Devaluation-Bias and the Bretton Woods System (*)

The exchange-rate system established at Bretton Woods — usually called the par-value or the adjustable-peg system — was intended to combine a fixity of the par-value of each member's currency in the short-run with a flexibility of the parity in the longer-run. That is, the member was expected to maintain the spot exchange rate within 1% on either side of the parity and to alter the par-value only where its officials could demonstrate to the Fund that a state of "fundamental disequilibrium" existed. Because of this emphasis upon the fixity of spot rates and of the parity in the short-run, the Fund's par-value system can be regarded as a variant of fixed exchange rates.

The presumption that there is a devaluation-bias in present international monetary arrangements rests primarily on the hypothesis, widely affirmed in the standard literature in international economics, that, under any variant of a fixed exchange rate, "the more urgent need for action and the bulk of the adjustment burden [is imposed] on deficit rather than surplus countries".[1] That is, the deficit country (which is the reserve loser) is more likely to be forced unwillingly to devalue than the surplus country (which is the reserve-gainer) is to be forced unwillingly to appreciate. Furthermore, there is so high a degree of substitution among the products of the industrial countries in world markets that an individual country can delay a decision to devalue (when its domestic prices have become no longer competitive at the current par-value) only at the risk of a significant loss of place in these markets. By contrast, a

(*) The analysis and conclusions of this paper represent the views of the author and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of its staff.

1 LELAND B. YEAGER, *International Monetary Relations* (New York: Harper and Row, 1966), p. 104.

delay in revaluing by a surplus country after its domestic price trends have lagged far enough behind those abroad to make the existing parity out-of-date is actually beneficial to the export industries.

As a result of those considerations, it is suggested, an industrial country is more likely to be forced unwillingly to devalue than it is to appreciate. When the country does eventually decide to alter the par-value, it is added, the authorities are more likely to make relatively larger changes in the downward, than they would tend to make in the upward, direction. Let us assume that officials decide, in a situation of "fundamental disequilibrium", to alter the par-value in accordance with international economic theory which assigns to the exchange rate the function of adjusting for differential rates of domestic price increases among trading partners. The devaluation-bias hypothesis suggests that they are likely to act differently in a devaluation than in a revaluation situation. When a devaluation is needed, it is argued, there are incentives for them to select a new par-value which is lower than would be needed merely to correct *existing* price disparities. They usually choose a lower par value on four grounds: to avoid a second devaluation; to anticipate the inflationary feedback of the devaluation process on local prices/costs; to obtain the support of the business community which will welcome the improved competitive position of exports in foreign markets; and to induce short-term capital inflow (on the basis of expectations that the country will be able to maintain the reduced parity).

These considerations are much altered in the case of a revaluation. In the case of an appreciation, the authorities can:

(a) Be less fearful of a second revaluation than the authorities in a devaluing country need be of a second devaluation;

(b) Select a lower increase in parity to the extent that they anticipate the deflationary feedback from the revaluation;

(c) Anticipate that the business community (fearing domestic deflation and loss of foreign competitiveness) will be more critical, the larger the amount of the revaluation; and

(d) Expect capital outflows — not inflows — after revaluation, which would be larger, the greater the appreciation.

It is proposed in this paper to consider the validity of the presumption that a devaluation-bias does exist under the Fund's system of the adjustable peg. We will review the actual experience

among Fund members in making changes in par-value and then consider the analytical and statistical evidence which might throw light on this experience.

Devaluation-bias under adjustable-peg?

The argument that there is a devaluation-bias under the adjustable-peg system is usually put in terms of the number and direction of exchange-rate actions. Since 1946, the changes in par value by members of the Fund have been one-sided: "the fact that in the past 25 years the Fund has seen 60 devaluations, and only three revaluations, suggests movements upward may be even more sticky than movements downward".[2] But this evidence must be qualified in at least two major respects. First, the devaluations of the major European and numerous other currencies in September 1949 might be excluded on the grounds that they were unavoidable transitional adjustments to the near-term effects of World War II: they were, in essence, differential rates of revaluation of the dollar against the principal European currencies. On the other hand, they would reflect a devaluation bias in those cases where the amount of devaluation could be regarded with hindsight to have been excessive.

Secondly, by count, most parity actions among Fund members have been by the less-developed countries (the LDC's) which are widely known to have been resisting the decision to devalue. Woodley has characterized the exchange-rate policies of these countries in these words: "the principal policy question... is why less-developed countries almost consistently err on the side of maintaining over-valued currencies".[3] In practice, the less-developed countries have often been reluctant to devalue their currencies because of the high domestic political costs of such a decision. In addition, officials in the LDC's have often come to regard the gains accruing to their particular country from the terms-of-trade benefits of an overvalued parity to exceed any improved trade-balance gains which could be expected from a lower and more realistic exchange rate. If there is

2 Speech by U.K. Chancellor of the Exchequer Roy Jenkins in *Summary Proceedings, Twenty-Fourth Annual Meeting of Board of Governors*, (September 29 - October 3, 1969), International Monetary Fund, Washington, 1969, p. 38.

3 W. John R. Woodley, "Some Institutional Aspects of Exchange Markets in the Less-Developed Countries" in *The International Market for Foreign Exchange*, edited by Robert Z. Aliber (New York: Praeger, 1969), p. 177.

any evidence of a devaluation-bias in world payments arrangements, then, it will have to be sought not among the LDC's but only in the exchange-rate decisions of the small group of highly-competitive industrial countries.

Exchange rate policies among the industrial countries. - Between 1960 and mid-1971, there were among the industrial countries four decisions to devalue (Canada in 1962; the United Kingdom and Denmark in 1967; and France in 1969) and five to revalue (Germany and the Netherlands in 1961; Germany in 1969; and Austria and Switzerland in 1971). (See Table 1). In addition, the Canadian authorities in 1970 and German and Dutch authorities in May 1971 permitted their currencies to float; each of them was quoted above the former parity on July 1 (1971). In magnitude, the devaluations ranged between 8 and 14 per cent and the revaluations between 5 and 9 per cent.

One way to summarize this experience is to weight the amount of parity change by the share in exports of the industrial countries supplied by the country whose parity is altered. On this basis, largely because of the heavy weight given to the two German revaluations, there is a near-balance between devaluations and revaluations: the net weighted change is — 0.89 per cent for the period from 1960-69 and — 0.65 per cent if the Austrian and Swiss revaluations are included. (See Table 1). This negative sum would have been increased if the observation period had been extended to include the French devaluation in 1957-58; on the other hand, it would be reduced if there were any allowance made for the effects of the rise in the Canadian dollar in 1970 or the temporary *de facto* rises in the market value of the German and Dutch currencies at mid-1971.

This position of near-balance in exchange-rate decisions as between devaluation and appreciation would seem to be evidence contrary to the existence of a devaluation-bias in current monetary arrangements. This denial of devaluation-bias on the basis of this experience is reinforced by arguments along two general lines.

Credits now available to deficit countries. - In the first place, it can be suggested, this hypothesis does not take adequate account of the access to official credits now available to deficit countries which have been developed, especially over the past decade. This argument has been stressed by Russell: "The common assumption with respect to deficit countries... that they cannot permit their reserves to decline

TABLE 1

THE BALANCE BETWEEN REVALUATIONS AND DEVALUATIONS AMONG INDUSTRIAL COUNTRIES, 1960-71

(in per cent)

Date and Country	Change in par value (1)	Country share in exports of industrial countries (a) (2)	Weighted change in par value (1) × (2) / 100 (3)
1961 Germany	+ 5.0	15.2	+0.76
Netherlands	+ 5.0	5.2	+0.26
1962 Canada	−11.8 (b)	7.3	−0.86
1967 United Kingdom	−14.3	10.4	−1.49
Denmark	− 7.9	1.8	−0.14
1969 France	−11.1	8.3	−0.92
Germany	+ 9.3	16.1	+1.50
Net weighted change in par values of industrial countries 1960-69			−0.89
1971 Austria	+ 5.05	1.37	+0.07
Switzerland (c)	+ 7.07	2.46	+0.17
Net weighted change in par values of industrial countries 1960-71			−0.65

Source: 1960-69, *The Role of Exchange Rates in the Adjustment of International Payments*, International Monetary Fund, Washington, 1970, p. 39; 1971, *International Financial Statistics*.

(a) In year of parity change, except for 1971 computations which are based on 1970 trade values.

(b) Par value adopted in May 1962, compared with level of floating exchange rate in January 1960.

(c) Not a member country of the International Monetary Fund.

infinitely... neglects the possibility of infinite borrowing of reserves".[4] It cannot be doubted that the possibilities of official borrowings which were developed during the 1960's have helped to allocate the adjustment burden somewhat more evenly between deficit and surplus countries. It is no longer realistic to assert unequivocally that the burden of adjustment falls mainly on the deficit country on *a priori* grounds.

4 ROBERT W. RUSSELL "Multilateral Surveillance, Consultation, and the Adjustment Process" in *The Future of The International Monetary System* edited by Hans W. J. Bosman and Frans A. M. Alting von Geusau, Publication of the John F. Kennedy Institute Center for International Studies, Tieburg, the Netherlands (Lexington, Mass.: Heath Lexington Books, 1970), pp. 76-77.

But there are limitations to the access which deficit countries have to external credits and their continuing use of such financing over an extended period has proved to be a costly strategy. Consider the case of the United Kingdom as an example. In connection with credits from the Fund in 1964, for example, the U.K. Chancellor supplied a letter of intent which "detailed the policies that the United Kingdom was pursuing, and would pursue".[5] Even "more specific" commitments were accepted in a May 1965 credit arrangement and again in November 1967 and there were close and continuing consultations between the U.K. and the Fund over current U.K. economic developments while the credits were being used. In addition, the Prime Minister gave as a reason for the decision to devalue in his television address to the British nation on November 19, 1967, an unwillingness to try "to borrow this time in conditions in which our creditors abroad might well insist on guarantees about this or that aspect of our national policies". As it turned out, it was not until July 21, 1971 that the U.K. Chancellor of the Exchequer could inform Parliament that the Government "will not now have to consult the staff of the IMF about the progress of the U.K. economy" because "the obligation to consult the Fund has been removed as a result of the accelerated debt repayment to the Fund announced last week".[6]

In practice, the Fund has been able to establish effective communication with borrowing countries concerning their current economic policies.[7] By contrast, the Fund's Managing Director has asserted: "it is clear that the influence which the Fund or any other organization can exercise on a surplus country is limited".[8] So far as surplus countries are concerned, their compliance with the Fund's code of behavior has depended largely on moral suasion and upon

5 J. KEITH HORSEFIELD, *The International Monetary Fund 1945-1965*, Vol. I. Chronicle, (Washington: I.M.F., 1969) p. 572.

6 IMF *Morning Press*, July 26, 1971 quoting from a report in the *Daily Telegraph* (London) of July 21, 1971, p. 17.

7 See my review *The International Monetary Fund, 1945-1965* in *The Journal of Finance*, December 1970, especially pp. 1218-19.

8 PIERRE-PAUL SCHWEITZER, "Stamp Memorial Lecture", London, December 2, 1969 (mimeo) p. 9.

the country's perception of its own longer-run self interest. For this reason, the greater availability of international credits and since 1970 the initiation of Special Drawing Right allocations through the IMF may have helped to bring more balance in allocating the burden of adjustment between surplus and deficit countries, but they have not removed entirely the unequal constraints upon unwilling deficit countries to take corrective action which have always been characteristic of a fixed exchange-rate system.

Revaluation as an alternative to domestic inflation

A second argument against a devaluation-bias hypothesis rests on the incentives which surplus countries have in a highly inflationary world economy to make use of revaluation on purely domestic considerations: to shield the internal economy from the "imported inflation" produced by large balance-of-payments surpluses. The record since 1959 found in Table 1 shows five instances of appreciation among the major industrial countries as compared with four instances of devaluation. (See Table 1.) In historical terms, this frequency of revaluation can be regarded as little short of remarkable. For "before the advent of the Bretton Woods system... explicit revaluation of a currency was extremely rare".[9]

The several instances of revaluation undoubtedly reflect an overriding concern in industrial countries about the domestic economic costs of "imported inflation" produced by large balance-of-payments surpluses. This concern contrasts with the period of the 1930's when deficit countries experienced pressures not only from losses of external reserves but also from internal demands for currency depreciation as a support for employment and domestic-income goals. In the prevailing environment in which countries have been facing inflationary pressures and excess demand instead, the recent Fund report on exchange rates notes that:

> "exchange adjustment will more often contribute to domestic stabilization in the countries whose external payments positions permit an appreciation of their currency, rather than in the countries whose external positions require a depreciation".

9 *The Role of Exchange Rates in the Adjustment of International Payments* (International Monetary Fund: Washington, 1970), p. 38.

European concern about domestic costs of external payments surpluses. - It is striking that the major country which has perhaps the greatest sensitivity to domestic inflationary dangers — Germany — has been the chief proponent of revaluation as a means of protecting the internal economy from external inflation. The change in attitude about revaluation expressed by the late President Blessing of the German central bank in the late 1960's was prompted largely by a concern about minimizing the domestic effects of "imported inflation". He stated:

> "It has been asked whether it would not be more appropriate for the sick to devalue than for the healthy to revalue... Until a few years ago, it had been my opinion that the sick ought to under-go an operation and not the healthy".[10]

It was only gradually, after he had faced the domestic inflationary effects of Germany's enormous export surpluses over a period of years, that Herr Blessing came to change his mind. He was led to recommend the revaluation of the DM in 1968 because, in his words,

> "I have since been forced to admit that we live in a world which is no longer... prepared to accept really severe disinflationary measures, and that the healthy can protect himself against inflation only by means of a change in parity".

By contrast with this view, President Holtrop of the Dutch central bank has argued that there is an asymmetry in the allocation of the economic costs of the adjustment-burden as between surplus and deficit countries in the post-war experience. In his view, the "surplus countries... generally lived up to the prescription of the Brookings Institution report and allowed their economies to be inflated by their surpluses without putting up too much resistance".[11] To the extent that this asymmetry reflected an unwillingness of surplus countries to appreciate, even when experiencing balance-of-payments surpluses in a period of excess internal demand, it could

10 Herr Karl Blessing, President of the Bundesbank, speech before the German Cooperatives at Mainz, Germany, on October 10, 1969.

11 M. W. Holtrop, "The Balance of Payments Adjustment Process, Its Asymmetry, and Possible Consequences for the International Payments System" in *Approaches to Greater Flexibility of Exchange Rates: The Burgenstock Papers* edited by George N. Halm (Princeton: Univesity Press, 1970), p. 138.

be held to support, rather than to deny, the existence of a devaluation-bias in the international monetary system. It certainly cannot be used to reject that hypothesis.

Is there evidence of a devaluation-bias? - There have been at least two major recent developments which have tempered the built-in incentives in any system of fixed exchange rates to place greater constraints to adjust on deficit than on surplus countries. But neither of them can be regarded as grounds for concluding that there is no devaluation-bias in international monetary arrangements. The greater possibilities that deficit countries have to borrow do not enable them to avoid adjustment indefinitely since foreign credits are often available only on the basis of conditions laid down by the lender, whether it is one or more countries or an international institution. Similarly, a concern about inflation has encouraged surplus countries to revalue on a scale which can only be regarded as unprecedented; but these decisions have often been delayed to an extent which can only be regarded, in retrospect, as excessive. If the traditional analytical basis for the hypothesis that there is a devaluation-bias in any fixed-rate system has been eroded, it has not been altogether invalidated by the post-war experience. Accordingly, let us review the statistical evidence to see whether it can throw light on whether a devaluation-bias does, or does not, exist in current monetary arrangements.

Devaluation-bias: the statistical evidence

Perhaps the major attempt to approach the question of devaluation-bias in current international monetary arrangements through an analysis of the statistical evidence has been the work of Hirsch and Higgins on "effective" exchanges rates.[12] In their article, the authors distinguished between actual changes in parity (or "nominal" adjustments) compared with the "effective" adjustments which measured the effects on each country of "changes in the exchange rate, as customarily expressed, of other currencies, whether these changes are large or small, and whatever their timing" (p. 453). As a technical matter, "effective" exchange rates were calculated for 14

12 Fred Hirsch and Ilse Higgins, "An Indicator of Effective Exchange Rates", IMF *Staff Papers*, November 1970, pp. 453-487.

industrial countries on the basis of the formal (or nominal) parity changes for each of them *minus* the weighted indirect changes produced by parity adjustments made by trading partners. These adjustments were intended to allow for economically significant movements in the parities of a country's trading partners as they might affect the international competitive position of each of 14 industrial countries. Accordingly, the computed "effective" exchange rate was intended to measure the "impact of the concurrent nominal rate changes for the other currencies" on the international position of each country.

The body of the Hirsch-Higgins article was concerned with the calculation of the "effective" exchange rates for 14 industrial countries between 1959 and 1969 and an exploration of the significance of this novel and useful concept. As a by-product of this work, however, they reported that "the movement in the effective exchange rate is also observed as an indicator of whether, from the standpoint of particular currencies, the changes in parities of other currencies have involved a devaluation bias or a revaluation bias" and were led to assert: "contrary to some general impressions, no general devaluation bias is found in the system as a whole". (p. 454). It is the statistical evidence on which their comments on devaluation-bias are based which concerns us in this paper.

The authors have proposed an explicit statistical test of devaluation-bias on the basis of a comparison of the "effective" and the difference between them, shown in the third column, constitutes found in Table 2. The steps taken by the authors in calculating the "effective" exchange rates are summarized at the bottom of Table 2 and explained in detail in their article. In Table 2, the "effective" exchange rates in the first column are compared with the changes in nominal parity by each country in the second column: the difference between them, shown in the third column, constitutes the test of devaluation-bias proposed in the Hirsch-Higgins article.

In their view, there is a devaluation-bias when the changes in effective parity exceed the changes in nominal parity and a revaluation-bias when they are negative. That is, there is a devaluation-bias when the effective parity value of the currency is higher than the announced parity change and a revaluation-bias when the effective value is less than the parity change.

By this test, there is a devaluation-bias in substantial amounts against the United States, Germany and Canada and in amounts

TABLE 2

INDUSTRIAL COUNTRIES: CHANGES IN EFFECTIVE EXCHANGE RATES, IN DOLLAR PARITIES, AND IN OFFICIAL RESERVES, 1959-1969

	Cumulative changes in effective parity (*)	Actual changes in dollar parity	Proposed test of devaluation-bias (**)	Official reserves (in billions of dollars): December 1959	December 1969	Change in period
1. United States	+ 4.7	—	+4.7	21.5	17.0	−4.5
2. Other Countries with devaluation-bias: (**)						
Germany	+17.3	+14.8	+2.5	4.8	7.1	+2.3
Canada	− 9.4	−10.5	+1.1	2.0	3.1	+1.1
Japan	+ 0.9	—	+0.9	1.4	3.7	+2.3
Norway	+ 0.6	—	+0.6	0.3	0.7	+0.4
Sweden	+ 0.4	—	+0.4	0.5	0.7	+0.2
3. Countries with revaluation-bias: (**)						
Netherlands	+ 2.8	+ 5.0	−2.2	1.4	2.5	+1.1
Italy	− 1.0	—	−1.0	3.1	5.0	+1.9
Belgium	− 1.3	—	−1.3	1.3	2.4	+1.1
Switzerland	− 1.4	—	−1.4	2.1	4.0	+1.9
Austria	− 5.3	—	−5.3	0.7	1.5	+0.8
Denmark	− 9.1	− 7.2	−1.9	0.3	0.4	+0.1
France	−14.2	−11.1	−3.1	1.7	3.8	+2.1
4. United Kingdom . . .	−13.5	−14.3	+0.8	2.8	2.5	−0.3

Source: (1) Changes in effective parity and in dollar parity: FRED HIRSCH and ILSE HIGGINS, "An Indicator of Effective Exchange Rates", International Monetary Fund *Staff Papers*, November 1970, Table 3 on page 473. (2) Changes in official reserves: *International Financial Statistics*, International Monetary Fund. The estimates include: Gold, SDR's, reserve positions in the Fund and foreign exchange.

(*) Hirsch-Higgins define the change in effective parity as "the percentage 'direct' change in its numeraire rate *minus* the weighted percentage 'indirect' change in the numeraire rates of other currencies" Because the U.S. dollar serves as the numeraire currency, its effective rate is affected only by the indirect effects of other parity changes. The effects of parity changes are calculated for the 14 industrial countries specified in *International Financial Statistics*. The authors have calculated an index of effective exchange parities for each of them; they applied to the direct changes in parities the indirect effects calculated on the basis of weights which "reflect the share of each of these countries in the given country's exports of manufactures to and imports of manufactures from the 13 other countries combined" (p. 459). The formula for the index is specified in footnote 3 on page 455 and in Appendix I on pages 479-480.

(**) The authors have proposed that "a devaluation bias is present if there is a positive difference between the change in a country's effective parity and any parity change of its own". (Footnote 12, page 474).

of less than one per cent against the United Kingdom, Japan, Sweden and Norway. For the other seven countries in Table 2, there was a revaluation-bias by this test. The denial by the authors of evidence of a devaluation-bias in current international financial arrangements is based on what appears by their test to be an even-balance as between devaluation-bias and revaluation-bias among these countries during the observation period.

Devaluation-bias against the dollar? - However, the Hirsch-Higgins calculations also show that there was — by their test and on the basis of the concept of the effective exchange rate — an effective appreciation of the dollar and a devaluation-bias in the system vis-à-vis the dollar of 4.7% between 1959 and 1969. (See Table 2.) The United States (as the numeraire currency in the system) was passively affected by the indirect impact of both revaluations and devaluations of the other 13 countries. As a result of all the parity changes made, the dollar was effectively revalued by 4.7%. Furthermore, the devaluation-bias in the system vis-à-vis the dollar was nearly double the 2.5% bias against a strong surplus country like Germany.

This appreciation of the dollar should be recognized for what it is: a purely statistical statement of the effects on the United States of the various changes in parity by each of the other 13 industrial countries. These effects are measured by the difference in each case between *actual* (effective) and the *intended* (nominal) parity changes for each of them.

At the same time, it must be noted, this upward thrust in the dollar's effective competitive valuation came during a period when the United States was losing, and the other industrial countries as a group (excluding Britain) were gaining, reserve-assets at an unsustainable rate. (See Table 2, Column 6.) Seven of the reserve-gainers experienced a revaluation-bias by this test (that is, the effective exchange rate changed less than the actual changes in their dollar parity) and five of them experienced a much smaller devaluation-bias than did the United States. The question must therefore be raised: were these results evidence of a general devaluation-bias in the system as a whole or merely of a devaluation-bias against the dollar?

The authors regard their results as evidence that there is no general devaluation-bias in the system as a whole. If we consider the changes in the effective parities of the seven countries in Table 2 which made no formal parity adjustments, we find that there were

four cases of revaluation-bias by this test and three cases of devaluation-bias. Had there been a devaluation-bias in the system as a whole, the argument would run, the changes in effective exchange rates (for countries which made no change in their own parities) ought to have been primarily only in one direction and not been so evenly-balanced.

Is the Hirsch-Higgins test an appropriate measure of devaluation-bias?

The main thrust of the Hirsch-Higgins work is to measure the cross-impact of parity changes by 13 trading partners on the effective exchange rate of each of 14 industrial countries. By themselves, these calculations were not intended to throw light on the question of devaluation-bias, and the conclusions in the article about the existence of devaluation-bias are only a by-product of their computations. The question must therefore be raised: how appropriate is the statistical test of devaluation-bias which they have proposed?

Exchange rates alone as a measure of devaluation-bias. - The authors conclusions are based upon their proposed test of devaluation-bias. Because their results show that seven countries experienced revaluation-bias and seven devaluation-bias, they conclude that there can be no tendency toward devaluation-bias in the system as a whole. (See Table 2 and the Hirsch-Higgins article, footnote 12, p. 474).

It is striking that the Hirsch-Higgins proposed test is made up of a comparison of the differences between two values of the same variable: that is, the *explicit* (" nominal ") and the *actual* (" effective ") changes in the exchange rate for each country. But exchange rates changes among a group of countries ought to have a built-in tendency toward *rough* balance; after all, exchange rates are merely price ratios and any change in the value of A's currency necessarily alters the value of B's currency in the opposite direction. In terms of the Hirsch-Higgins computations, a revaluation of currency A will produce a relative devaluation for each of the other 13 currencies in proportion to the trade-value weight selected; conversely, a devaluation will produce relative revaluations of the other currencies on the same basis. In the case of Austria, for example, there was a devaluation of the " effective " exchange rate for the schilling between

1959 and 1969 (even though there was no change in its parity) merely because the German mark had been revalued. A tendency for changes to be roughly in balance as between revaluation and devaluation when effective changes in exchange rates among a group of countries are compared should not be regarded as altogether unexpected; on the contrary, purely on *a priori* grounds, a tendency toward one-directional movements in these rates would be a surprising outcome.

The main objection to the Hirsch-Higgins test, from an analytical point of view, is the absence in it of any indicator of changes in the *internal* value of each of the currencies. By concentrating exclusively on two measures of *external* value, the test appears to treat changes in relative exchange rates as a phenomenon entirely independent of developments in the internal economies or even in the balance of trade or payments of the group of countries being studied.

Have exchange-rate changes offset relative changes in domestic prices? - Perhaps a more broadly-based test of devaluation-bias would compare the changes in the external and the internal value of the several currencies. This test would be closer to the traditional concern in international economic theory about the function of changes in exchange rates as the means of adjusting for differential rates of domestic price increases among trading partners. Under this approach, the question would be posed: to what extent have the changes in external values of these currencies between 1959 and 1969 served to offset relative changes in their internal values during this period?

Interestingly, the authors made such a comparison for the United States against the other 13 countries, but they did so only in passing in a footnote digression. They found that " the effective appreciation of the U.S. dollar in this period... falls well short of the apparent relative appreciation in its internal value, if the latter is measured by the comparative increase in the consumer price index in the United States against the weighted increase in the other industrial countries ". (Footnote 14, pp. 475-76). On the basis of the consumer price index, prices outside the United States rose by 45% between 1959 and 1969 compared to a rise of only 34% in the United States. Thus, there was " excess inflation outside the United States of 11% " on the basis of this calculation.

This alternative test of devaluation-bias needs to be explored more fully. For this purpose, price relatives for *each* of the 13 other industrial countries vis-à-vis the United States have been computed on the basis of:

$$\frac{P_F(69)}{P_{US}(69)} \times \frac{P_{US}(59)}{P_F(59)} = \text{index}$$

where F is each of the 13 other countries in turn. By this measure, the index will be < 100 when U.S. prices have risen more rapidly (and > 100 when they have risen less rapidly) than those in country F during the observation period. Separate indexes have been computed for:

— Consumer prices;

— Wholesale prices or home- and imported goods prices; and

— Export prices or average (unit) values.

The second step is to measure, on the basis of $1959 = 100$, the change in the dollar value of each F-currency in terms of the dollar on the basis of

$$\frac{X_F(69)}{X_F(59)}$$

where X is the dollar-value of the F currency. The exchange-rate calculation will yield a value > 100 only when the dollar-value of the F-currency is higher in 1969 than it was in 1959.

We can then compare the changes in the external and internal values of each F currency against the dollar by combining these two components into a form of competitiveness-index in which

$$\frac{P_F(69)}{P_{US}(69)} \times \frac{P_{US}(59)}{P_F(59)} \times \frac{X_F(69)}{X_F(59)} = 100$$

when the change in external value exactly offsets the change in internal value. An improvement in the relative position of the United States vis-à-vis country F would be demonstrated by an index-value > 100 since it would mean that relative price movements abroad have been greater than the changes in the dollar-value of the F-currency. A deterioration in the U.S. relative position (marked by an index-value < 100) would signify either a higher rate of inflation in the United States than in country F or a depreciation of the F-currency against the dollar.

Consumer price comparisons. — The computations in Table 3 demonstrate that the three price measures produce contradictory findings. Accordingly, a judgment from this evidence that there is, or is not, a devaluation-bias against the dollar depends upon the particular price measure which is chosen. By our calculations, the comparative changes in the external-versus-the internal values of the dollar vis-à-vis each of the F-countries: (a) improves substantially on the basis of the consumer price index; (b) improves marginally on the basis of the wholesale price index; and (c) deteriorates substantially on the basis of the export-price (or unit-value) index. These results are consistent with the Hirsch-Higgins calculations in that the changes in the external value of the dollar were less than the changes in its internal value *as measured by the consumer price index*. The difference between the average excess inflation outside the United States of 10% in Table 3 and the 11% reported by them is probably to be explained by differences in weighting and/or in computation.

However, there are doubts about the validity of the CPI as a realistic measure of relative price trends for international comparisons. This index is usually rejected because it has so large a services component and because it includes so many products which do not enter into international trade. Hence, changes in the CPI have been of only limited value as a measure of the comparative changes in the local currency's internal value for international purposes. For example, Junz-Rhomberg did not use it at all in their study of prices and export performance of industrial countries; instead, they considered two alternative price variables (export unit values and wholesale prices) and one cost variable (unit labor costs).[13]

McKinnon has pointed out a second objection to the CPI for international comparison in a recent *Essay* in the Princeton series: that the difference between consumer and either wholesale or export prices (in any country and, hence, as between countries) can be a

13 Helen B. Junz and Rudolf R. Rhomberg "Prices and Export Performance of Industrial Countries, 1959-63", IMF *Staff Papers* July 1965, p. 230.

TABLE 3

PRICE AND EXCHANGE-RATE CHANGES VIS-A-VIS THE UNITED STATES FOR 13 INDUSTRIAL COUNTRIES, 1959 TO 1969

(1959 = 100)

	Based on formal changes in parity			Based on changes in effective exchange rate		
	Consumer prices	Wholesale prices	Export prices	Consumer prices	Wholesale prices	Export prices
1. Countries with devaluation-bias:						
Germany	115.6	107.5	102.5	118.1	109.8	104.7
Canada	90.8	97.6	92.7	91.9	98.8	93.9
Japan	134.7	98.7	86.0	135.9	99.6	86.8
Norway	111.5	108.7	87.7	112.2	109.4	88.2
Sweden	114.6	115.4	99.3	115.1	115.9	99.7
2. Countries with revaluation-bias:						
Netherlands	122.5	109.3	92.2	120.0	107.0	90.3
Italy	113.6	108.4	91.3	112.5	107.3	90.4
Belgium	102.8	104.6	97.0	101.5	103.2	95.7
Switzerland	107.6	103.4	111.4	106.1	102.0	109.8
Denmark	123.2	102.8	89.5	120.6	100.6	87.5
France	103.7	102.2	91.5	100.1	98.7	88.3
Austria	110.3	108.8	81.2	104.5	103.0	76.9
3. United Kingdom	95.8	98.3	95.6	96.7	99.2	96.5
4. Averages, unweighted	111.5	105.1	92.9	110.4	104.2	93.0
5. Averages, weighted (1967 exports)	110.2	103.9	95.2	110.1	103.9	95.0

Source: Price data as reported in *International Financial Statistics*, I.M.F. Changes in parity and in effective exchange rates from Hirsh-Higgins article, I.M.F. *Staff Papers*, November 1970. (1) Home and import prices except as follows: wholesale prices for Canada, Japan, Italy, Belgium; wholesale prices for industrial products, Germany; prices for industrial output, United Kingdom. (2) Export-price or average (unit) value of exports, as reported by each country.

functiton of the rate of growth of per capita output.[14] In fast-growing countries, rapid increases in real wages lead to increases in the costs of services to final consumers which mainly affect the CPI. He cited Japan, Germany and Italy as examples of rapid-growth economies as compared to Canada, the United Kingdom and the United States as slow-growth ones. Using Japan as the extreme example, he found that consumer prices rose by 97.3% in Japan between 1953 and 1969 compared to a rise of only 41.4% in the United States. (p. 22). By contrast, however, export prices actually declined by 5.2% in Japan but rose by 29.6% in the United States in this period. Because rapid increases in real wages in fast-growing countries lead to increases in the cost of services to final consumers, which mainly affect the CPI and are largely *nontradable*, the consumer price index cannot serve as a measure of the change in a currency's internal value for international purposes. (p. 21). It is also not a satisfactory indicator of the change in relative competitiveness of an industrial country — the kind of calculation which might be made in an attempt to determine whether a change in parity between two countries might be indicated on the basis of price variations.

Wholesale price comparisons. - When we turn to the calculations based on wholesale prices in Table 3, the evidence continues to be contrary to the hypothesis that there has been a devaluation-bias against the dollar in the post-1959 period. However, the competitive advantage in favor of the United States vis-à-vis the other 13 countries is reduced — on a weighted average basis — from 10% to 4%. (See Table 3).

There are doubts about the usefulness of the wholesale price index as a comparative international measure on at least two grounds. On one side, the wholesale price index includes numerous commodities (both of domestic and imported origin) which do not enter into export costs or move in international commerce. It also includes widely-traded standardized international goods whose prices tend to move together. On the other hand, it gives little weight to the wide range of finished manufactured goods which comprise the bulk of the export trade of the industrial countries. In these respects,

14 RONALD I. MCKINNON, *Monetary Theory and Controlled Flexibility in the Foreign Exchanges*, Princeton Essay No. 84, April, 1971, pp. 21 ff.

the wholesale price index can be regarded as a faulty indicator of changes over time of a currency's internal value for purposes of international comparison.

Export price comparisons. - When we turn to the computations based on export prices, however, we find that the competitive-index has a value of 95 on a weighted average basis, whether based on changes in formal parities or in effective exchange rates. (See Table 3). By this criterion, accordingly, a devaluation-bias against the dollar vis-à-vis the other 13 currencies can be identified.

Again there are doubts about the relevance of these results for our purposes. In particular, there is concern about the technical properties of export-price indexes (whether of the price or unit-value variety) because of weighting and valuation problems over time. Furthermore, they are heavily weighted by goods in which the country has a strong comparative advantage. On the other hand, however, Junz-Rhomberg found that "regression equations with wholesale price relatives indicate that in many cases changes in this measure of price competitiveness are less closely associated with changes in market shares than are changes in relative unit values" of exports (p. 245) and that "on the whole, unit value indices are the most useful indicators currently available for the measurement of price competitiveness in international trade". (p. 259).

Concluding observations

We have attempted to measure the extent to which changes in exchange rates have, or have not, offset differential price movements as between the United States and each of the 13 other industrial countries. The evidence from these purely statistical exercises is mixed. A judgment about whether there has, or has not, been a devaluation-bias against the dollar in the observation period depends upon the arbitrary selection of one price measure over the other two.

Hirsch-Higgins found, as an incidental by-product of their construction of "effective" exchange rates for 14 industrial countries, that there had been a devaluation-bias against the dollar between 1959 and 1969. By their proposed test of devaluation-bias, however, they denied that this bias could be attributed to a general bias in the way par-values were adjusted. Both analytical and statistical

doubts can be raised about the use of their test as an appropriate measure of whether there is a general bias in the way par-values have been adjusted.

On analytical grounds, the primary evidence offered in the Hirsch-Higgins test encompassed only two ways of measuring the same economic indicator — the country's exchange rate. We have indicated a preference for a devaluation-bias test which follows the traditional concern in international economics for a measure of exchange rate changes related to differences in domestic price or cost fluctuations. Let us assume, as a limiting case, for example, that we have measures for the 14 countries in which each country's exchange rate was changed in the observation period to the *exact* extent needed to offset differential internal price variations in each country. Under this assumption, a comparison between each country's formal parity changes and its computed "effective" exchange rate might reveal differences, but these differences would merely be a statement of statistical results. It would be difficult, it is suggested, to attribute *analytical* significance to such deviations between parity and "effective" exchange-rate values.

On statistical grounds, the evidence as to the existence of devaluation-bias was mixed. That is, any conclusion about devaluation-bias, one way or the other, which is based only on price data, depends on the arbitrary selection of one price measure over the other two. There is no analytical consensus which would justify an exclusive concentration on any one of them. However, the measure the authors chose to explore in a passing footnote — the CPI — is probably the least widely accepted measure of changes in a currency's internal value for international comparative purposes. Furthermore, the measure found by Junz-Rhomberg to be the best measurement of price competitiveness — export prices or unit-values — yields results which contradict the findings based on international comparisons of CPI trends.

Apart from the disparate evidence of the several price measures, there is some question about the relevance of any statistical exercise to a meaningful conception of devaluation-bias. From a theoretical point of view, a tendency toward devaluation-bias could take the form of a *delayed* adjustment of exchange rates by surplus countries to differential rates of change in internal prices. So long as the delayed adjustments were made within the observation period, the statistical evidence would show no confirmation of that hypothesis.

Furthermore, a protracted reluctance of surplus countries to revalue promptly in accordance with a devaluation-bias hypothesis could lead to accelerated price inflation within the surplus countries. In that situation, the statistical correction of a devaluation-bias could take the form of an adjustment of internal prices in them. In both these cases, the statistical results could fail to record the effects of the devaluation-bias merely because the adjustments did occur within the observation period, even though the processes of adjustment were admittedly delayed in ways consistent with a devaluation-bias hypothesis.

We come therefore to the conclusion that the statistical evidence that is available cannot be interpreted as a categorial denial of the existence of a devaluation-bias in current international monetary arrangements, either as a general bias in the way par values have been adjusted or as a particular bias against the United States. But it also cannot be regarded as categorial support for such an hypothesis either. Accordingly, support for the devaluation-bias hypothesis must continue to be looked for in the concepts of international economic theory which postulate that the greater part of the adjustment burden under a fixed-rate system is likely to be borne by the deficit country and in the practical world of affairs where officials in surplus countries widely regard it as appropriate that deficit countries ought to bear the greater part of the burden of international payments adjustments.

Samuel I. Katz

Washington D.C.