ESSAYS IN INTERNATIONAL FINANCE

No. 78, January 1970

EXCHANGE-RATE SYSTEMS, INTEREST RATES, AND CAPITAL FLOWS

THOMAS D. WILLETT
SAMUEL I. KATZ
WILLIAM H. BRANSON

INTERNATIONAL FINANCE SECTION

DEPARTMENT OF ECONOMICS

PRINCETON UNIVERSITY

PRINCETON, NEW JERSEY

This is the seventy-eighth in the series ESSAYS IN INTER-
NATIONAL FINANCE *published from time to time by the
International Finance Section of the Department of Eco-
nomics of Princeton University.*

*The authors, William H. Branson, Samuel I. Katz, and
Thomas D. Willett, are all in government service in Wash-
ington. Dr. Branson and Dr. Willett are Senior Staff
Economists at the Council of Economic Advisers, on leave
from teaching posts at Princeton and Harvard Univer-
sities, respectively. Dr. Katz is in the Office of International
Finance at the Federal Reserve Board. He has been Visit-
ing Professor at Harvard University, the Sloan School of
Management at Massachusetts Institute of Technology,
and the Fletcher School of Law and Diplomacy at Tufts
University. All three are authors and co-authors of numer-
ous books and journal articles in the field of international
finance. This is the fourth contribution by Dr. Katz to the
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FRITZ MACHLUP, *Director
International Finance Section*

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INTEREST RATES AND CAPITAL FLOWS
UNDER LIMITED FLEXIBILITY OF
EXCHANGE RATES
THOMAS D. WILLETT

THE INTEREST-RATE CONSTRAINT
AND THE CRAWLING PEG
SAMUEL I. KATZ

POLICIES REGARDING
SHORT-TERM CAPITAL MOVEMENTS
WILLIAM H. BRANSON
AND
THOMAS D. WILLETT

EXCHANGE-RATE SYSTEMS, INTEREST RATES, AND CAPITAL FLOWS

I. Interest Rates and Capital Flows Under Limited Flexibility of Exchange Rates

One of the major areas of concern over the effects of limited exchange-rate flexibility, specifically of proposals for a crawling or gradually adjusting peg, is that such systems might seriously constrain the ability of countries to use monetary policy for domestic purposes. If a country's currency were confidently expected to crawl down at (say) 2 per cent per annum, then in order to neutralize this incentive to shift funds out of the country interest rates would have to be raised by a corresponding amount relative to those in nondepreciating currencies. Would the introduction of a crawling-peg system thus mean that greater exchange-rate flexibility was being gained only at the expense of monetary flexibility, with no net policy gain?

It is argued in this paper that there is a presumption that the answer to this question is no.

In the first section it is assumed for the sake of argument that the interest-rate constraint under a crawling peg would be as rigid as is suggested above. Even in this case it is argued, however, that it is not at all clear that the crawling peg would score badly, because the relevant comparison is not between the constraint which would exist under a crawling peg and no constraint at all, but rather between the constraints which would exist under a crawling peg and under the present adjustable-peg system. In the second section, the nature of the interest-rate constraint under a crawling peg is considered more closely and it is argued that it may be considerably less stringent than is assumed in section one.

INCENTIVES FOR CAPITAL MOVEMENTS
UNDER JUMPING AND CRAWLING PEGS

To facilitate comparison of the constraints which the international sector puts on interest rate policy under these two systems, let us assume that monetary authorities always so adjust interest rates as to prevent any capital outflow and that the country under consideration has been running a deficit. Then our question becomes under which system would interest rates have to be higher in the face of a given autonomous

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external situation. The answer depends upon which of two effects is greater. Under the crawling peg there will be a greater probability of a small decline in the spot rate (for example, 2 per cent per year) than there would be under the adjustable peg, but the probability of a large discrete change in parity or the imposition of controls should be less. Thus, on the first count there would be a tendency for interest rates to have to be higher under the crawling peg, but on the second count there would be a tendency for them to be lower. The net effect would depend upon the particular set of expectations that ruled at any point in time. There seems a strong presumption, however, that expectations of a major change in parity present the most difficult problem as far as liquid capital movements are concerned. If the additional scope for adjustment which would be provided by the crawling peg would substantially reduce market expectations of a major change in parity or imposition of controls, then it seems likely that the interest-rate constraint would be less of a problem under such a system.

This can be seen in the following table, which gives expected appreciation values of the mark at annual rates under alternative assumptions concerning the expected amount of revaluation, the time period during which it is expected to occur, and the confidence with which the revalua-

EXPECTED APPRECIATION VALUES OF THE MARK AT ANNUAL
RATES UNDER ALTERNATIVE SETS OF EXPECTATIONS

		Expected Revaluation = 7%	Expected Revaluation = 10%
Likelihood of Mark Revaluation during next 3 months	70%	19.6%	28.0%
	50%	14.0%	20.0%
	25%	7.0%	10.0%
Likelihood of Mark Revaluation during next 6 months	70%	9.8%	14.0%
	50%	7.0%	10.0%
	25%	3.5%	5.0%

Explanatory Note: This table gives the mathematical expected values of appreciation under alternative assumptions. Actual behavior would also be influenced by risk attitudes. Hence, a risk-averting speculator would prefer a sure gain of 2 per cent to a 20 per cent chance of a gain of 10 per cent. On the other hand, a risk-averting trader who views a change in exchange rate as a prospective cost would be less unhappy with a sure 2 per cent loss than with a 20 per cent chance of a 10 per cent loss. For a discussion of speculative behavior within the framework of von Neumann-Morgenstern expected-utility maximization, see Martin S. Feldstein, "Uncertainty and Forward Exchange Speculation," *Review of Economics and Statistics* (May 1968).

tion is expected. These would seem to be indicative of the range of expectations during the summer of 1969. If initiation of a crawling peg were to eliminate expectations of a discrete parity change, then even a certain crawl of 3 per cent per year would give less incentive to shift funds into the mark than any of the cases illustrated in table 1. Of course the assumption of elimination or substantial reduction in the expectations of a discrete parity change is crucial. It seems likely that in the German case starting from an initial sizeable disequilibrium a 3 per cent certain crawl would be more stabilizing than, say, a one per cent crawl, for in the latter case expectations of a discrete parity change still occurring might not be significantly reduced.

While a crawling peg would "work better" the greater the reduction in expectations of discrete parity changes or the imposition of controls, the complete elimination of such possibilities would not be a necessary condition for a crawling peg to improve upon the present system. Realistically, it is doubtful if any action short of monetary unification (or a return to a genuine gold standard) could bring about absolute confidence that there would be no discrete changes in parity. A creditable crawling-peg system could bring about a substantial reduction in the likelihood of such changes, however.

Variability of Incentives

This conclusion that the interest-rate constraint may be less of a problem under a crawling peg than at present is reinforced by the consideration that the variability as well as the level of interest rates needed to restrain undesirable international capital flows may be important. It would seem much easier to adjust the domestic economy to a relatively constant level of somewhat higher interest rates required by a downward crawl than to rates which could be somewhat lower most of the time, but which would have to be raised considerably higher during periods of speculative crisis.

Similarly, it should be easier to use selective measures to restrain capital movements where the incentives for such movements are not highly variable. As will be discussed below, it is only in cases where there are fairly confident expectations that the exchange rate will continue to crawl downward for some time that any substantial interest-rate constraint resulting from the crawling peg would become operative. Thus difficulties with the flexibility of selective fiscal measures such as a crawl-equalization tax may not present as serious a problem under a crawling peg as they do under the present system. It should be noted that there does seem to be a presumption that, in the choice of selective measures for the purpose in question, policies which seek to operate directly on the interest rates relevant for international investors and

borrowers and keep the domestic interest rate unchanged would have advantages over those which allow domestic interest rates to adjust to external circumstances and then try to offset the domestic effects of these changes.

Distorted Incentives with Discrete Adjustments of the Peg

While a thorough discussion would go beyond the scope of this paper, it should also be noted that the presumption of distortions resulting from selective measures to reduce flows of *liquid funds* under today's system of managed national currencies seems much weaker than in the case of selective measures which inhibit *trade* or *direct investment*. Friedrich Lutz has pointed out how differential rates of price inflation under "fixed" exchange rates may stimulate capital movements which are not necessarily in the direction of the higher marginal efficiency of capital, and the 1967 *Annual Report of the Council of Economic Advisers* lists differences in monetary conditions and financial structure, exchange-rate speculation, tax advantages and opportunities for tax evasion, all as motives for capital movements which may not lead to a "rational pattern of international investment." As Forte and Scott have argued, where the alternative is manipulating domestic interest rates to influence international capital movements, it is not at all clear that a selective tax on or subsidy to capital movements would have greater distorting effects. (Francesco Forte and Ira O. Scott, Jr., "The Use of Selective Measures as a Means of Achieving Balance of Payments Equilibrium," *National Banking Review*, 1966. On the potentially distorting effects of aiming interest-rate policy at international capital flows, see also Richard Ablin, "Fiscal-Monetary Mix: A Haven for the Fixed Exchange Rate?" *National Banking Review*, 1966; Harry G. Johnson, "Theoretical Problems of the International Monetary System," *Pakistan Development Review*, 1967; and F. Modigliani, "International Capital Movements, Fixed Parities, and Monetary and Fiscal Policies," unpublished manuscript, 1966.)

Nominal Versus Real Rates of Interest

Two other factors may tend to mitigate adverse domestic effects of the interest-rate constraint under the crawling peg. One is that the need to raise interest rates above those in nondepreciating countries need not necessarily imply that they should be raised above the level desired for internal reasons. For example, where an expected downward crawl was due to inflation of an equivalent amount, then the real rate of interest would remain the same while nominal interest rates rose by an amount equal to the expected crawl. One would expect that there would

be a tendency for those countries whose rates were depreciating also to be having above average inflation. To the extent that this is the case, high nominal interest rates need not be high real rates that would have deterrent effects on domestic investment and growth, and under a crawling peg one would not have the distorted incentives for international capital movements discussed by Lutz.

Coordination of Policies regarding Capital Movements

A second point is that the required change in the interest differential could be brought about by interest-rate declines in the countries with upward-crawling parities as well as by interest-rate increases in the countries with downward-crawling parities. This suggests that when considering the various rules of the game under which the system would operate (such as the conditions on intervention in the foreign-exchange market) it might be useful to include coordination of interest-rate policy as well. The average level of world interest rates could be affected considerably by whether the countries with upward or downward-crawling parities took on the majority of the interest-rate adjustment which might be necessitated by the system. This point may remain of some importance, even though it is argued below that the interest-rate constraints induced by limited flexibility are not nearly as great as often imagined. Just as in the case of countries with downward-crawling rates, countries with appreciating rates could use selective measures to differentiate the interest rates paid on domestic and foreign deposits so as to reduce capital inflow. This already occurs to some extent under the present system, for example, in Germany and Switzerland.

Thus, even if it would be necessary for countries with downward-crawling parities to keep their interest rates correspondingly above those in countries with upward-crawling parities, there seems to be considerable question whether such a constraint would more seriously hinder accomplishing domestic policy objectives than would the constraint which would exist in the same circumstances under the adjustable peg. Furthermore, on the external side one would be gaining a more potent policy instrument for adjustment and the gains from this would also have to be counted against any greater constraint on interest-rate policy, if this did indeed turn out to be the case in a particular situation.

THE NATURE OF INTERNATIONAL FLOWS OF LIQUID FUNDS

Now let us consider more closely the likely effects of an expected downward crawl in a country's parity. For an expected downward crawl of X per cent a year to require an equivalent X percentage point increase in domestic interest rates to prevent a disruptive flow of

capital, either one or the other of the following two conditions would have to hold:

(1) There is perfect international mobility of uncovered funds in response to differentials in the country's interest rates adjusted for any expected upward or downward crawl of its spot exchange rate. (Such funds could be moved by leads and lags in payments as well as by direct arbitrage.)

(2) The covered-interest-arbitrage schedule and the speculative-backwardation schedules are both perfectly elastic.

A perfectly elastic covered-arbitrage schedule implies that capital will always flow in response to any interest differential, so that in equilibrium the forward discount would have to adjust fully to the interest differential. The speculative-backwardation schedule relates the forward commitments of nonarbitragers to the difference between the present forward and expected future spot rate. If this schedule were perfectly elastic, then the current forward rate could not diverge from the expected future spot price. With both schedules perfectly elastic, equilibrium would require both that the forward rate be at its interest-parity level and that the forward rate equal the expected future spot rate. These two conditions could be simultaneously met only where interest differentials are brought into line with the expected change in the spot rate.

With perfect capital mobility, a country could not follow an independent monetary policy even under the present system. But capital is not perfectly mobile internationally. The covered-interest-arbitrage schedule is not perfectly elastic over all of its relevant range, much less the schedules of backwardation (forward speculative) and uncovered arbitrage. Sizeable differences in interest rates frequently exist between national money markets and uncovered differentials are often even greater.

From the theory of portfolio choice, one would expect changes in interest differentials to lead primarily to a stock-adjustment reallocation of funds rather than a continuing flow. A capital flow would appear in the balance of payments during the transitional stock adjustment, but after their adjustment was substantially completed, continuing interest-induced capital flow would be much smaller and would result primarily from the growth of portfolios over time.

We may view interest sensitivity in a broad sense as the responsiveness of funds to differentials in interest rates corrected for any confidently expected gradual appreciation or depreciation of the exchange rate. For convenience this combination of interest rate and expected crawl

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will be referred to as the effective interest rate. While all uncovered capital movements are in one sense speculative, funds influenced by expected small changes in exchange rates would seem better treated as interest-motivated in a broad sense. In this vein the phrase speculative capital flight from a country would seem more appropriate to describe large outflows motivated by anticipations of a major parity change than to describe outflows induced by a combination of interest rates and expected crawl which was below that combination which ruled abroad.

The effects of an expected crawl would be analogous to a change in the interest differential. If a country's currency began to crawl down and was expected to continue to do so, then, unless compensating policy was undertaken, capital would flow out of the country. The initial size of such a flow, however, would exaggerate the longer-run effects. After the stock adjustment of funds had taken place, a continued crawl of the exchange rate at the same pace should have a much smaller continued further impact on the balance of payments. Furthermore, the capital movements induced by expected crawls would be reversible. If the rate of crawl slowed, investors would begin to shift funds back into the country. If other conditions remained the same, then one would expect that when the crawl ceased there would be a substantially full return of the funds which had flowed abroad. In other words, these flows would be a function of expected changes in the exchange rate rather than its level, and it would not be necessary for the currency to begin to crawl upward to make it attractive to shift funds back into the currency.

This reversibility applies to the continuing-flow effects of a change in effective interest rates (due to portfolio growth) as well as to the initial stock adjustment. A numerical example may make this clearer. To make the numbers easier, assume that only citizens in A allocate funds internationally. Citizens of A have a total portfolio size of 100 a's. Ten per cent, or 10 a's, is invested in B. Now A begins to crawl down and the incentives to invest in B are increased. A reallocates its portfolio to hold say 15 per cent in B and there is a stock-adjustment capital outflow from A to B of 5 a's. Now over the next time period (during which the crawl continues) A's portfolio size grows by 10 per cent, or 10 a's. Without the crawl 10 per cent, or 1a, would have been invested in B, but with the crawl 15 per cent, or 1.5 a's, is invested. The "flow" due to the crawl is $1.5 - 1.0 = 0.5a$. In total 5.5a's have flowed out of A. Now the crawl stops and the incentives to invest in B return to their original level. Citizens in A reallocate their portfolios again to hold 10 per cent in B. Since portfolio size has now grown to 110 a's, the 5 per cent reduction equals 5.5a's, the quantity which flowed out in response to the crawl.

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The Case for Official Financing

The nature of such effective interest-induced capital movements would seem to make the use of reserves or some form of official borrowing such as recycling particularly advantageous methods of handling them. It should be mentioned, however, that recycling of this type of capital movement might imply a willingness to extend credit over a longer period of time than would probably be required of the type of recycling of speculative funds during crises that has been the topic of considerable recent discussion.

It is true that because of interest costs, one would not expect reflows at the end of a crawl to fully repay official borrowings, but there is a strong presumption that this interest cost would be much lower than would have had to be paid to keep the private funds from shifting. This is because the interest cost of official financing is only that paid on the newly borrowed funds, while when domestic interest rates are raised to influence private capital an important element of the cost is the increase in the interest which must be paid on funds already in the country. For countries with sizeable liquid liabilities to foreigners, this "rent" cost of an increase in interest rates may be quite large. (For further discussion of official versus market financing, see Willett, *Kyklos*, 1968.)

Would the size of the stock adjustment caused by a depreciating exchange rate be so large as to make official financing impossible? We do have some clue of magnitudes involved from the econometric work which has been done on the interest sensitivity of international capital movements. Interest-induced shifts of funds are far from negligible, and their size appears to be increasing rapidly over time. But their magnitude is definitely finite and it will be some time, if ever, before their magnitude is such that they become technically impossible to manage. The major economic rationale for suppressing rather than financing such movements would seem to be the difficulties for domestic financial management to which sizeable flows might give rise. Difficulties of political agreement of course might well arise before such economic considerations become important. But it is important to remember that the general problem of controlling capital movements is due to the increasing capital mobility per se.

The Effects of Crawling Pegs and Wider Bands
on the International Mobility of Capital

Of course, the nature of the exchange-rate system itself affects the international mobility of capital. Because of the diminished likelihood of controls and major parity changes, a narrow-band crawling peg would

probably increase the international mobility of liquid funds in response to effective interest-rate incentives. As argued above, however, it seems unlikely that the shifts of funds in response to, say, a 2 per cent change in the effective interest differential would be as great as the speculative shifts which now occur when parities come under suspicion. For a surplus country such as Germany, the major alternative route out of surplus (inflation) would also be likely to induce in time substantial capital inflows due to the higher interest rates which generally accompany inflation.

The reduced likelihood of convertibility controls which might accompany a crawling peg would have asymmetrical effects on capital mobility. The fear of controls tends to increase the interest-rate constraint under the present system. It is in deficit rather than surplus countries that the fear of controls is most relevant. Thus, the fear of controls (as opposed to controls themselves) tend to accelerate the movements of funds from deficit to surplus countries. Insofar as the crawling peg would reduce such fears, it should prove easier *ceteris paribus* for deficit countries to attract capital. This is, of course, the general characteristic of high interest sensitivity of capital movements. A country's interest-rate policy is constrained in that an effective interest rate below that abroad will lead to a sizeable capital outflow, but on the other hand, by moving its effective rate somewhat above that abroad, it may attract a sizeable inflow.

As contrasted with a narrow-band crawling peg, a widened band would tend to lower the interest sensitivity of international capital movements. Unless there were strong expectations that the spot rate would stay at or very near the floor (ceiling) of its permissible fluctuation, even the certainty of small depreciations (appreciations) in parity would not imply that actual spot rates would move with the parity. The greater the permissible band of fluctuation and the greater the likelihood that fluctuations would in fact occur, the less elastic would become the speculative-backwardation schedule, and the less likely would become uncovered movements of funds. Because of the greater freedom of the spot rate to adjust, substantial deviations from interest parity would be less likely. Covered-arbitrage movements would tend to reduce the incentive for further arbitrage movements more quickly than would uncovered movements and hence would reduce the total quantity of funds which would be transferred as a result of a change in the effective interest-rate differential. Similarly, the potential opportunity cost of speculating on a possible major change in parity would also be greater, thus tending to reduce to some extent the amount of speculation which would take place when a country's ability to maintain its

parity was in question. The reduction in movements of uncovered funds would give an additional benefit in that the efficacy of forward intervention to control capital movements would be increased.

CONCLUDING REMARKS

For the various reasons discussed above, it appears that fears concerning the interest-rate constraint under a crawling-peg system have often been exaggerated. Even with a narrow-band crawling peg, gearing interest-rate policy to mitigating undesired capital flows would probably not lead to a more serious constraint on domestic financial policy than exists under the present system. Furthermore, if it is desired, the monetary interdependence among countries may be reduced by widening the band of permissible exchange-rate fluctuation, by officially financing private capital flows, by using selective measures to reduce such flows, or by some combination of the three. Any of these types of measures would be perfectly compatible with a crawling peg.

It also is clear, however, that crawling parities would be most likely to place constraints on domestic policy in situations where a country's currency was considerably overvalued and there were strong expectations that the spot rate would continue to bump along the bottom of the band for some time. A crawling-peg system is more effective where it can keep substantial disequilibrium from building up as a result of differential balance-of-payments trends, than when it must seek to reduce a substantial disequilibrium which already exists.

This suggests that such a system will work better both the more closely its initial position corresponds to equilibrium and the more quickly it begins to respond to disequilibrating forces. This latter point suggests that some form of self-adjusting peg that responds automatically to market forces may be preferable to a variant that depends on deliberate policy decision to initiate a crawl.

That the crawling-peg system will work better the more closely its initial position responds to equilibrium does not imply that it would not work where there is substantial initial disequilibrium or that it would place an intolerable constraint on domestic policy, but only that problems would be greater in such a situation. These, of course, would also be circumstances under which a defense of parity under the present system would most interfere with desired domestic financial policies. Thus, for comparative purposes it will make quite a difference whether one considers the relevant alternatives under the present system to be a prompt parity change in response to the disequilibrium or a concerted effort to maintain the initial parity.

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