	15.6
	(2.5)	(3.8)	(5.3)	(4.3)				
4	− 1.83	0.20	0.35	0.11	0.14		0.93	3.3
	(2.0)	(3.3)	(5.8)	(3.7)	(1.7)			
5	− 2.38	0.21	0.35	0.10	0.13	0.02	0.94	2.4
	(2.5)	(4.2)	(7.0)	(3.3)	(1.9)	(2.0)		
6		0.86	0.80	0.43	0.29	0.16		

A reasonable evaluation of regression [1] might be that the joint contribution of I and M to the explanation of Y is predominant; that the individual contributions of K and perhaps S are significant; and that the total contribution of all four variables is very large.

In a sense the collinearity of I and M is disappointing, but its economic meaning could be most significant, if it means that there is acute complementarity between I and M as inputs in the production of Y. The enormous strength of this complementarity is conveyed intuitively by the data in Table 3. In the Y column the twenty-two countries are listed in descending order of their rates of growth of real GDP. These Y values have been grouped in three tiers — high, medium and low values of Y. If the I value for a country fell into the same tier as its Y value, then the I value was entered in the same row as the Y value. Otherwise the I value was entered in the tier appropriate to itself. The M entries were treated in the same manner. The degree of reliability with which a country's Y ranking permits a prediction of a similar I and M ranking is reasonably high.[6]

6 If the Y values are adjusted to what they would be if the value of K were set for every country at its median magnitude of 22.5 percent, the correspondence between the Y, I and M rankings becomes even stronger.

TABLE 3

Tier	Country	Y % Per Annum	I % Per Annum		M % Per Annum	
High						
	Israel	10.4		10.0		11.0
	Japan	10.0		16.6		14.2
Y > 5%	Italy	6.1		9.5		12.9
I > 8%	Germany	6.0		8.2		13.3
M > 10%	Austria	5.4		8.4		11.8
			Switzerland	9.6	Switzerland	10.5
Medium						
	France	4.9		7.5		6.7
	Finland	4.8		6.7		7.6
4% < Y < 5%	South Africa	4.7				
5% < I < 8%	Iceland	4.6				
6% < M < 10%	Switzerland	4.5				
	Netherlands	4.3		5.8		8.2
	Denmark	4.2		7.9		8.2
	Australia	4.1				
			Sweden	6.0	Sweden	6.8
					Belgium	7.4
					Norway	6.5
			U.K.	5.7		
Low			Iceland	4.3	Iceland	5.3
			Australia	4.1	Australia	4.5
Y < 4%	Sweden	3.8				
I < 5%	Canada	3.7		2.4		2.8
M < 6%	Norway	3.6		3.4		
	New Zealand	3.5		3.8		3.1
	Belgium	3.4		4.3		
	Luxembourg	3.3		4.2		5.6
	U.S.A.	2.8		2.3		4.9
	U.K.	2.7				4.1
	Ireland	2.1		3.1		4.2
			South Africa	1.9	South Africa	2.5

Inspection of Table 3 casts additional light on two significant issues: first, the nature of the complementarity between domestically produced and imported inputs, and secondly, the nature of the dependence of Y upon I and M.

Not only is the correlation (0.87) between I and M extremely high, but even more significant is the fact that for 18 of the 22 countries the rate of growth of imports was at least ten percent greater, and often from 20 to 30 percent greater, than the rate of growth of investment. Moreover, M is substantially greater than I even for three of the four countries (Israel, France, Finland and Iceland) which undertook substantial devaluations during the period of this study. Finally, the hypothesis of acute complementarity between imported and domestic inputs derives particular support from the experience of Belgium, Norway and the United Kingdom. In each of these cases one input, I or M, grew at a slow rate, while the other input grew at a medium rate. It is significant that the rate of growth of total output was controlled by the more slowly growing input.

It should be emphasized that complementarity between imported and domestically produced inputs can take two forms. The two inputs can be physically different and can be poor substitutes technologically. Alternatively, the imported and domestic input may be technologically identical, but the expansion of domestic production of the input may be subject to rapidly rising marginal cost. Devaluation, of course, does induce some degree of import substitution, and in Table 3 there is some evidence of this. The values of M for Israel, France and Iceland, which did devalue, do seem a little low relative to other countries experiencing similar rates of growth of total output.

Turning to the nature of the dependence of Y upon I and M, the overwhelmingly predominant pattern is that the achievement of a given rate of growth of total output requires a higher rate of growth of investment and a still higher rate of growth of imports. Moreover, three of the exceptions to this rule are easily explained. Israel, Iceland and Norway would clearly have needed higher rates of growth of investment to achieve their observed rates of growth of total output, had they not started with such a high *initial* investment effort. Their K values are 31.2, 29.0 and 31.3 percent respectively, whereas the median value of K is only 22.5 percent. Australia, Canada, and the United States do constitute mild exceptions to the general pattern, but South Africa is really the only spectacular, and, to put it mildly, inexplicable exception.

We turn now to equation [2]

$$M = a + bX$$

in which the rate of growth of exports explains the rate of growth of imports. Table 4 shows the regression results with t-ratios in parentheses. Row 1 results are for all 22 countries. Row 2 excludes Israel and South Africa because their exports grew much faster than their imports. The conclusion that by and large X determines M seems reasonable. The following simple test provides further support for this position. If for each country we compare the *cumulative* annual values of real imports and exports, the cumulative import total deviates from the cumulative export total by less than five percent for ten countries, and by less than eight percent for 19 countries.

TABLE 4

$M = a + bX$

Row	a	X	R^2	F-level
1	1.83 (1.5)	0.74 (5.1)	0.57	26.4
2	− 0.68 (7.4)	1.17 (9.0)	0.81	76.7

We now consider the regression results for five variants of equation [3]

$$X = a - b_1P + b_2C + b_3D$$

which seeks to explain export performance. The results are displayed in rows 1 through 5 in Table 5. Row 6 shows the correlation between X and each explanatory variable. Apart from row 3 the results are poor. Neither D_1, the rate of increase of the degree of diversity of exports, nor D_2, the initial level of export diversity, contribute at all to explain the rate of growth of exports. Perhaps the time span from 1953 to 1964 was too brief to reveal the influence of this process. The row 3 results are better as a result of the respectably high correlation, 0.59, between the rate of growth of exports and D_3, the rate of decline of the ratio of primary product exports to total exports.

TABLE 5

$X = a - b_1P + b_2C - b_3D$

	a	P_{GDP}	P_{CPI}	C	D_1	D_2	D_3	R^2	F-level
1	9.59 (4.2)	− 1.15 (1.4)		2.36 (1.1)	0.28 (0.3)			0.16	0.11
2	11.21 (3.7)	− 1.03 (1.3)		2.80 (1.2)		− 0.47 (0.6)		0.17	0.37
3	8.59 (2.2)	− 1.59 (2.7)		0.84 (0.6)			− 1.21 (3.8)	0.56	6.77
4	7.69 (3.7)		− 0.37 (0.5)	2.18 (1.0)	0.23 (0.3)			0.06	0.07
5	9.70 (3.2)		− 0.16 (1.9)	2.94 (1.2)		− 0.64 (0.8)		0.09	0.58
6		0.30	− 0.09	0.22	− 0.05	− 0.05	0.59		

It seems strange that the correlation between the rate of growth of exports and P_{GDP}, the adjusted rate of inflation of the price deflator for gross domestic product is only — 0.3. The coefficient of P_{GDP} is — 1.59, so that an increase of one percentage point in the adjusted annual rate of inflation tends to reduce the rate of growth of exports by more than one and one-half percentage points (row 3). Although the t-ratio of 2.7 is not as large as one would wish, it is hard to believe that the rate of inflation does not exert a powerful influence on the rate of growth of exports. For example, the unadjusted rate of inflation of the gross domestic product deflator for Iceland was a galloping 9.5 percent per annum. But Iceland's adjusted P_{GDP}, after correcting for the effect of devaluations and of export subsidies, was only 2.6 percent per annum. It seems unlikely that Iceland's exports could have grown by anything remotely resembling their observed 5.5 percent per annum in the absence of this radical offset to the high rate of internal inflation. The corresponding figures for Finland, France and Israel in Table 6 are equally persuasive.

TABLE 6

Country	X % Per Annum	P_{GDP} (Adjusted) % Per Annum	P_{GDP} (Unadjusted) % Per Annum
Israel	18.9	0.1	6.4
Finland	7.2	0.6	4.6
France	6.4	1.0	5.3
Iceland	5.5	2.6	9.5

These countries experienced the highest internal rates of inflation but succeeded through substantial devaluations and/or export subsidies in achieving high or medium rates of export expansion.

For the other countries, which did not devalue, a plausible hypothesis might be that to keep their exports competitively priced they would need to adopt monetary and fiscal policies that would keep their rates of inflation bunched together. This bunching is, in fact, observable. For 15 countries the values of P_{GDP} lie between the limits of two and four percent per annum, and the value of P_{OPI} lies within the same limits for 13 countries. This bunching may well explain why the correlation between X and P appears to be much weaker than is believable.

III. Policy Implications

1. If we define import-substitution as the attempt to achieve a high rate of growth of total output by means of a very high rate of growth of domestic investment combined with relatively low rates of growth of exports and imports, the likelihood of success seems rather dim.[7] Presumably primitive economies are even less able than advanced economies to substitute domestic in place of imported inputs. Consequently import substitution would seem even less advisable for the less developed countries. This argument is,

7 Unless one would be satisfied with a very low rate of growth of the output of consumer goods, which would, of course, indicate that import-substitution is a relatively high-cost strategy.

however, open to one substantial objection. It can be argued that the countries in this study were not attempting import substitution, but were at least cautiously pursuing the opposite strategy of import liberalization, this being especially true for the six Common Market countries. A policy of increasing dependence on imports obviously requires for its success a relatively rapid growth of exports. Nevertheless, it is difficult to discard the impression that this experience of the developed countries might also have significance for the less developed countries.

2. Presumably an exchange rate should be changed in the event of a fundamental disequilibrium in a country's balance of payments. The indicators which we most commonly examine in order to diagnose whether or not we are faced with a fundamental disequilibrium are two: the condition of balance of payments reserves and the unemployment rate. If we are close to full employment and if the reserve position is not obviously weak, there tends to be a presumption that the exchange rate should not be changed. However, it is entirely possible for the above two conditions to be satisfactory, while at the same time the rate of growth of total output during the preceding five or ten years has clearly been inadequate by comparison with most similar economies. In this event a devaluation is definitely called for unless a persuasive case can be made for concluding that the binding constraint preventing a higher rate of growth has been, not the balance of payments, but an inability to accelerate domestic saving and investment. If this is correct it may mean that most of the countries listed as low growth rate countries in Table 3 should probably have devalued at some time between 1955 and 1960, and it becomes doubtful whether the Netherlands should have appreciated its currency in 1961.

It should be emphasized that devaluation by slowly growing economies is not a zero-sum game. The gains to those countries which through devaluation succeed in raising their growth rates will not be offset by equal losses for those countries whose exchange rates remain unchanged. Although a devaluation by one country does via the substitution effect reduce the rate of growth of exports of other countries, nevertheless the more rapid growth of the economy which has devalued exerts a favorable income effect on

VALUES OF VARIABLES IN REGRESSION EQUATIONS

Country	Y % p.a.	I % p.a.	K %	S % p.a.	L %	M % p.a.	X % p.a.	P_{GDP} % p.a.	P_{CPI} % p.a.	C	D_1 % p.a.	D_2	D_3 % p.a.
Australia	4.06	4.14	25.0	4.09	41.9	4.52	6.15	2.57	2.26	0.0	3.19	1.97	0.93
Austria	5.41	8.42	21.2	0.50	29.1	11.8	9.91	3.33	2.40	0.0	2.26	3.64	3.75
Belgium	3.36	4.32	17.7	3.55	29.3	7.37	7.17	1.65	1.54	1.0	1.18	3.96	1.52
Canada	3.68	2.43	25.7	4.84	52.7	2.84	3.96	0.95	0.51	0.0	1.38	4.07	0.0
Denmark	4.25	7.91	16.7	3.14	29.5	8.19	6.95	3.34	3.22	0.0	2.04	3.90	2.46
Finland	4.85	6.73	25.6	3.63	32.6	7.56	7.25	0.59	0.81	0.0	−0.3	2.64	2.59
France	4.86	7.49	17.6	2.91	26.3	6.68	6.40	1.02	0.60	1.0	−0.3	5.85	1.31
Germany	6.02	8.23	22.2	−0.9	41.9	13.3	9.82	3.49	2.57	1.0	−1.1	4.54	4.38
Iceland	4.60	4.26	29.0	4.00	33.1	5.26	5.53	2.63	0.00	0.0	1.45	1.29	0.18
Ireland	2.12	3.12	16.0	0.48	44.9	4.23	4.71	2.69	2.74	0.0	1.18	2.87	1.60
Israel	10.4	9.97	31.2	9.79	42.4	11.0	18.9	−0.1	0.00	0.0	0.75	2.25	2.46
Italy	6.08	9.48	18.8	1.53	29.3	12.9	14.1	2.45	2.73	1.0	0.25	4.95	6.10
Japan	10.0	16.6	24.2	2.00	51.7	14.2	11.3	2.10	3.13	0.0	0.60	4.17	5.65
Luxembourg	3.35	4.16	22.9	1.43	24.3	5.61	4.83	1.60	1.26	...	....	....	....
Netherlands	4.35	5.84	24.3	2.64	43.8	8.23	7.74	3.92	3.41	1.0	−0.7	6.14	1.52
New Zealand	3.53	3.82	23.1	4.54	52.1	3.07	4.43	2.66	2.69	0.0	1.13	1.92	0.21
Norway	3.64	3.38	31.3	4.06	27.2	6.46	7.18	2.85	2.96	0.0	1.36	4.01	3.87
South Africa	4.71	1.87	24.2	5.15	25.6	2.53	6.75	1.61	2.14	0.0	....	....	−0.78
Sweden	3.80	6.00	19.4	3.69	29.3	6.81	6.49	3.49	3.33	0.0	1.05	3.61	4.64
Switzerland	4.54	9.64	18.6	3.18	27.4	10.5	6.64	2.79	1.76	0.0	0.39	4.25	....
U.K.	2.73	5.65	14.6	2.80	31.5	4.08	3.05	3.11	2.57	0.0	−1.5	5.42	0.81
U.S.A.	2.84	2.31	18.4	3.38	52.8	4.89	5.00	2.11	1.48	0.0	0.80	5.14	−1.27

other countries, since it becomes a better market for their exports, and its expanding exports provide additional imported inputs to them. By and large, higher national growth rates are mutually reinforcing rather than competitive.

3. If exchange rate flexibility is one indispensable instrument for managing the rate of economic growth, grave doubt is cast upon the wisdom of common currency proposals for members of a common market. A common currency is roughly equivalent to an arrangement whereby each member country retains its own distinctive currency but undertakes to devalue or appreciate it only at the same time and by the same amount as all other members acting in concert. If then a single member country should find its rate of growth of total output inadequate and rate of unemployment excessive, it would not be free to devalue its currency but would have to encourage its unemployed to migrate to other member countries who happen to be enjoying higher growth rates and less unemployment. Since the younger, more capable and better educated members of the labor force are most likely to migrate, there may result a continuing depletion of the quality of the human resources that remain behind, so that the economy becomes less and less able to cope with its difficulties.

Deficient economic performance is the single most powerful factor tending to undermine the confidence of a people in their national government. Consequently, to deprive that government of one of the most essential instruments for controlling the performance of the economy is a formula for political and social instability, as well as for destroying the morale of those who operate the processes of government at the national level.

The counterargument in favor of a common currency is that it eliminates exchange rate uncertainty and therefore encourages the freer flow of capital across national boundaries to those locations within the common market where the return on capital is expected to be the greatest. But this may well mean that capital will flow from the member country whose growth rate is lower to member countries where growth rates are higher. Consequently, the balance of payments situation of the slower growing country will become even worse, its importing capability will deteriorate still further and its growth rate will lag still further behind its neighbors.

By contrast, if the slower growing member country is allowed to improve its growth rate by devaluing its currency, this improvement in its growth rate will almost certainly attract inflows of capital, or prevent outflows, on a scale much greater than the net loss of capital exclusively attributable to the greater exchange rate uncertainty associated with a policy of exchange rate flexibility.

It follows that the case for a common currency is tied to a measure of aggregate welfare that is extremely insensitive to the effects of severe disparities among national growth rates of member countries. This is a most serious defect because the most demoralizing form of inequality is not so much persistent differences in income levels but the contrast between incomes that are growing rapidly and incomes that are growing slowly.

4. If exchange rate adjustment is a necessary instrument for controlling the rate of growth of total output, it can be argued that the "crawling peg" adjustment process would be superior to the "band proposal", if it is intended that the band parity be held constant over prolonged periods. The experience of the last 20 years suggests that *short-run reversible* surpluses and deficits have not been a substantial source of difficulty and have been accommodated quite easily by allowing reserves to rise and fall and by adjusting aggregate demand with a view to holding the *annual* values of total output, investment, exports and imports close to their mutually consistent long-run growth paths. Data for the countries in this study indicate that the percentage deviations of these observed annual values (y, i, x and m) from their simultaneous long-run growth path values are highly and positively correlated. That is, the adjustment of aggregate demand causes all of these observed annual magnitudes to move up and down together around their long-run growth paths. A fixed parity band would enable this short-run adjustment mechanism to function with less reserves, and might possibily permit some reduction of the observed departures of total output, investment, exports and imports from their long-run growth paths.

But this would constitute at best only a minor improvement over the traditional pegged-rate system. It would not cure the primary shortcoming of that system which is the tendency to postpone for absurdly long periods the larger devaluations required to shift the economy onto a different and higher long-run growth

rate path. A band whose par value is changed only reluctantly actually discourages this adjustment. The crawling peg, by contrast, may provide both a short-run adjustment mechanism which is not significantly less efficient than the band proposal, while also facilitating the search for that exchange rate which will generate a satisfactory long-run rate of growth.

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DATA SOURCES

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