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EXCHANGE-RATE SYSTEMS, INTEREST
RATES, AND CAPITAL FLOWS

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INTEREST RATES AND CAPITAL FLOWS
UNDER LIMITED FLEXIBILITY OF
EXCHANGE RATES

THOMAS D. WILLETT

THE INTEREST-RATE CONSTRAINT
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SAMUEL I. KATZ

POLICIES REGARDING
SHORT-TERM CAPITAL MOVEMENTS

WILLIAM H. BRANSON

AND

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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

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

		<i>Expected Revaluation = 7%</i>	<i>Expected Revaluation = 10%</i>
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 nonarbitraders 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

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 1*a*, 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 5.5*a*'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 5.5*a*'s, the quantity which flowed out in response to the crawl.

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.

A second implication concerns how fast parities should be allowed to crawl. It seems to be a common view that the maximum feasible rate of crawl is set by the interest-rate constraint. Hence perhaps the popularity of 2 per cent as an illustrative figure. To the extent that the interest-rate constraint is less of a problem than has previously been thought, a faster rate of crawl should be feasible. Indeed, given the importance of substantially reducing expectations of discrete parity changes for the smooth working of a crawling-peg system, a 3 per cent maximum rate of crawl might yield a lower interest-rate constraint than would a one per cent maximum.

In closing, let me bring up one further consideration. The discussion of the interest-rate constraint has been concentrated on the case of deficit countries. Would we expect crawling pegs to lead to a higher level of interest rates in the system as a whole? This is, of course, a complicated question and I cannot offer to answer it here. But let me mention one consideration which suggests that the average level of interest rates may not be higher under a crawling-peg system. A number of observers have discussed the interest-rate competition to influence the balance of payments under the present system. To the extent that the crawling peg would add a more efficient adjustment technique to countries' policy arsenals one might hope that the upward thrust of international interest-rate competition would be reduced.

II. THE INTEREST-RATE CONSTRAINT AND THE CRAWLING PEG

This paper is concerned to explore, in their technical and theoretical dimensions, the specific range of questions raised by Professor Willett's attempt to deal with a problem that heretofore has not been analyzed in the literature on the crawling peg. This paper does not summarize my personal views about the relative merits of the crawling peg as an exchange-rate system and, of course, carries no implications as to the views on these matters either of the Board of Governors of the Federal Reserve System or of colleagues on its staff.

Advocates of the crawling peg have commonly recognized that, to forestall short-term capital movements under a crawl of 2 per cent per annum, the central bank would be required to neutralize the incentive to transfer funds elsewhere by paying interest rates 2 per cent above those available in nondepreciating currencies. However, the notion that this "crawl incentive" would necessarily limit the flexibility of monetary policy for domestic purposes during the period of crawl has recently been challenged by Professor Willett.

DOMESTIC INTEREST RATES AND THE CRAWLING PEG

On the basis of a comparison of a deficit country under the two systems, Willett concludes that the interest-rate constraint may be less under a crawling peg than under present exchange-rate arrangements. Such a country would have to keep a higher level of interest rates under the crawling peg in order to offset the crawl incentive; but under the present system, expectations of a major change in parity create the likelihood of abrupt advances in interest rates during temporary speculative crises. Such advances would push domestic rates above the levels required under the crawling peg. This pattern would, in addition, create greater strains on internal economic stability, since somewhat higher rates held at a constant level would be less disturbing to the domestic economy than a mixture of lower rates most of the time with much higher rates during periodic (temporary) speculative episodes.

Willett also suggests that the flows of private capital likely to respond to changes in the "effective-interest-rate" differential (that is, the sum of any interest-rate difference and what we have called the crawl incentive) would be limited in amount. Such movements would fully exploit interest differentials only where private capital was fully mobile. But sizeable differentials often exist among major financial markets, both on a covered and on an uncovered basis, suggesting imperfect capital mobility as the general situation.

In addition, he builds up a pattern of capital flows he would expect under a crawling peg on the basis of a portfolio-adjustment theory which holds that short-term capital flows in response to interest incentives would be primarily "a stock-adjustment reallocation of funds rather

than a continuing flow" (p. 8). Under this hypothesis, Willett would expect substantial flows initially, during the transitional stock adjustment; but once the portfolio adjustment had been substantially completed, "continuing interest-induced capital flows would be much smaller." These flows would come essentially from portfolio growth over time. On the basis of this model, Willett would advise the monetary authorities that the "initial . . . flow . . . would exaggerate the longer-run effects": once the stock adjustment had been completed, a continued crawl of the exchange rate at the same pace should have much less impact on the balance of payments.

The fact that, under this theory, the capital flows induced by the expected crawls would be reversible leads him to recommend inter-governmental "recycling" agreements as a method particularly suited to finance crawl-incentive capital flows which might occur under a crawling-parity system. He argues that, if other conditions remain the same, then once the crawl ceased "there would be a substantially full return of the funds that had flowed abroad" (p. 9).

On the basis of this pattern of projected private capital flows under a crawling-peg system, the author is able to conclude that there would be only a limited constraint on the domestic use of credit policy by the central bank under it. This analysis would appear to be based upon three principal propositions:

- a. That the height and variability of interest rates are the relevant criteria for measuring the relative constraints on domestic credit policy under the adjustable-peg and under the crawling-peg systems;
- b. That substantial disequilibrating tendencies are more likely to be found under the adjustable peg than under the crawling peg; and
- c. That private capital flows (in response to interest incentives under the crawling peg) would have the characteristics of a stock-adjustment model of short-term international capital movements.

We shall consider each of them in turn.

DURATION AS A CONSTRAINT UPON THE CENTRAL BANK

In the Willett paper, the effective constraint on monetary policy is measured primarily in terms of comparative interest-rate levels under the two forms of limited exchange-rate flexibility being compared. But the central bank may be more hampered in attaining domestic goals by a reduced flexibility for credit policy during an extended period of crawl than it would be by the need to advance domestic interest rates sharply but temporarily.

The "duration" measure of comparative constraint becomes the more important, the more continuous the crawl in exchange rates would have to be. For example, the crawling peg is said to have clear advantages over the adjustable peg in situations where only small annual changes in par value are required to restore or maintain external equilibrium, since the adjustable-peg system cannot easily accommodate itself to frequent and repeated parity changes.

But suppose the crawl had to remain in effect continuously over time, and was neither intermittent nor temporary. One could anticipate a virtually continuous crawl to correct an initial position of substantial disequilibrium or one, discussed by Emminger, where German public opinion was not "ready to accept annual price increases of more than 2% except very temporarily" compared with its trading partners where residents "are prepared to tolerate annual price increases of 3% or even more." (Speech by Otmar Emminger, "The Position of the D-Mark in the International Monetary System," at the University of Cologne, June 12, 1969, mimeographed, p. 5.) In this situation, it would be desirable to have the D-Mark crawl upward at annual rates in excess of one per cent "in small gradual steps with a minimum of disturbance."

Furthermore, a continuous crawl might develop because the crawling peg would work better, "the more quickly it begins to respond to disequilibrating forces." To this end, a system of virtually continuous crawl or even, in Willett's choice, "some form of self-adjusting peg which responds automatically to market forces" might be preferable to a variant which depends on a deliberate policy decision to initiate the crawl.

Where the crawl proved to be virtually continuous in one direction, the central bank might find a crawl-incentive factor a *permanent* aspect of the domestic credit situation. How much the crawl incentive would limit internal monetary flexibility would depend largely on the domestic economic situation at the time. It would be at a minimum in non-dilemma cases (where the deficit country had excess, and the surplus country deficient, internal demand), because the needed change in domestic interest rates in these two cases to offset the crawl incentive would be in a *direction* consistent with internal balance. Even in these situations, however, the extent to which interest rates need to be higher or lower in order to offset the crawl incentive could prove to be inconsistent with the preferred mix of fiscal and monetary policy.

In dilemma situations, on the other hand, the existence of a crawl incentive would aggravate for the central bank the conflict between the credit policy needed to restore internal balance and to achieve external balance. Where the surplus country was experiencing the threat of

internal inflation, an upward crawl in the exchange rate would imply a relatively low level of domestic interest rates, which might be inconsistent with combatting inflation; where the deficit country was experiencing internal deflation, a downward crawl in the exchange rate would imply higher domestic interest rates, which could endanger further expansion.

In summary, a crawl incentive that persisted over an extended period in one direction would reduce the flexibility of monetary policy to adjust to changes in the internal business situation. How substantial this constraint proved to be under the crawling peg would depend on the domestic economic position at any particular time. By neglecting this duration factor, however, Willett underestimates the constraint on the flexibility of credit policy implicit in the crawling-peg system.

In practice, central banks have been required under the adjustable peg to advance domestic interest rates sharply in periods of balance-of-payments weakness or in speculative crises, as Willett has suggested. But they have tended to do so chiefly in non-dilemma situations where the balance-of-payments deficits were usually associated with excessive domestic spending and where deflationary measures of some kind were usually overdue, even on domestic grounds. This generalization would cover the several instances between 1957 and 1967 when the United Kingdom advanced Bank rate during external payments difficulties and the high interest rates in the United States in 1966 and again in 1968-69.

On the other hand, despite references to advanced interest rates under the adjustable peg in the Willett paper, the financial authorities in dilemma situations have usually avoided drastic interest-rate action and turned instead to selective measures to limit private capital movements or to mandatory direct controls. That is to say, they have been reluctant to take restrictive (or easing) domestic actions in periods of balance-of-payments deficits (or surpluses) when there was inadequate (or excessive) domestic aggregate demand.

In discussing the crawling-peg proposal, Willett also considers the usefulness of selective measures, at least in a range of situations, to neutralize the crawl incentive. How effective this approach would be in practice is difficult to judge in the abstract: it would depend on the type of selective measure and the particular circumstances in which it were to be employed. In general, the experience of the United States has thus far been concentrated on limiting long-term capital flows: there are probably greater difficulties in devising administrative procedures to control short-term flows, aside from bank credit. In addition, the selective measures adopted by the United States have been most effective when they have applied to banks and other financial institutions

and have been less effective in limiting foreign lending and investment by nonfinancial investors. They have not attempted to influence capital outflows by nonresidents. Both nonfinancial investors and nonresidents might be tempted to undertake capital shifts under the crawling peg which might threaten the stability of the adjustment process under it, as we shall consider in the next section of this paper.

THE ADJUSTMENT PROCESS UNDER THE CRAWLING PEG

The effect on monetary policy of speculative flows during the financial crises that occur under the adjustable peg is one of the key elements of the comparative analysis in the Willett paper, but there is not sufficient attention to the possibility that disorderly adjustment processes could also arise under the crawling peg. Even though advocates favor the introduction of a crawling peg at a time when the exchange-rate structure was in balance, the possibility that it would not be—or that it would become unbalanced—must be considered. For this reason, the Furth attempt to analyze a built-in process of disequilibrium under the crawling peg usefully supplements the Willett paper. (See J. Herbert Furth, "International Monetary Reform and the 'Crawling Peg'—Comment," *Review*, Federal Reserve Bank of St. Louis, July 1969, pp. 23-24.)

The assumptions of the Furth model are unfortunately not clearly specified, but his paper does suggest the outlines of a process of disequilibrium in the mechanics of adjustment under the crawling peg in certain circumstances. He begins his process with a tightening of credit at home, without indicating the country's external position at the time. This action leads banks and entrepreneurs to seek funds abroad; the capital inflows would push up the exchange rate under the crawling peg. Once under way, Furth argues, capital inflows would persist as long as financial markets believed the upward creep would be maintained.

The expectation of a further upward crawl in the spot rate is central to the Furth model. Because of this expectation, the argument runs, the forward rate would move to a premium and create a crawl incentive for inflows of capital. Because of this self-reinforcing process of inflow of private capital, Furth concludes that "anti-inflationary monetary policy would probably be less effective, not more effective, than under the present system" (p. 13).

The critical role of the expectations of further upward crawl in the exchange rate would limit the likelihood of a self-reinforcing upward crawl only to a country with a protracted surplus, and a downward crawl only to a country in continuing deficit. The emergence of a self-

reinforcing process of disequilibrium under the crawling peg would seem to depend on the assumption that a further crawl in the spot rate would remain credible. For example, we could imagine self-reinforcing capital inflows into Germany in mid-1969, if the DM had begun an upward crawl, even greater than those which took place at the time; under the crawling peg the pressures on the monetary authorities would be to relax monetary policy, since the inflows would tend to be intensified so long as credit conditions continued to tighten. Similarly, capital outflows would probably have occurred in mid-1969 from the United Kingdom if the spot pound had had any freedom to crawl downwards, especially if the British authorities had come to the view that the main targets of domestic stabilization were being reached and that current levels of interest rates ought to be allowed to recede.

The distinctive character of the narrow- or moderate-band variants of the crawling peg, from an adjustment point of view, is the limited movement in the spot rate. Hence, export and import flows can change only slowly. In situations where only minor changes in trade or capital flows would restore external equilibrium, accordingly, a smooth adjustment could be expected under the crawling-peg system.

But the efficacy of the crawling-peg system would be much diminished in situations where the degree of external disequilibrium was substantial. Such a situation could arise because the pattern of exchange rates was distorted when the crawling peg was introduced or because corrective exchange-rate actions had been postponed under it, just as they had been under the adjustable-peg system.

As an example, suppose the DM could crawl at a rate of only 2 per cent per annum in a situation where an appreciation of, say, 10 per cent seemed to be required. This kind of situation, as it actually developed under the adjustable peg, produced continuing capital inflows into Germany, augmented from time to time by bursts of heavy speculation, which were usually explained (at least by German officials) in terms of a weakness of the French franc or of the pound. In Germany, the authorities offset both the domestic and international effects of these inflows, partly through encouragement of German private capital exports and partly through dollar-swaps between the Bundesbank and local commercial banks. Nevertheless, during 1964-66 and again in 1969, the German authorities were able to raise local interest rates to slow down the internal boom, despite the threat of private capital inflows.

Under the crawling peg, however, investors and entrepreneurs might have even greater incentives to place funds in Germany than under the adjustable peg, especially when the forward DM premium was

pushed up. Even if the forward DM were at interest parity (so that there was no incentive to shift funds from Euro-dollar to DM assets on a covered basis), a holder of Euro-dollar deposits would still have an incentive to buy DM assets on an uncovered basis. Because the DM would be crawling upward, the dollar value of his DM assets would grow with time; in the circumstances, he might prefer to be self-insured against what he might regard as a minimal risk of a devaluation of the DM against the dollar.

On this basis, private parties would have incentives to move funds on a precautionary or outright speculative, rather than on an interest-arbitrage, basis into an upward-crawling DM, as has been the case under the adjustable peg. Because adjustment through the trade accounts could necessarily proceed only slowly, however, a temporarily self-reinforcing process of disorderly capital flows could develop. During the transition in these circumstances, in fact, the monetary authorities might well find that these unwanted capital flows would continue over a longer period and be as difficult to bring under control as they had been during the temporary speculative crises under the adjustable peg.

WHAT PATTERN OF PRIVATE CAPITAL FLOWS?

The Willett paper outlines a pattern of expected private capital flows in response to the incentives under the crawling peg, which must be regarded with caution. The central criticism of this pattern of flow is focused not on its theoretical foundations but on the reliability of the pattern of flows which he outlines. In the sequence presented in the paper, these capital flows

- a. would be much reduced, once a transitional stock adjustment had been completed;
- b. would thereafter be limited, even with a continued crawl of the exchange rate at the same pace; and
- c. would be reversible in character so that, when the crawl ceased, a full return of the funds that had flowed abroad would be anticipated.

That is, crawl-induced flows, once underway, would be expected (i) to diminish, (ii) to be limited in amount, and (iii) to be reversible. It is the credibility of this particular response to an interest-differential or crawl incentive which we must consider in this section.

This pattern of response rests of course upon familiar portfolio theory, supported by econometric tests designed to measure the response of capital flows to changes in interest-rate differentials. The analysis, based

on a stock-adjustment concept of capital flows, concentrates upon the given portfolios of investors: how investors alter the distribution among investment outlets when interest-rate incentives are changed and how their portfolios grow over time. The theory can, in fact, be broadened to encompass short-term capital movements associated with the pattern of trade financing (so-called leads and lags in commercial transactions) and even extended to include a range of assets of longer-term maturities.

For our present purpose, questions about the magnitude of capital movements from such portfolio adjustments are of secondary importance. Estimates of interest-sensitive funds under the adjustable peg have become much larger in recent years; they reflect both improvements in estimating techniques and an increased capital mobility in the real world. Under a Branson estimate referred to in the paper, the interest sensitivity of American short-term capital movements would produce on the average a stock adjustment of \$1.5 billion in response to a one percentage point change in domestic interest rates relative to those abroad.

But the actual flows in the real world under the adjustable peg seem to have substantial variation. There are undoubtedly major data imperfections in this area. In addition, there are technical difficulties. Interest rates in the real world may not fully reflect variations in availability (so that they do not fully reflect the demand for loanable funds) or variations in credit-market conditions (so that there can be substantial differences in the supply of loanable funds at identical levels of interest rates). Furthermore, variable expectations about exchange rates, whether or not reflected in forward rates, could produce differing capital flows at identical interest differentials. Finally, differences in balance-of-payments trends at identical interest differentials could produce different magnitudes of capital flow.

In brief, under the adjustable peg, estimates which relate short-term capital flows to interest-rate differentials (under the stock-adjustment model) or to levels of interest rates (under a flow-adjustment model) show substantial variance. The common experience is that, up to now, measurement estimates have had a notoriously poor performance in predicting capital flows. In part, these results may reflect noninterest-sensitive funds which are not measured by these estimates; in addition, the econometric estimates are necessarily based on a given set of expectations and would be altered by any change in them.

If we turn to the pattern of capital flows to be expected under the crawling peg, the principal theoretical question to be asked is whether the crawl itself—as it progresses in financial markets—would have effects on expectations, which would be destabilizing. Consider the case

of a country like Italy in 1963-64, which experienced substantial capital outflows, prompted by a growing uncertainty about internal political stability as much as by domestic inflation. Under the adjustable peg, the capital flows, based on fears about the political outlook, themselves contributed to a major deterioration in the internal political climate.

As the situation developed under the adjustable peg, however, the Italian authorities did not devalue the lira. Instead they introduced a stabilization program which was accepted by financial markets as credible, and quickly proved to be effective in transforming the balance of payments into surplus and the internal inflation into mild recession. What would have been the course of events had the spot lira begun to crawl downward? Would a crawl have sparked additional capital outflows and would they, in turn, have contributed to a further deterioration in Italy's domestic political situation?

The proposition that a downward crawl in the lira in 1963-64 would have adversely affected expectations is difficult to evaluate in analytical terms, in large part because noneconomic factors are the dominant uncertainties in such situations. The effects on expectations of a stable rate subject to the threat of devaluation compared with the effects on them of an actual downward crawl raise difficulties beyond the technical resources of economic analysis.

A downward crawl might, or might not, stimulate private capital flows additional to those under the adjustable peg. In economic terms, the case for a positive answer would seem to rest on the signal effect of a declining spot rate: that is, a wider group of investors and entrepreneurs might be alerted to the currency's weakness if the spot rate began to decline than would be alerted by reserve losses at an unchanged spot rate in the exchange market. This argument would be strengthened by the general consideration that the monetary authorities now have techniques for postponing, or offsetting, the effects of reserve losses on the official reserve assets shown in published statistical series. This factor could have been especially important in the Italian episode, because the effects of the growing Italian deficit on official reserves were much diminished by substantial private Italian borrowings in the Euro-dollar market in 1963.

The question can also be raised as to whether entrepreneurs would respond with a different pattern of leads and lags in commercial payments under the crawling peg than they would under the present system. Under present arrangements, such flows occur as uncertainties about a par value mount. They tend to erupt into massive volume during the acute phase of balance-of-payments crises; but they also tend to be reversed when the government presents a credible stabilization program,

whether the par value is altered or not. This sequence of flows occurred in Britain in mid-1966, in Italy in the spring of 1964 and could take place in France in late 1969 or in 1970. The return flow into sterling was limited after the devaluation in November 1967, despite a broadly-based stabilization effort, because British policies were not fully effective in strengthening expectations.

Under the crawling peg, by contrast, there would be two main differences in the situation. First, entrepreneurs would face the certainty of a slowly declining par value. Again we have the question about the signal effect: would a broader group of entrepreneurs shift leads and lags against a weakening, and in favor of a strengthening, currency where the spot rate actually began to move than they would in situations where the spot rate was held?

Secondly, could we expect the leads and lags to be reversed under the crawling peg as they might be under present conditions? The critical element under the adjustable peg is the presentation of a credible program of domestic stabilization; such a program would also be necessary to halt the downward crawl, although in some situations the downward crawl could itself ease the conflict between the domestic and external goals of economic-stabilization policies.

In the absence of a credible program, these leads and lags would not, in my view, respond to changes in credit costs or otherwise have a tendency to be reversed. For entrepreneurs are assumed to be risk-aversers rather than profit-maximizers and their decisions to reverse their positions would not be based on a calculation of the probability of change and amount of change in the exchange rate similar to Willett's. On the contrary, commercial leads and lags are precautionary and, to entrepreneurs, usually *risk-reducing* and not *risk-increasing* in character. In this situation, the certainty of a continued decline in the spot rate would probably lead them to maintain an unbalanced foreign-currency position for the duration of any crawl. In a word, their strategy would seek to reduce assets and/or increase liabilities in a downward-crawling currency and to reduce liabilities and/or increase assets in an upward-crawling currency. (The precautionary and risk-averting character of leads and lags is elaborated in my paper, *Sterling Speculation and European Convertibility: 1955-1958*, Essays in International Finance No. 37, October 1961, esp. pp. 3-6.)

To summarize, there are grounds for doubting whether the comfortable pattern of short-term capital flows, and even of purely interest-sensitive funds, outlined in the Willett paper, can be expected to materialize under either an adjustable peg or a crawling peg. These doubts rest on major data imperfections as well as on the reliability of market

interest rates as measures of variations in the demand and supply of loanable funds in financial markets and of expectational factors which shape investor portfolio behavior in the real world. Furthermore, if the pattern of these flows varied from the three characteristics he has outlined, the case for using temporary recycling credits as a neutralizing device for crawl-induced flows would be much weakened.

But our concern about the assumption of a regular pattern of crawl-induced capital flows goes beyond these technical considerations. The crawling-peg system is unique in that, unlike the adjustable peg, the spot rate will always be in motion in periods of imbalance. The question must therefore be asked: could the crawl itself have effects on expectations, which were destabilizing either in the downward or upward direction? Economic analysis cannot provide a clear-cut answer to the question, in part because noneconomic factors may sometimes be more important determinants of the weakness or strength of a currency than purely economic factors. But there have been enough episodes in the real world to confirm the importance of this possibility under the crawling peg.

CONCLUDING OBSERVATIONS

To focus fresh attention on the constraints on credit policy under the crawling peg, as the Willett paper does, is particularly constructive at a time when various forms of limited exchange-rate flexibility are being seriously explored. His contention that the constraints would be limited in situations where only small changes in the exchange rate are required to correct international imbalances should be recognized. The analysis becomes more controversial when he compares the processes of adjustment between a situation of mild disequilibrium under the crawling peg with one of substantial disequilibrium under the adjustable peg. The possibility of substantial disequilibrium under the crawling peg must also be introduced into the analysis.

Within this broader appraisal of the crawling peg, Willett's conclusions may understate the magnitude of the constraints on the central bank, even in his own terms. The preferred form of crawling peg, from an adjustment point of view, may be one characterized by a continuous crawl, whether self-adjusting or discretionary in character, as he recognizes. Because it would create the most enduring crawl incentive within the domestic credit system, this form might greatly reduce the flexibility of monetary policy to respond to short-term variations in internal effective demand. In this case, the exchange-rate arrangement that might promote more effective adjustment than has taken place under the adjustable peg since 1958 might well be at the expense of a loss of flexibility in using monetary tools for internal stabilization. On the other hand, the central banks can hope to retain their present freedom to use

credit policy for domestic-stabilization objectives only if they can agree upon ways to make the adjustment process function more smoothly under the adjustable peg.

From an adjustment point of view, the great need is for the monetary authorities to be prepared to respond to external imbalance with more prompt exchange-rate action in the future than they have in the past, whether we have an adjustable-peg or a crawling-peg exchange-rate system. The founding fathers at Bretton Woods sought to create a form of limited exchange-rate flexibility in the adjustable peg: under their intentions, exchange rates were to be stable in the short run and flexible in the long run. But the rigidity of exchange rates between 1958 and 1967 made the adjustable-peg system, as it was interpreted in practice, more nearly akin to a fixed-rate system of the years before 1914 than to any recognizable form of limited flexibility.

For this reason, Willett may be unduly pessimistic in his assumption that the adjustable peg would function no more flexibly in the future than it has in the past. The same shift in official thinking which would lead the major industrial countries to accept a system of crawling pegs could also be reasonably expected to produce more flexibility under the adjustable peg.

Because a change in official attitudes needed to make the crawling peg work would also make the adjustable peg function more smoothly, the emphasis in the Willett paper upon the competitive elements between these two systems obscures both an essential similarity and a potential complementarity between them. They are similar in that both depend upon a willingness of officials to permit exchange rates to be altered in the interest of international adjustment. They could be regarded as complementary from the point of view of technique of adjustment. To avoid a disorderly process of self-reinforcing capital flows in situations of substantial disequilibrium, advocates of a crawling peg might support larger discrete changes in parity when required to erase accumulated imbalances. That is to say, they have recognized as a practical matter that the system would work better the more closely the initial position corresponds to equilibrium. This reasoning has led them to recommend a one-time change in par values, when needed, as a prerequisite to the introduction of the system. It could equally provide a theoretical justification for discrete parity changes to eliminate substantial disequilibrium even after the system had been in operation. On the other hand, advocates of the adjustable peg might welcome correction through a crawling peg of a situation of minor external imbalance which, otherwise, would be expected to cumulate over time into a position of substantial disequilibrium.

III. POLICIES REGARDING SHORT-TERM CAPITAL MOVEMENTS

Samuel Katz has raised several interesting points in his paper in this essay. After some discussion in our first section of issues raised by Katz, we will go on in the second section to discuss the general nature of policy issues raised by international financial capital movements, and various possible ways to deal with these issues. Finally, in the third section, we suggest a policy strategy for dealing with financial capital movements under a gliding parity system. Since our views on some of these issues are in the formative stage, the points in this section are offered to stimulate further discussion.

COMMENTARY ON THE KATZ PAPER

We welcome Katz's emphasis on viewing adjustable and gliding parities as potential complements rather than necessarily as antagonists. This has been implicit in the comments that it would not be feasible to rule out entirely the possibility of discrete changes in exchange rates, but it is useful to have it stated in a positive manner.

Considering the effects on both trade and capital flows, it appears to us that gliding parities work best in keeping a country's balance of payments roughly in equilibrium rather than in trying to overcome an already existing disequilibrium of substantial size. Narrow-band gliding parities can handle divergent balance of payments trends caused by differential rates of monetary expansion, technological progress, growth, and so forth, but they are not as well suited to handle disturbances which cause rapid changes in a country's competitive position. In the face of such disturbances greater exchange-rate flexibility is needed, be it in the form of substantially wider bands, free rates, or discrete parity adjustments.

Now let us offer a brief rejoinder to several of Katz's criticisms of the Willett paper. In the first section of his paper Willett attempted to compare the incentives for capital movements under a gliding parity and under a sticky adjustable peg. To illustrate these incentives it was assumed that interest rates were always adjusted to prevent speculative short-term capital flows. In the second part of his paper Willett considered the nature of short-term capital movements and concluded that this interest rate constraint need not be met. Katz argues that Willett's analysis overlooks the importance of the duration of the constraint in limiting domestic monetary flexibility. But Katz's discussion assumes that the interest-rate constraint is accepted by policymakers, while the thrust of the Willett paper (and also of an early memorandum by Branson) is that it need not be accepted. As was noted by Willett, it makes considerable difference whether one contrasts the incentives for capital movements under

a sliding parity with an adjustable peg which adjusts promptly to disequilibrium or one under which adjustment is postponed for considerable periods of time. The latter behavior has been more characteristic of the recent operation of the international monetary system. Katz discusses, on page 19 the recent situation of the under-valued mark in comparison with what would have occurred under a gliding parity. He notes the large volatile movements of short-term capital into Germany, but argues that "Under the crawling peg, however, investors and entrepreneurs might have even greater incentives to place funds in Germany than under the adjustable peg. . . ." This apparently overlooks the calculations given in the table in Willett's paper which considers just such a situation. These indicate that unless a discrete change in parity is still considered likely, the expected return from shifting into marks would almost certainly be reduced by a sliding parity.

The discussion of incentives from changes in expected returns in Willett's paper covers forward speculation and spot speculation as well as leads and lags and covered and uncovered arbitrage. However, it did fail to point out explicitly that a change in expected returns which lasted for only a few days or weeks would not induce as great a shift of funds as would a more permanent change. There are many factors which may constrain the speed with which firms and individuals adjust their portfolios (defined broadly to include the timing of flows of payments and receipts). Thus the duration of a change in returns may be an important determinant of the flow of funds, up to the point at which the stock adjustment is substantially completed. The econometric evidence available suggests that most of the stock adjustment in response to a change in incentives would be completed within six months.

Of course expected returns are not the whole story. As indicated in the explanatory note to Willett's table, risk attitudes may also be important. Economic units are generally thought to be expected-utility maximizers rather than money-income maximizers. An individual may not be indifferent between a sure \$2 gain and a 20 per cent chance of a \$10 gain. Nor will he necessarily be just indifferent as to whether or not to pay \$2 as insurance against a 20 per cent chance of a \$10 loss. A risk-averter would take the sure \$2 choice in each case.

What does this tell us about how short-term capital movements would react to prospective exchange rate changes with the same expected return, for example a certain 2 per cent change or a 20 per cent chance of a 10 per cent adjustment? While conceptually the result could go either way, we do have some clues about the likely effects. Despite the press coverage given to the Gnomes of Zurich who speculate for gain, most specialists in the international money market (including Katz, who has made important contributions in this area) believe that the

quantitatively most important motivation for short-term capital movements is precaution. To the extent that this motivation for capital movements predominates and traders view movements from one currency to another as cost-minimizing, the incentive to move funds under a gliding parity would be less than that under a sticky adjustable peg on risk grounds as well as on the basis of expected return.

There is one more point in this connection which Katz raises and which Willett did not consider explicitly. This concerns the visibility of possibilities for speculation. The previous discussion assumed that economic units had equal knowledge of the alternatives. This may not be the case, however. Possibilities might be more visible under one system than another. As Katz indicates, it is difficult to say which would be more visible. Katz's discussion, however, appears to indicate a suspicion that possibilities for speculation would be more visible under a gliding parity than under the present system. This may well be the case, but we cannot suppress the thought that the exchange crises of the recent past have made the New York investor much more aware of the strength of the mark than would have been the case had the German Council of Economic Experts' recommendation of an upward-crawling parity been accepted in 1966.

In concluding, let us briefly supplement Katz's discussion of the argument put forward by Furth that under an upward-crawling peg capital inflows will be accelerated as long as the market believes that the rise in the exchange rate will continue. In his discussion, Katz argues that the likelihood of such a process would be limited to cases in which countries registered protracted surpluses or deficits. We would argue, however, that the conditions necessary for such a process to occur are even more stringent than this. Either relevant portfolio decisions (including forward positions) would have to be of a flow rather than a stock-adjustment nature or the movement of the exchange rate must not only be expected to continue; it must be expected to accelerate.

Let us now turn to a more general discussion of economic policy toward international financial capital movements.

A TAXONOMY OF POLICY MEASURES AND CONCERNS

The sources of the interest of policymakers in international financial capital movements may be divided into three major categories: the actual or potential effects of such capital movements on

- 1) the balance of payments,
- 2) domestic monetary management, and
- 3) the efficiency of resource allocation.

While the same capital movement or policy toward capital movements may have effects under all three categories, it is useful to keep the three conceptually distinct.

Concern over the balance of payments effects of capital movements may range from the desire to prevent or offset potential capital flows themselves to the active manipulation of capital movements to offset a net surplus or deficit in the rest of a country's balance of payments. Discussions of the effects of financial capital movements on domestic monetary management are usually concerned with the reduced ability to follow an independent monetary policy implied by high capital mobility, although it should be noted that some countries manipulate the foreign (asset and liability) positions of their commercial banks in lieu of open-market operations to influence the domestic money market.

Concern over the resource-allocation effects of financial capital movements results from the fact that for numerous reasons, such as the existence of disequilibrium exchange rates and other market imperfections, the private and social costs and returns from international financial capital movements may not be the same. International interest rate differentials often do not adequately reflect international differences in the productivity of capital; thus false signals may be given to private investors and borrowers. Furthermore, deficiencies in the adjustment mechanism mean that there may be a transfer problem—"desirable" net financial capital movements may not generate commensurate movements of real resources. In many cases, these distortions are the result of poor functioning of the international monetary system. Thus, for instance, greater exchange-rate flexibility should substantially reduce the type of large, volatile movements of capital which have recently been observed when parities come under suspicion, and likewise should reduce the distortions (pointed to by Lutz) caused by differential inflation premiums in the interest rates of countries connected by temporarily fixed exchange rates. Similarly, the transfer of real resources in response to net capital movements would be facilitated. In such a situation the first-best solution would be reform of the exchange-rate system. But where this is not possible, there may be a case for the use of selective measures, as a second-best policy. Furthermore, there may be some market imperfection not connected directly with the exchange-rate system. Thus, while the Interest Equalization Tax was enacted primarily for balance-of-payments reasons (as a second-best policy to exchange-rate adjustments), it appears to have had a major effect in giving infant-industry protection to the development of European capital markets. It may thus have had a beneficial long-run effect on the efficiency of resource allocation.

Within any given exchange-rate system policy measures toward financial capital movements may be grouped into four major categories:

1) General monetary (interest-rate) policy may be adjusted to induce or prevent capital movements.

2) Selective measures may be used for this purpose. These may range from attempting to twist the interest-rate structure or the use of official forward intervention or swaps, through moral suasion (voluntary controls), to formal requirements or controls and fiscal (tax and/or subsidy) measures which influence the relative profitability of investing and/or borrowing at home and abroad. These may be applied in a general or discriminating manner and may be used either to affect directly some type of capital movement or to offset it by inducing a private capital movement in the opposite direction.

3) Capital movements may be financed by reserve movements or official borrowing and lending.

4) Other components of the balance of payments may be allowed or forced to adjust to the capital movements.

In addition, as we have briefly indicated above, changes in the exchange-rate system may have important influences on capital movements.

The reason for concern over capital movements will of course be an important determinant of the most desirable policy or mix of policies to follow. Where the cause of concern is a relatively constant divergence between private and social costs and returns, a selective tax and/or subsidy would probably be prescribed if other institutional improvements could not be made. The number of cases in which a pure case of externalities is of substantial importance is probably not great, however. More often, a significant divergence between the private and social points of view will be caused by the desire to maintain a disequilibrium exchange rate. In such a circumstance, the private and social points of view (the latter taken as the view of policymakers) can be thought of as a shadow price implicitly placed on the reserve changes which would be necessitated by the capital movement in question. Where a country is in a tight reserve position with little borrowing power, the relationship between reserve losses and the shadow price of reserves would be nonlinear over the relevant range, with the shadow price sharply increasing as a function of reserve losses within a given time period. Maintenance of an overvalued exchange rate not only increases the average rate of outflow of reserves, but also increases the variability of reserve movements. This is because such a currency is especially susceptible to periodic speculative runs generated by events which

change expectations concerning exactly when the devaluation will come. In cases where maintenance of an overvalued exchange rate generates volatile capital movements, an efficient tax-subsidy scheme would have to be nonlinear and would prove extremely difficult administratively. In such a situation, formal controls would probably be required in order to suppress capital movements. This is in fact the policy approach toward volatile capital movements which was provided in the Articles of Agreement of the Bretton Woods System.

An alternative policy under the assumed conditions would be to raise interest rates to the level that would be needed to reduce capital outflows. The high level and variability of interest rates which this would require would make such policies extremely unsettling to the domestic economy, however. A third approach would be to make available to the country sufficient credits to allow it to ride out fluctuation in its short-term-capital account. This would reduce the shadow price on reserves, diminishing the externalities to the deficit country from capital movements under conditions in which exchange-rate movements are constrained.

A STRATEGY FOR POLICY REGARDING FINANCIAL CAPITAL MOVEMENTS UNDER A GLIDING-PARITY SYSTEM

Now let us offer the following three propositions as the basis for policy toward international financial capital movements under a system of gliding parities.

1) Exchange rate and reserve movements should be used as balance-of-payments policies, leaving monetary policy to be focused primarily on achieving internal balance. (This may be subject to qualification in that a given exchange rate system may imply the maximum continued differences between countries' financial policies which is considered desirable by the international community or a regional grouping.)

2) Ample facilities should be available to allow official financing to offset the balance-of-payments effects of fluctuations in short-term capital accounts.

3) Where short-term capital movements are so large and volatile as to upset domestic monetary management, selective measures should be used by the country in question to insulate at least partially its domestic financial markets.

Without attempting a rigorous explanation and defense of these propositions, let us offer the following observations.

The basic case for official financing of fluctuations in the short-term capital account has been presented elsewhere. (Willett, *Kyklos*, 1968 and Willett and Forte, *Quarterly Journal of Economics*, 1969.) How-

ever, let us add here that the case for official financing seems even stronger under a system of gliding parities than under the present system. Greater exchange-rate flexibility would help reduce what is probably the major source of friction in the international monetary system: the question of how adjustment to mutual imbalances should be shared.

There are two major purposes for international reserves: to allow time for basic corrective developments and to avoid the need for adjustment to temporary phenomena. Fluctuations in the short-term capital account are certainly prime candidates for the use of reserves for this second purpose. One way to accomplish this would be to increase owned reserves to the point where they were ample to cover such fluctuations. This, however, may not be the most desirable solution. While such reserve creation would be virtually costless in terms of resources directly expended, beyond some point it could adversely affect the operation of the international monetary system. The level of reserves most desirable from the point of view of the first function of reserves may not coincide with that which is most desirable for the second function. In particular, given the large quantities of funds which may switch from one currency to another, the level of reserves required to finance such movements might place more adjustment pressure on surplus countries than might be desirable.

One way to help reconcile this difficulty is to make borrowed reserves available for financing balance-of-payments fluctuations in order to supplement the use of owned reserves to finance basic deficits while corrective actions were being taken. Of course, in practice, these two functions of reserves cannot be sharply distinguished. Generous financing of balance-of-payments fluctuations almost inevitably leads to some easing of the pressure on deficit countries to take basic corrective actions. Such reasoning underlies the reluctance of officials to agree to open-ended commitments to recycle movements of speculative funds. Under a gliding parity, however, concern over the adjustment pressure placed on deficit (or surplus) countries should be lessened, for movements in the exchange rates will be acting to reduce underlying imbalances (unless one believes that exchange-rate movements would be more than offset by increased financial tightness in surplus countries and looseness in deficit countries). Thus it should be easier to secure agreement to finance fluctuations in the short-term capital accounts under systems of greater exchange-rate flexibility.

One of the basic arguments for greater flexibility of exchange rates is that it would reduce the use of balance-of-payments controls. Yet in proposition three we advocate the use of selective measures. Does this

not undermine the basic argument for greater flexibility? Our answer is no. Sufficient exchange rate flexibility to bring long-run adjustment and ample provision of official financing to handle fluctuations such as short-term capital movements can eliminate the need for using controls or selective measures for *balance-of-payments* reasons. However, there still remain the other two reasons for possible policy concern over capital movements discussed in the first section. These may still call for use of selective measures for reasons other than maintaining balance-of-payments equilibrium. We would expect the general level of usage of selective measures to drop significantly with the introduction of a gliding-parity system, however.

As we indicated earlier, in our opinion most of the concern over the resource allocation effects of free capital movements stems from the maintenance of disequilibrium exchange rates. Thus greater exchange-rate flexibility should substantially reduce the need for corrective fiscal measures for such purposes. Likewise, if we are correct that greater exchange-rate flexibility would bring about more stable expectations, the large volatile movements of short-term capital which have recently been observed should be reduced. Thus, greater exchange-rate flexibility in itself could reduce the extent to which domestic monetary management is complicated by large inflows and outflows of capital.

It is primarily in the surplus countries that domestic financial management might be complicated by the high mobility of international short-term capital movements. The types of measures which can be taken to help insulate the domestic money market include special taxes on interest payments to foreigners and special reserve requirements against funds obtained from abroad by commercial banks.

The effects of inflows could also be offset to some extent by generating compensatory outflows of private funds. However, we should note a serious disadvantage with the policy of inducing *private* recycling by offering special inducements such as attractive forward rates to domestic concerns to place short-term funds abroad to offset the effects of inflows from abroad. Unlike official recycling, the same funds under private recycling could go round and round. Consider a speculative inflow of funds from the Euro-dollar market into Germany. If swapped back out again to the Euro-dollar market, interest rates and the availability of funds will not be tightened. The cost of borrowing funds in the Euro-dollar market to invest in marks would not rise and the same net flow of funds could facilitate an ever increasing level of gross assets and liabilities.

The types of selective measures used to insulate domestic money markets should have little adverse effect on the efficiency of the interna-

tional monetary system. They would not disrupt movements of capital for the purpose of trade financing, for instance. And if we are correct that expectations would be more stable under a gliding parity, partial selective measures would be much more easily enforceable. Where one thinks that there is a substantial probability of a large discrete change in parity, the loss of interest on one's funds during the time they are reinvested in the currency expected to revalue might be of little concern. As indicated in the table in the Willett paper, even a substantial interest loss might still leave a net expected return when a revaluation appeared likely. But under the more gradual exchange-rate adjustments under a gliding parity, a tax on foreign-owned financial assets could easily offset the incentives for portfolio funds to move into Germany. There should certainly be less need for the types of comprehensive exchange controls recently used by France, for instance.

In summary, our conclusion on the question of the use of selective measures under a gliding parity is that there still may be appropriate occasion to make use of selective measures toward financial capital movements, but not for balance-of-payments reasons. As a result both of this directly, and of the smoother operation of the international monetary system in general, the number of occasions when the use of selective measures would be appropriate would be reduced substantially, and the types used could generally be limited to selective fiscal measures which would be much less disruptive to normal economic activities than many of the types of formal or de facto exchange controls in operation today.

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