

International Monetary Reform and the “Crawling Peg”

The following is a guest article prepared by George W. McKenzie, Assistant Professor of Economics at Washington University in St. Louis. Professor McKenzie received his Ph.D. from the University of California at Berkeley in 1967. The article is presented with the anticipation that his framework and viewpoint will bring forth useful comment and discussion on the international monetary system. These views do not necessarily represent those of the Federal Reserve Bank of St. Louis or of the Federal Reserve System.

IN ORDER for the world economy to function smoothly, it is necessary that the international monetary system meet three basic tests:¹

1. It should provide an environment in which each participating country can pursue its own domestic goals, such as full-employment, reasonable price stability, economic growth, and social justice.
2. It should be conducive to stability and growth in international trade and capital investments.
3. It should operate without the imposition of direct controls on international transactions, since these controls reduce the benefits of international specialization.

Over the past decade, there has been continuous and growing concern by many economists and Government officials that the framework of the International Monetary Fund (IMF), as developed at Bretton Woods in 1944, is unable to meet these three goals and, hence, should be modified. To most casual observers, the events of the past two years seem to support this concern. An air of uncertainty and skepticism surrounds the Bretton Woods System, which has experienced the British devaluation, the increase in the free market price of gold, the imposition of restrictions on domestic activity in France and the United Kingdom, and a proliferation of controls on international transactions.

¹These three goals roughly correspond to the objectives of economic policy discussed by the Deputies of the Group of Ten in the Annex to the 1964 Ministerial Statement. These documents are reprinted in the *Federal Reserve Bulletin*, August 1964, pp. 975-999.

This article proposes that the basic philosophy underlying the International Monetary Fund is *workable*, but that to be satisfactorily implemented, certain reforms in its operation are needed. In particular, a “crawling peg” exchange rate system should be substituted for the current “adjustable peg” mechanism.

The national representatives who drafted the IMF’s Articles of Agreement generally believed that reasonably stable exchange rates were necessary for the growth of international transactions. While they hoped that rates could remain pegged for extended periods of time, they also recognized that some countries might want to adjust their exchange rates if they were experiencing serious international payments imbalances. Hence, the “adjustable peg” concept was created.

In practice, the “peg” has been adjusted only infrequently by industrial countries and often only as a last resort.² Thus an important policy instrument for dealing with international payments difficulties has not been utilized. In contrast, under a “crawling peg” system, exchange rates would vary but only on the basis of a predetermined formula agreed upon by the members of the IMF. Such an international monetary arrangement would have the following advantages:

1. Exchange rate flexibility would increase the effectiveness of monetary policy in achieving domestic goals.

²For a discussion of the reasons for this, see R. S. Sayers, “Co-operation Between Central Banks,” *The Three Banks Review*, September 1963.

2. By spreading exchange rate adjustments over long periods, the "crawling peg" system would avoid the periodic exchange crises and uncertainty of the present system.
3. The incentive for countries to impose controls on international transactions would be reduced. Indeed, a prerequisite for the successful operation of the "crawling peg" is a reduction in such controls.

Thus the "crawling peg" meets the three basic tests of a satisfactory international monetary system. Before examining the "crawling peg" in detail, the present system and the sources of its weakness are discussed.³

The Bretton Woods System

Because exchange rates are pegged under the Bretton Woods System, a gap may develop between the *demand* for foreign exchange by a country's citizens to purchase goods, services, and financial items abroad and the *supply* of foreign exchange generated by sales of such items to foreigners. If the country's officials consider the imbalance to be *temporary*, they may fill the gap by allowing a net change in their country's international reserves, consisting of (a) gold, (b) foreign exchange, and (c) its position vis-a-vis the IMF.⁴ In addition, countries may arrange to obtain loans from one or more countries.

International reserves exist in order to enable countries to withstand such temporary payments deficits. However, since the deficit country has a limited stock of reserves, its ability to rely on them to bridge a continuing gap between its international payments and receipts is also limited. Supplemental loans from trading partners may be sought but are usually contingent upon some form of positive

balance-of-payments adjustment. In addition, the surplus countries, while initially welcoming reserve accumulation as an indicator of their strength in the world economy, eventually may want to limit their build-up and hence will put pressure on the deficit country to take remedial action.⁵ Thus countries experiencing prolonged deficits under the present system eventually must undertake severe measures of adjustment. These usually take the form of either policies of exchange rate adjustments, aimed at switching spending from foreign to domestic goods, or policies aimed at reducing aggregate expenditure and hence spending abroad. Although in extreme circumstances a deficit country is permitted, under the IMF Articles of Agreement, to impose controls on international transactions in order to correct a deficit, this course generally encounters opposition.

The "Adjustable Peg"

Because changes in exchange rate par values are discretionary, and their timing and magnitude are extremely difficult for officials to determine, exchange rates tend to be altered only as a last resort under the "adjustable peg" system. As an alternative, industrial countries have developed a complex network of credit facilities and supplements to existing reserve assets that enable them to postpone exchange rate changes in the hope that either the situation will correct itself, or that suitable domestic policies can be implemented.

Therefore, when they do occur, exchange rate adjustments are usually relatively large in magnitude, and concentrate within a short period a large burden on the import and export sectors of the initiating country and its trading partners. On the other hand, failure to undertake such adjustments may be equally costly. If a country's payments deficit is due to costs and prices rising faster at home than abroad, domestic export- and import-competing industries will find business dwindling.

The prospect of large periodic exchange rate adjustments can lead to a considerable loss of confi-

³For a detailed discussion of the pros and cons of fixed and flexible exchange rates, there are a number of interesting sources: Fritz Machlup and Burton Malkiel, eds., *International Monetary Arrangement: The Problem of Choice*, (Princeton: Princeton University Press, 1964), especially Chapter 4; M.O. Clement, et. al., *Theoretical Issues in International Economics*, (Houghton-Mifflin, 1966), Chapter 6; and the Federal Reserve Board, "A System of Fluctuating Exchange Rates: Pro and Con," *State of the Economy and Policies for Full Employment*, Hearings, Joint Economic Committee, U.S. Congress, Eighty-seventh Congress, Second Session.

⁴Under the provisions of the IMF, a member country is obliged to deposit with the IMF a quota consisting of 25 per cent gold and the rest its own national currency. A country's reserve position at the IMF consists basically of its gold subscription minus its net drawings plus the IMF's net sale of its currency, in addition to any amounts of its own currency that it has repurchased. This position represents the amount that essentially can be drawn automatically.

⁵Basically, countries hold international reserves for the same reasons that stores and manufacturers hold inventories. Each merchant wants to have enough stock on hand to meet his customers' demands as quickly as possible. On the other hand, he does not want to maintain such a large inventory that a significant portion of his investment is tied up. Similarly, a country will want to have enough reserves on hand in order to meet any balance-of-payments deficits. However, it does not want to build up reserves indefinitely, since this involves the transfer of real resources to foreigners in return for less productive assets.

dence in the currencies of the countries involved. Suppose that country X has experienced prolonged balance-of-payments deficits and the expectation is that its officials will fail to prevent new deficits. Many people, speculating that the only way for X to solve its problems is through devaluation, will convert assets denominated in X's currency into gold or assets denominated in some other currency which is expected to maintain its value. In addition, speculators will sell X's currency in the forward exchange market in the hope of being able to buy it back later at a lower price.⁶

These pressures make the price of X's currency in the forward market expensive relative to the spot price, or current price, and thus make hedging quite costly. An X importer who must deliver a certain amount of foreign exchange in the future may discover that the premium he has to pay to buy foreign exchange in the forward market is prohibitive. However, if X does devalue he then finds that his bill is higher in terms of his own currency.

This example indicates that considerable uncertainty can be generated under the present "adjustable peg" system. The difficulty lies not in the fact that exchange rate adjustments are possible, but that they are postponed so long that even the dullest speculator knows that some change must be made. When an exchange rate adjustment is anticipated, speculators are in a position to make large profits with relatively little risk. In fact, speculative capital movements, in anticipation of an exchange rate adjustment, may actually force a change upon a country which had no fundamental economic reason for the adjustment.

An alternative to altering exchange rates is a policy which entails a slower rate of relative price adjustment: countries with deficits could allow wages to increase at a slower rate than productivity increases.⁷

⁶The forward exchange market deals in contracts calling for the future purchase or sale of foreign exchange. A variety of transactions take place in this market. For example, a successful speculator at the time of the British devaluation was able to sell pounds in the forward market at around \$2.80 per pound. After the devaluation he could buy them back for \$2.40. International traders use the forward facilities to hedge. An exporter who knows he will be receiving foreign funds several months hence will sell these funds in the forward market at a rate established today. In this manner, the trader is able to insulate himself from potential exchange rate fluctuations. The forward market is also used by those engaging in covered interest rate arbitrage.

⁷See the papers by Fritz Machlup and Robert Triffin in *Maintaining and Restoring Balance in International Payments*, William Fellner, et al., (Princeton: Princeton University Press, 1966), pp. 45-47, 102-104. This book consists of a series of papers dealing with policy guidelines and was undertaken at the suggestion of the Group of Ten Industrial countries.

As a result, costs would decline and this would enable the country to improve its international price competitiveness. Conversely, a country experiencing a surplus in its balance of payments might allow its wages to increase at a rate higher than productivity increases, thereby reducing its competitiveness. Such policies, however, would be difficult to administer and would probably meet political resistance. Not only would it be difficult to control wages, but there are also problems in measuring productivity changes. In addition, the period of adjustment could be extremely long, and a country with insufficient reserves might be forced to seek an alternate and more costly remedy.

The Fixed Exchange Rate and Domestic Economic Policy

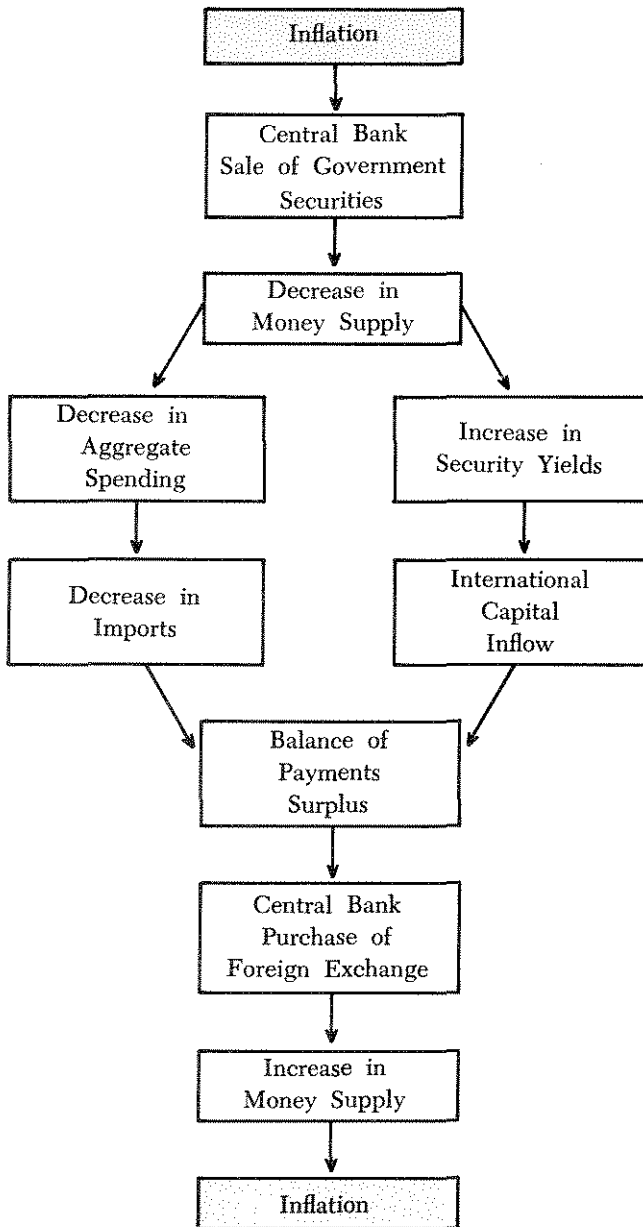
Not only does the present fixed exchange rate system prevent smooth balance-of-payments adjustments: it also severely frustrates the application of domestic stabilization policies.

To understand this weakness, consider the hypothetical situation in which a country, such as Italy, is experiencing inflation but has no balance-of-payments deficit or surplus. In an attempt to control rising prices, the Italian Central Bank decides to sell government securities in the open market. This reduces the level of demand deposits and hence the funds available to commercial banks.⁸ Interest rates and security yields rise. The yield differentials that emerge between Italian and foreign securities induce arbitrage, that is, investors sell their foreign assets and purchase Italian securities. In addition, Italians borrow funds in countries where interest costs are lower. This capital inflow creates a surplus in Italy's balance of payments. As economic activity slows, imports decline and hence the surplus grows.

In order to maintain the exchange rate at its pegged level, the Italian Central Bank then enters the exchange markets to purchase the "excess" supply of foreign exchange. The impact of this operation is identical to one where the central bank purchases government securities in the open market, that is, there

⁸The analysis of this section is based upon R. A. Mundell, "Capital Mobility and Stabilization Policy Under Fixed and Flexible Exchange Rates," *Canadian Journal of Economics and Political Science*, November 1963; and Ronald McKinnon and Wallace Oates, "The Implications of International Economic Integration for Monetary, Fiscal and Exchange Rate Policy," *Princeton Studies in International Finance*, November 16, 1966.

is an increase in the money supply. This will tend to offset the effect of the original restrictive monetary policy. Economic activity will be stimulated to return to its original level and hence imports will increase. As interest rates and security yields return to their original levels the capital inflow will be reduced, returning the balance of payments to its previous state. Thus the goal of slowing the rate of inflation through monetary policy will be thwarted by the goal of maintaining the pegged exchange rate, as the following diagram shows.⁹



⁹This and subsequent analyses are essentially short-run in nature.

With this view in mind, foreign officials have sought to increase the effectiveness of monetary policy by placing controls on the foreign operations of their country's banking institutions.¹⁰ Such controls, designed to prevent capital inflows during periods of restrictive monetary policy, include:

1. Limits or ceilings on the expansion of credit by banks. This reduces the incentive to borrow in general.
2. Higher reserve requirements against bank liabilities to foreigners than against liabilities to its own citizens. This reduces banks' incentive to borrow abroad.
3. Quantitative limits on net foreign liabilities.
4. Requirements that a bank's spot foreign assets and liabilities should be equal.
5. Prohibiting interest payments on deposits owned by foreigners.

In addition, some countries encourage lending abroad during restrictive periods. This can be accomplished by providing guarantees against exchange rate changes or by offering better foreign exchange rates than could be obtained in exchange markets.

Such controls, however, are merely short-run remedies. By reducing the capital inflow, such controls do indeed increase the immediate effectiveness of the restrictive monetary policy. However, as economic activity declines, so does spending on foreign goods and services. This leads once again to a payments surplus and the offsetting, expansionary effect on the money supply. The balance-of-payments effects on the money supply have merely been postponed until the impact of changes in the real sector are felt. In addition such controls reduce the benefits of free capital flows by leading to an inefficient allocation of financial resources.

Although the effects of monetary policy are weakened under a fixed exchange rate system, fiscal policy remains effective. Let us suppose that in order to reduce inflation, Italy increases taxes, thereby reducing government financing operations. As a consequence of this decline in government financing operations, security prices rise and yields fall. This leads

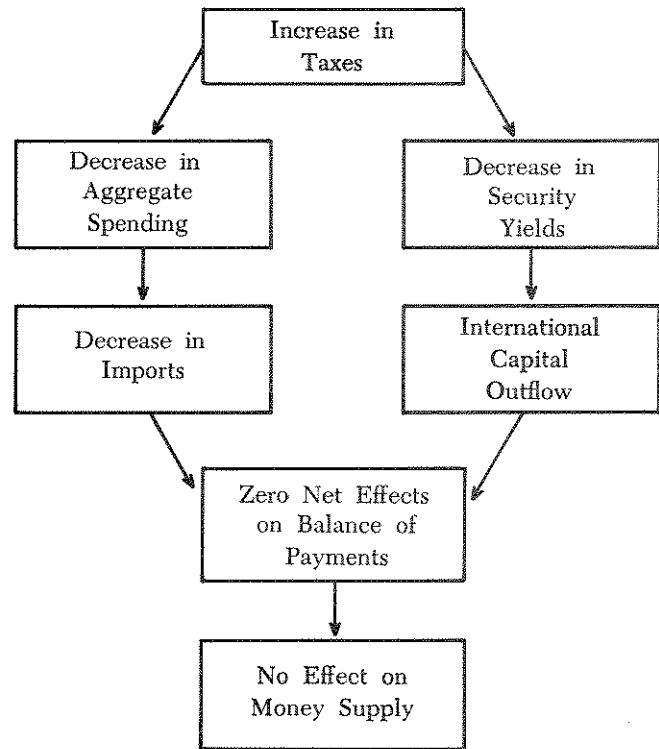
¹⁰For a detailed discussion of these controls, see Rodney H. Mills, "The Regulation of Short-Term Capital Movements: Western European Techniques in the 1960's," *Staff Economic Studies*, Board of Governors of the Federal Reserve System, May 22, 1968. Also see comments by Otmar Emminger, "Practical Aspects of the Problem of Balance-of-Payments Adjustment," *The Journal of Political Economy*, Supplement, August 1967, p. 39.

to a capital outflow and hence a deterioration in the balance of payments. However, as domestic economic activity slows because of the reduction in disposable income, imports will decline and this will tend to offset the deterioration in the capital account. Thus balance-of-payments equilibrium will be restored, the net effect on the money supply will be zero, and hence the slowdown in economic activity will be preserved. This sequence of events can be seen from the accompanying diagram.

The drawback of fiscal policy is its implementation. As with monetary policy, there is a time lag between the actual change in economic conditions and recognition of the need for policy response. Fiscal policy measures, however, are subject to an additional lag between recognition and actual legislation of measures. Frequently this lag arises from political considerations. For example, no one likes an increase in taxes.

In reality, the responses of the real and financial sectors to changes in interest rates and aggregate spending will take time. In addition, there are tariff and quota restrictions on international trade and various impediments to the free flow of capital, which may prevent the process from working itself out.¹¹

In addition, there may be a conflict of policy aims in the short run. In situations when there is (a) unemployment and a balance-of-payments surplus or (b) inflation and a deficit, policies which change the level of aggregate spending will be consistent with the achievement of both internal and external balance. However, when there is (a) unemployment and a payments deficit, or (b) inflation and a surplus, it becomes difficult for officials to achieve both domestic and international goals. Policies which reduce spending and eliminate a balance-of-payments deficit will only increase unemployment. Similarly, attempts to reduce a payments surplus by stimulating spending when there is inflation lead to more, not less, inflation. Resolving this conflict is not easy since it involves weighing the value of domestic, social, and political goals against the costs of international payments imbalances.¹²



Domestic and International Stabilization and the "Crawling Peg"

Many economists have argued that the best method to avoid the dilemma posed by the present international monetary system is to allow greater flexibility in exchange rates.¹³ This could be achieved by either or both of the following modifications:

1. Introduce flexibility in the parity exchange rate so that it might "crawl" over time.
2. Widen the band in which exchange rates fluctuate around the parity level. (At present, the band is one percent on either side of the parity.)

The "Crawling Peg"

The basic idea behind a "crawling peg" system is that there exists an exchange rate which equilibrates the international supply and demand for a particular currency. However, the possibility that political or economic uncertainties might generate undesirable fluctuations in the supply and demand over short

¹¹Impediments to capital flows may take various forms: 1) limited access to information; 2) higher commission rates for placing foreign issues; 3) difficulties arising from legal procedures; 4) obstacles due to national taxation procedures; 5) exchange risk; as well as 6) governmental controls. See OECD, *Capital Markets Study: General Report*, Paris, 1967.

¹²For an approach which emphasizes a "mix" of monetary and fiscal policy to simultaneously achieve domestic and international goals, see Robert A. Mundell. "The Appropriate Use of Monetary & Fiscal Policy For Internal and External Stability," *IMF Staff Papers*, March 1962.

¹³For example, see the list of twenty-seven economists who signed a statement advocating greater, though limited, exchange rate flexibility in "On Limited Exchange Rate Flexibility," Fellner, et al., *op. cit.*, p. 111.

periods suggests that the movement of the exchange rate should be restrained. To accomplish this, countries would continue to hold the foreign exchange market rate within a predetermined range during any business day by sale and purchase of international reserves.¹⁴ However, the parity rate would be allowed to change from day to day by small amounts.

The actual formula for changing the parity exchange rate or peg would have to be determined by the members of the IMF. However, there are at least two possibilities. James Meade has suggested that the peg be allowed to "crawl" not more than one-sixth of one percent in any one month, with the timing of such changes subject to the discretion of government officials.¹⁵ Such a plan would thus not impinge upon the sovereignty of individual countries. Nevertheless, international co-operation would still have to be maintained in order to avoid the possibility of countries undertaking mutually conflicting actions, such as beggar-my-neighbor policies.

An alternative is for the IMF to adopt a plan such that the peg's "crawl" is automatic. For instance, today's parity rate might be a moving average of exchange rates over a certain previous period of time. (The rate would be allowed to move freely within a band around the "crawling peg.") If the trend in a country's exchange rate was up, then its parity rate would crawl up as well. Such a system eliminates the possibility of human error that would exist under the discretionary "crawling peg." On the other hand, it assumes that the operation of the foreign exchange market will bring desirable results. The ultimate choice between these two alternatives would depend on the results of carefully weighing the political and economic feasibility of each.

A Wider Band

In the previous discussion we assumed that there existed around the parity level a band in which ex-

change rates were free to vary without official intervention. The width of the band might remain at two per cent, as it is today, or it might be broadened perhaps to ten per cent. Under the automatic version of the "crawling peg," this band would play an important role, since past exchange rate movements within it would determine today's parity. Should the exchange rate threaten to move outside the limits prescribed by the band, officials would be obliged to intervene in the foreign exchange markets.

Any proposal designed *solely* to widen the band of variation around an inflexible parity is unsatisfactory since it provides no guarantee that the long-run equilibrium exchange rate will fall within the band.¹⁶ It should be emphasized that the "crawling peg" proposal is designed to allow exchange rates to seek their equilibrium levels while limiting undesirable short-run fluctuations.

Freely Flexible Exchange Rates

An extreme plan for greater exchange rate flexibility would eliminate the concepts of "peg" or "band" and allow rates to fluctuate freely. This proposal is countered by those who argue that potentially wide fluctuations will lead to increased risk and hence restrict the growth of international trade and investment activities. Milton Friedman points out, however, that intelligent speculators will tend to move the exchange rate toward its equilibrium value.¹⁷

Consider a situation in which interest rates are roughly equivalent in the United States and the United Kingdom and the price of pound sterling is expected to fall. Speculators will then sell pounds in the forward exchange market in the hope of later buying pounds at a lower price. As this forward selling develops, the forward price of pounds falls.

Arbitragers seeking to take advantage of the spread between the spot and forward rates will then sell spot pounds, thus driving down the spot exchange rate. Simultaneously, they will buy pounds in the forward market, thus moderating the fall in the forward rate caused by the speculative pressures.

The operations of arbitragers and speculators may help to move the exchange rate toward its ultimate

¹⁴Because exchange rates will vary over time, the value of a country's reserves will also change. For example, one country will find that the value of a unit of foreign exchange from a particular country will decline if the latter's exchange rate depreciates. The reason a country holds reserves under the "crawling peg" system is to withstand sharp exchange rate fluctuations without having to sacrifice domestic goals. To guarantee that countries will always have sufficient reserves to meet both their domestic and international obligations, supplementary reserve facilities would continue to be needed within the framework of the IMF.

¹⁵James E. Meade, "The International Monetary Mechanism," *The Three Banks Review*, September 1964. In a subsequent article, "Exchange Rate Flexibility," *The Three Banks Review*, June 1966, Meade credits the original idea of the "crawling peg" to Mr. J. Black of Merton College, Oxford.

¹⁶The "band" proposal has been elaborated by George N. Halm, *The "Band" Proposal: The Limits of Permissible Exchange Rate Variations*, International Finance Section, (Princeton: Princeton University Press, 1965).

¹⁷Milton Friedman, "The Case for Flexible Exchange Rates," *Essays in Positive Economics*, (Chicago: University of Chicago Press, 1953), pp. 157-203.

equilibrium. However, there is no guarantee that they will always possess sufficient foresight to avoid adversely affecting the stability of international transactions by under- or over-shooting the long term equilibrium exchange rate. In fact, this question can only be answered empirically. As is pointed out in a later section of this paper, Canada, with a flexible rate between 1950 and 1962, experienced a growing level of international trade and investment activity. In addition, there is evidence that speculation did not cause any destabilizing exchange rate fluctuations.

It would seem desirable to guard against the unknown risks of flexible exchange rates by adopting the "crawling peg" constraint on the spot rate. Under this system, the difference between spot and forward exchange rates would be kept within reasonable bounds by arbitrage. This spread is an important consideration for international traders and investors who may desire to hedge their transactions. If the cost of hedging is high, there will be good reason for the growth of international transactions to be slowed.

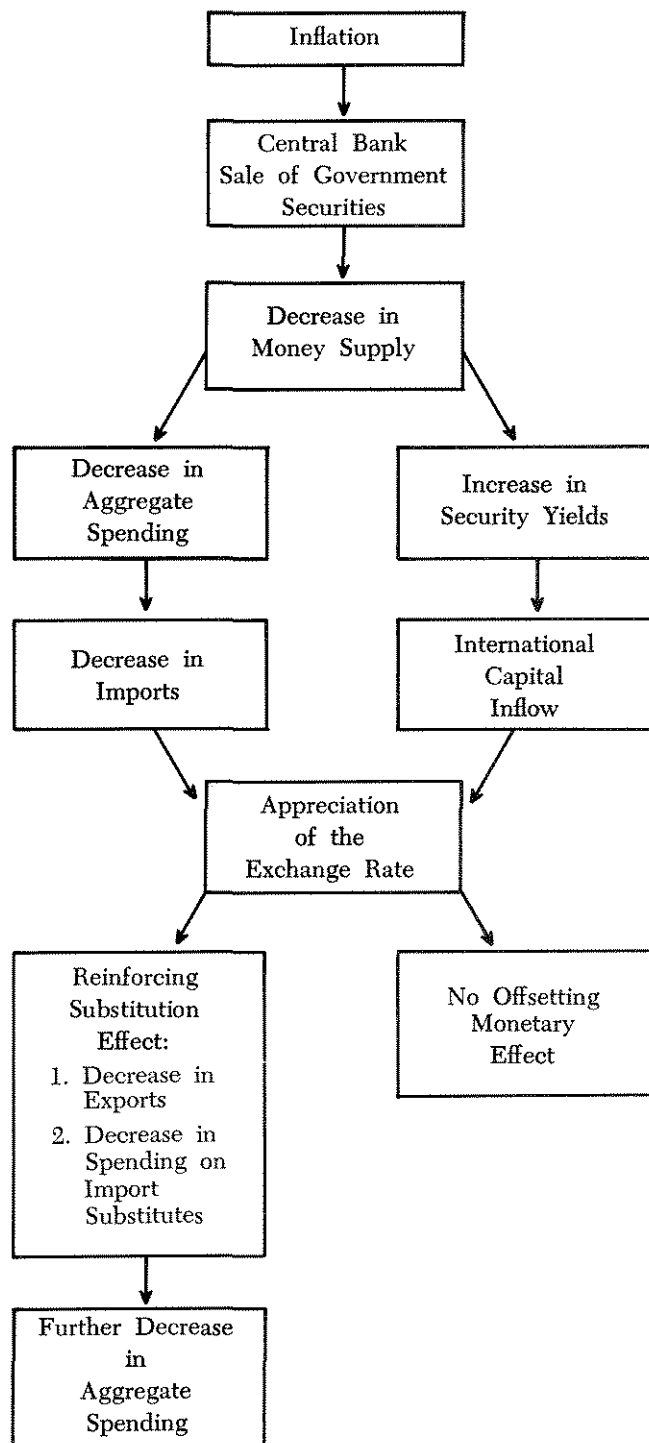
Again, suppose that the price of pound sterling is expected to fall and that interest rates are roughly equal in the United States and United Kingdom. Individuals would realize that the spot rate cannot fall by more than a predetermined amount under the "crawling peg" system. Any divergence of the forward rate by more than this would induce arbitrage, that is, there is an incentive to buy pounds forward with the knowledge that they can be re-sold at a price higher than the current forward rate. The forward rate would thus be kept within reasonable bounds by the increased demand generated by such operations.

Implications for Monetary Policy

One of the implications of the "crawling peg" is that it would *increase* the effectiveness of domestic monetary policy in the short run.

Let us again consider a situation where Italy is experiencing inflation and its central bank seeks to restrain economic activity by selling Government securities on the open market. As interest rates rise, investors will find Italian assets more attractive. There will be an increase in demand for lire, and the exchange rate will tend to appreciate. As a result, as the lira appreciates over time, Italy's exports will decrease and Italians will substitute imports for domestically produced goods. This tends to reinforce, rather than to weaken, the effects of the original decrease in the money supply. Because there is no balance-of-

payments deficit or surplus, there is no offsetting monetary effect. Consider the following diagram:



It should be emphasized that the continued effectiveness of monetary policy in achieving domestic aims hinges upon the degree of exchange rate variability that the members of the IMF deem to be acceptable. If the peg is allowed to "crawl" at a slow

rate, monetary policy will be almost as ineffective as under a fixed exchange rate system. If, however, the range of potential variability is reasonably wide, then monetary policy can be expected to have an influence on domestic economic activity within a relatively short period. This will have the added benefit of reducing the capital controls required to increase the effectiveness of monetary policy under the present system.

The Canadian Experience with Flexible Exchange Rates

Much remains to be learned from the Canadian experiment with flexible exchange rates between 1950 and 1962. However, an examination of several issues surrounding this experience should give us an idea of some of the problems and possibilities of a "crawling peg" exchange rate system.

First, the Canadian experience tends to bear out the theoretical discussion above. Studies carried out by Rudolf Rhomberg of the IMF indicate that monetary policy is considerably more effective under a system of flexible exchange rates than under a system where rates are pegged.¹⁸ In addition, Rhomberg's results indicate that an increase of \$500 million in Canada's money supply would cause a depreciation in the exchange rate of approximately 1.2 cents during the first quarter of its impact and an ultimate depreciation of 2.4 cents. This is also consistent with our previous discussion.

In spite of the potential strength of monetary policy under a flexible exchange rate system, the Canadian business cycle was not eliminated over this period and, in fact, followed the United States business cycle very closely. Robert Mundell has argued that this was mainly the result of improper policies followed by Canadian monetary authorities,¹⁹ rather than a weakness of the system. His argument runs as follows: During periods when economic activity subsided in the United States, demand for credit also decreased, and this led in turn to a decline in interest rates. At the same time, however, Canadian monetary authorities continued to decrease the money supply for at least six months following increases in their level of unemployment. As a consequence, interest rate differentials between the United States and

Canada widened, bringing about a capital inflow and an appreciation in the Canadian exchange rate. The latter tended to reinforce the effects of the United States business cycle. The inappropriateness of policies was most profound in the period 1958-1960 when, in the presence of high unemployment, a restrictive monetary policy was pursued at the same time a deficit existed in the Government budget. The combination of the two brought about a wide difference between United States and Canadian interest rates with the attendant exchange rate appreciation.

Concern is voiced in academic, government, and business circles that flexible exchange rates would fluctuate so as to discourage international transactions. The Canadian experience does not support this conclusion. International trade between 1950 and 1962 doubled and direct investment by foreigners nearly tripled. In addition, the statistical results of Rhomberg²⁰ and, more recently, Sven Arndt²¹ indicate that short-term capital movements tended to moderate movements in the exchange rate. For example, Rhomberg's work indicates that if the Canadian three-month Treasury bill was one per cent higher than the similar United States rate, approximately the same amount of short-term capital would flow into Canada as if there were a depreciation of one cent in the exchange rate.

Calculations by Yeager²² show that in only six of the 128 months under the flexible rate system did the rate fluctuate within a range greater than two Canadian cents. In more than two-thirds of the months the range was less than one cent. Longer-run fluctuations tended to coincide closely with changes in monetary policy. During periods when monetary policy was restrictive, the exchange rate tended to appreciate, and conversely. No doubt, if changes in these policies had been better timed and more gradual, these longer fluctuations would have been moderated even further.

Conclusions

If the industrialized nations of the world are going to place heavy reliance on monetary actions to achieve domestic goals, then under a pegged exchange rate system these actions may be considerably weak-

¹⁸Rudolf Rhomberg, "A Model of the Canadian Economy Under Fixed and Fluctuating Exchange Rates," *Journal of Political Economy*, February 1964.

¹⁹Robert Mundell, "Problems of Monetary and Exchange Rate Management in Canada," *The National Banking Review*, September 1964.

²⁰Rhomberg, p. 12.

²¹Sven Arndt, "International Short-Term Capital Movements: A Distributed Lag Model of Speculation in Foreign Exchange," *Econometrica*, January 1968.

²²Leland Yeager, *International Monetary Relations*, Harper and Row, 1966, pp. 425-426.

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ened unless controls on capital movements are imposed. This involves costs: not only are such restrictions incompatible with the goal of international currency convertibility, but by raising "barriers" to entry into international capital markets, these restrictions bring about an inefficient allocation of resources throughout the world. In addition, the present pegged exchange rate system is not conducive to international adjustment, but instead fosters periodic uncertainty in the form of exchange rate crises.

On the other hand, a system of crawling exchange rates renders monetary policy effective without capital controls. In fact, to assure that this is the case, it is necessary to reduce impediments to the free international flow of capital. Equally important is that this system enables long run balance-of-payments adjustments through greater exchange rate flexibility. The increased flexibility does not mean instability, however, for the exchange rate will be free to vary, or "crawl", only within bounds predetermined by the IMF.