THE THEORY OF OPTIMUM CURRENCY AREAS AND EXCHANGE-RATE FLEXIBILITY

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1 Introduction

The phrase "optimum currency areas" was coined by Robert Mundell in his classic paper by that title in 1961. However, the basic idea, that the choice between fixed and flexible exchange rates should not be independent of the economic characteristics of the countries or areas in question, is contained in numerous earlier writings. As subsequent literature expanded upon the list of important determinants of optimum currency areas, the concept lost the simplicity with which it had been endowed by Mundell, who defined it primarily in terms of areas of factor mobility.[1] This loss in simplicity has been more than balanced by the gain in insights into the multiple criteria that crucially influence the relative desirability of fixed and flexible exchange rates and by recognition of the need to weigh these criteria against one another. Given the degree of complexity to which such investigations have advanced, it is perhaps inappropriate to refer to *the* theory of optimum currency areas. Rather, current investigations might better be classified under the rubric of the "optimum-currency-area approach" to the question of alternative exchange-rate systems. The distinguishing feature of this approach is that the analysis begins with recognition that there are both costs and benefits involved in choosing either fixed or flexible exchange rates and asks the question: For what types of countries or under what circumstances is one arrangement or the other more likely to be better? In other words, this approach accepts that there is merit in arguments that have been put forward for both genuinely fixed and flexible exchange rates and asks: What is the optimum configuration of currency domains, i.e., what areas or countries should adopt genuinely fixed exchange rates among themselves, allowing variability of their exchange rates in unison vis-à-vis other currency blocs?[2]

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[1] It is interesting to note, as Mundell pointed out, that this same criterion had been put forward by a number of earlier writers as the major determinant of when flexible exchange rates are not needed. As he noted, emphasis on factor mobility as a chief requisite for full economic integration was common during the 1950s. See, for instance, Meade (1957) and also the chapter entitled, "International Currency or Sentimental Internationalism" in Lerner (1951), especially the section (pp. 258-260) entitled "Except where there is high mobility of population, exchange-rate fixing is unnecessary and dangerous," which contains the explicit statement (p. 259) that "the condition for a successful single currency area is that there be a high degree of mobility of population within the area."

[2] For recent discussions of the question of monetary unification in the common market see Corden (1972), Fleming (1971), Ingram (1973), Ishiyama (1975), Magnifico (1973), Mintz (1971), and the exchange between Kasper, Mosconi, and Morris in Halm (1970).

The purpose of this paper is to develop a more comprehensive framework than is currently available for identifying optimum (or at least good) currency areas. In the process of developing this framework, we critically review and attempt to integrate the existing literature (much of which does not deal explicitly with optimum currency areas). In the latter portion of this paper we examine in considerable detail the stabilization criteria for judging the efficacy of fixed versus flexible exchange rates and develop a more general rule for evaluation, of which the previous ones proposed by Stein (1963), Giersch (1970), and Kenen (1969a) are all special cases. We define "currency area" to be identical with what Corden (1972) has characterized as the "complete exchange-rate union" or "monetary integration." It is "an area within which exchange rates bear a permanently fixed relationship to each other even though the rates may—in unison—vary relative to nonunion currencies," and one which is characterized by "the permanent absence of all exchange controls, whether for current or capital transactions, within the area."[3] As Sohmen (1971) has stressed, the fixed exchange rates within such a currency area are very different from rates fixed by imposing restrictions on convertibility. From the standpoint of optimum currency areas, it can be argued that the latter are nothing more than rather inefficient forms of variable exchange rates.[4]

Throughout the paper, variable exchange rates may be taken to refer to any type of effective exchange-rate flexibility, including the use of administrative measures that vary the shadow price of foreign exchange and multiple exchange rates or tax-subsidy schemes that vary the explicit price of foreign exchange. Flexible rates refer to either freely floating exchange rates (which we sometimes refer to simply as floating rates) or managed floating. Most of the literature on the opti-

[3] Corden argues that maintenance of such an arrangement requires explicit agreement on adjustment responsibilities among the members. Otherwise, there is always the possibility that the finance ministers will not agree on how to apportion the adjustment responsibility, so that the exchange rate may ultimately change from the solemnly agreed-upon level. The latter system he labels a "pseudo-exchange-rate union."

[4] An argument sometimes made for the adjustable-peg system is that it combines the advantages of exchange-rate fixity in the short run and exchange-rate flexibility in the long run. This view overlooks, however, that to obtain this long-run flexibility requires a large, discrete adjustment in some short run. Thus, long-run flexibility is obtained in a technically inefficient manner as judged by most relevant criteria. The use of sliding parities would appear to be a much more satisfactory way to combine the major characteristics of a substantial degree of exchange-rate fixity in the short run and flexibility in the long run.

mum currency area has addressed the question: Should a country adopt freely floating exchange rates vis-à-vis the rest of the world or join a full-fledged currency area with some other country or countries? A full treatment must consider an even broader question: Over what domains of time and space should there be any effective exchange-rate flexibility?[5] This encompasses the question of the desirability of the various kinds of commercial policy—such as tariffs, quotas, and multiple exchange rates—which alter the effective exchange rate between domestic and foreign goods. Such an approach makes currency-area formation seem relatively less desirable than if freely floating rates are the only alternative considered.

A full treatment of all the methods for creating effective variability of exchange rates is beyond the scope of this paper. Thus some of our analysis focuses on the criteria for fixed rates versus the general family of methods of effective exchange-rate variability, while at other times we consider the choice between currency-area formation and adoption of floating exchange rates. Ideally, one would like to pick out from all the possible configurations of currency areas for the world the one that maximizes world welfare in some sense, but our goal is considerably less ambitious. We limit our investigation to the major factors that determine whether it is desirable for two countries to join together in a currency area.[6]

We first explore the impact on the usefulness of money of joining a currency area, the major benefit of currency-area formation stressed by the early contributors to the literature on optimum currency areas (e.g., Mundell, 1961, and McKinnon, 1963a; see also Kindleberger, 1972). We show that joining a currency area will generally enhance the usefulness of money, but that the importance of this consideration will be greater the smaller and more open is the economy in question. Moreover, this is also true of effects on the efficiency of resource allocation and on each of the various functions of money—its usefulness as a medium of exchange, unit of account, store of value, and standard of deferred payments.

We then examine the major cost of joining a currency area, namely that, at least in the long run, the use of discretionary macroeconomic

[5] The question of the optimum time dimension of exchange-rate flexibility has been addressed recently by Grubel (1973b), Makin (1970, 1975), and Willett and Tower (1971).

[6] Admittedly, it is quite possible that a succession of bilateral decisions of this type would not lead to a global optimum. This is an important question that warrants considerable further attention.

policy to achieve internal balance must be sacrificed to some extent because of the balance-of-payments constraint, which dictates that wage and price trends must be adjusted in order to maintain external balance. Next, we examine the constraints imposed by currency-area membership on the use of particular policy instruments. This is followed by discussion, first, of factors affecting the cost per unit of adjustment to each of various kinds of disturbances, and then of factors influencing the amount of adjustment necessary, i.e., the size and source of disturbances that are likely to arise. Thus, in our consideration of the effects of alternative exchange-rate systems on macroeconomic stabilization, we include not only the effects of constraints on discretionary macroeconomic policy but also the effects of alternative exchange-rate systems on automatic stabilization. This relates the discussion of optimum stabilization in the foreign-exchange market as formulated by Stein, Laffer, and others to the theory of optimum currency areas, a consideration not sufficiently treated in the papers on optimum currency areas and exchange-rate unification by Aliber, Corden, Fleming, Grubel, and Ishiyama.[7]

We tie our discussion together with a series of graphs to illustrate the trade-offs between the various costs and benefits of currency-area formation. These graphs consider the effects of currency-area formation on (1) the usefulness of money as a medium of exchange, (2) the freedom to select the optimum point on the inflation-unemployment trade-off in the long run, and (3) the expected costs of adjusting to

the random disturbances that are likely to occur (which may be negative as compared with flexible rates). Major components of the third consideration are the effects of currency-area formation on the liquidity value of money, the microeconomic efficiency of resource allocation, and the characteristics of the inflation-unemployment trade-off.

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[7] It seems appropriate to compare our schema with those used by other recent writers. Aliber (1972) considers the choice to be a trade-off between allocative efficiency and resource utilization, while Corden (1972) treats it as a trade-off between the freedom to select the optimum point on the unemployment-inflation curve under flexible rates and the increased price stability offered by fixed rates. Fleming (1971) balances the problem of dealing with fundamental disequilibria under fixed rates and the effect of exchange-rate union on specific aspects of economic life, namely, trade in goods and capital, inflation, and the centralization of government functions. Grubel (1973a) explicitly considers the trade-off between the desirable properties of fixed exchange rates as automatic stabilizers and the increased real income associated with a common currency versus the constraints that fixed rates impose on stabilization policies, but he does not consider many of the complexities explored here. Ishiyama (1975) contrasts the traditional approach to the optimum currency area "which tries to single out a crucial economic characteristic which supposedly indicates where the lines should be drawn" with an alternative approach which "recognizes the shortcomings of theories based on a single facet of the economy and tries to evaluate costs and benefits of participating in a currency union from the point of view of the self-interest of a particular region or country." His benefits are the three uses of money, the elimination of speculative capital flows, the savings on exchange reserves, risk pooling, and the acceleration of fiscal integration; his costs are the loss of autonomy in monetary and fiscal policy, a possible worsening of the Phillips curve, and a possible deterioration of regional economies.

2 The Usefulness of Money and Allocational Efficiency in Open Economies

Advocates of variable exchange rates do not mean to imply that each individual consumer or producer should have his own currency, which could fluctuate against others. Such an arrangement would amount to worldwide barter. The usefulness of money would be destroyed, a factor not to be considered lightly. A common money serves as a measure of value, a standard of deferred payments, a generally accepted medium of exchange, and a store of value. As Johnson (1970b) has written, a common money "simplifies the profit-maximizing computations of producers and traders, facilitates competition among producers located in different parts of the country, and promotes the integration of the economy into a connected series of markets, these markets including both the markets for products and the markets for the factors of production (capital and labor)." This chapter explores how openness reduces the usefulness of a domestic currency for an economy that is not a member of a currency area, and how this fact makes adjustment under flexible exchange rates more difficult and resource allocation less efficient as the degree of openness increases.[1]

2.1 The Effect of Openness on the Usefulness of Money as a Store of Value and Unit of Account

Clearly, the less well behaved is private speculation in the foreign-exchange market, the less desirable is a move from a unified currency to freely floating exchange rates.[2] There has, of course, been considerable controversy about how to define "well behaved" in this context and about the interpretation of historical evidence concerning the behavior of private speculation during periods of floating rates. (For discussion and references to much of the literature on this controversy,

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[1] Openness is a multidimensional concept. The most common measures of openness in trade are the ratio of tradeable to nontradeable goods (see McKinnon, 1963a, and Orcutt, 1955) and the marginal propensity to import (see McKinnon and Oates, 1966). For the purposes of this study, openness is represented by these two factors. However, openness may also be thought of in terms of the international mobility of labor and capital. On the latter definition, see Wallich (1969, pp. 286ff.), McKinnon and Oates (1966, p. 2), and Whitman (1969).

[2] It does not necessarily follow that less-well-behaved speculation always reduces the case for moving from forms of limited exchange-rate flexibility to freely floating exchange rates. Indeed, greater volatility of speculative capital flows may increase the desirability of floating rates compared with adjustable or crawling pegs. On this see Willett (1975).

see Stern, 1973, pp. 77-89, 97-101, 104-105.) Attention has also been focused on the manner in which the size and openness of an economy may influence the volatility of its exchange rate.

It can be argued that small, open, undiversified economies adopting freely floating exchange rates are likely to find that their exchange rates vary a great deal and that the purchasing power of their currency over all goods will tend to be unstable. There are a number of reasons for this.[3] First, as Kenen (1969a, p. 49) notes, "From the standpoint of external balance, taken by itself, economic diversification serves, *ex ante*, to forestall the need for frequent changes in the terms of trade, and therefore for frequent changes in exchange rates." Second, as argued in section 4.6.1, there is reason to believe that the sum of the elasticities of excess demand for imports and exports tends to be lower in smaller, more open economies. This would imply that in such economies a greater exchange-rate change will be necessary to improve the balance of trade by a given percentage of imports or exports. Third, in such economies a larger fraction of domestic incomes will be spent on foreign goods, so that a given exchange-rate change will have a larger impact on the purchasing power of a unit of domestic currency. In other words, adoption of freely floating exchange rates by a small, open, undiversified economy will tend to reduce markedly the liquidity of its domestic currency unit.[4] Another consideration leading to this conclusion is that the exchange market for the currency of a small country might be so thin that a small number of speculators could affect the market price, increasing the potential for large fluctuations in the external value of the currency. As Mundell (1961) pointed out, a small number of speculators might be able to collude to influence the exchange rate in order to reap monopoly profits, fostering exchange-rate instability or at least not fully eliminating it. Furthermore, if there is an independent random factor in the subjective probability distribution of each speculator, then the fewer speculators there are the less these random factors cancel out, and the less stable the speculative demand function for foreign exchange is likely to be.

As Mundell has noted, "The thesis of those who favor flexible exchange rates is that the community in question is not willing to accept variations in its real income through adjustments in its money wage rate or price level, but that it is willing to accept virtually the same

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[3] Several of these will be developed more fully in subsequent sections.

[4] We use the term "liquidity" in the sense of the predictability and stability of purchasing power. On this, see Klein (1974, p. 444), who argues that the reduction-of-information-costs characteristic of money depends on the predictability of prices rather than their stability.

changes in its real income through variations in the rate of exchange" (1961, p. 663). In other words, because of money illusion or institutional rigidities, exchange-rate flexibility can partially substitute for domestic wage and price flexibility.[5] However, in an extremely open economy, wage negotiations might be more strongly influenced by prices of foreign than of domestic goods, and as Orcutt (1955) has noted, wage contracts might even be fixed in terms of foreign currency. Such a low level of money (or, more properly, exchange-rate) illusion with respect to the domestic currency increases the strength of cost-push forces generated by exchange-rate depreciation, so that larger exchange-rate changes are needed to effect a given change in the terms of trade. This further reduces the liquidity of domestic currency and the effectiveness of exchange-rate adjustments.

2.2 Allocative Efficiency and the Usefulness of Money

The usefulness of money as a medium of exchange is an increasing function of the size of the domain over which it is used. The greater the number of currencies and the greater the volume of exchange among currency areas, the greater will be the total transactions cost of currency conversions. Hence, on the basis of the usefulness of money as a medium of exchange, one should have a single world currency or what would be essentially the same thing—all currencies rigidly and immutably pegged to one another with perfect convertibility[6]—thereby eliminating any possibility of exchange-rate change and assuring the equality of spot and forward rates.

Ceteris paribus, a world currency would yield the greatest microeconomic efficiency in the allocation of resources.[7] As Grubel (1970) stressed, by eliminating exchange-rate uncertainty, fixed exchange rates would permit the growth of larger, more efficient markets for capital as well as goods and services, and would free the resources previously absorbed in currency conversions, on both scores raising the level of real income.

The difficulty is that one cannot legitimately assume for the question

[5] The role of exchange-rate flexibility as a partial substitute for wage and price flexibility is the central theme of Yeager (1959). The greater the correspondence between currency areas and regions (defined as areas of factor mobility), the more effective a substitute it will be. See, for instance, Flanders (1969) and McTeer (1968, p. 114).

[6] Of course, in this case the costs of currency conversion would not be eliminated but, as Sohmen (1971) argues, their quantitative importance is slight.

[7] The distinction between what should be called microeconomic and what macroeconomic is not always clear-cut, but we hope that our meanings throughout this paper will be clear to the reader. For a useful discussion of micro and macro effects of exchange-rate flexibility, see Lanyi (1969).

at hand that ceteris paribus conditions are maintained. Since members of a currency area must give up the use of exchange-rate adjustments to correct balance-of-payments disequilibria, the need to maintain payments balance must be a primary determinant of financial policy. And this creates problems of its own (see, e.g., Caves, 1963; Friedman, 1953 and 1969; and Grubel, 1973a). Under fixed rates, the desire to avoid the risk of capital losses imposed by balance-of-payments policies may make the allocation of capital less responsive to its social marginal product, so that resource allocation actually may be less efficient under fixed rates. In other words, exchange fixity may reduce the liquidity of stores of wealth, including money-fixed claims. Moreover, as Johnson (1967, p. 10) has argued, when interest rates are adjusted to maintain external balance, "The resulting pattern of international capital movements obviously need not be anything like an efficient one, since there is no reason to expect that the real return on investment in countries with current account deficits is higher than that on investment in countries with current account surpluses; it may on the contrary involve a serious distortion of the allocation of new investment resources, and a consequent welfare loss for the countries concerned and the world economy" (see also Mundell, 1968, Chap. 14; Ablin, 1966; Willett, Katz, and Branson, 1970; Williamson, 1971; and Modigliani and Askari, 1973).

2.2.1 The costs of interest-rate versus exchange-rate variability. The interest rate is the exchange rate between current and future consumption, and a major determinant of the relative cost of using capital and labor in production. Thus changes in the interest rate will have the same sorts of effects on economic efficiency as changes in any other relative price or exchange rate. Clearly then, the uncertainties and other costs associated with the deflation or inflation of incomes and prices that may be necessary to preserve external balance under fixed rates may prove a greater barrier to trade and the efficient allocation of investment than changes in exchange rates. This is more likely to be true the more closed the economy.[8] In relatively closed economies, the amount of international trade and investment tends to be small relative to total production and investment, so that exchange-rate changes tend to have a small impact on resource allocation as a fraction of gross national product (GNP) relative to their impact on the payments imbalances that are likely to occur, while adjustments in interest rates will have a larger impact on resource allocation relative to payments imbal-

[8] Contrast this with Aliber (1972), who argues that exchange-rate flexibility will always increase uncertainty and therefore reduce allocative efficiency.

ances. Conversely, in very open economies the international sector will be much larger relative to the investment sector, and interest-rate variability may be less costly to the efficiency of resource allocation than exchange-rate variability.

The same sort of argument applies when adjustments in public spending or incentives for certain types of private spending are used as the equilibrating mechanism, because (assuming that there is a diminishing marginal utility associated with these types of spending) fluctuations in the distribution of expenditure will necessarily reduce the level of utility corresponding to any mean level of consumption. In other words, the utility lost when consumption is below normal exceeds the utility gained when consumption is the same number of units above normal. Hence, we see that fiscal policy, like monetary policy, is not without its costs, so that one goal in choosing the optimal exchange-rate system should be to minimize the need for variation in the policy instruments used for stabilization. Thus, varying the monetary-fiscal mix to attain internal and external balance simultaneously under fixed exchange rates is not a panacea, and such variations are likely to be more costly relative to exchange-rate changes the more closed is the economy in question.[9]

2.2.2 The importance of the source of disturbance. We should also note that the source of disturbance will profoundly influence whether flexible exchange rates really do destabilize the terms of trade. Building on Hause's (1966) article, Johnson (1966) assessed the impact of stabilizing the nominal exchange rate in the face of fluctuations in relative price levels, assuming full employment to be continually maintained by a system of variable income taxes and subsidies. The Hause-Johnson argument centers on the idea that, if diminishing marginal utility is associated with consumption of the import, the additional utility reaped during periods when imports are high will be less than the utility lost when imports are low. Although they determined that one country may gain from such fluctuations, they concluded that a loss of world welfare must result.

Their work considered only monetary disturbances in fully employed economies. Obvious extensions are to consider various types of real disturbance, and to examine the effects of disturbances in both Keynesian and fully employed economies and the role of various types of policy responses in combating them. For example, suppose sudden wars or investment booms occasionally draw upon an economy's scarce

[9] More detailed investigations of the conditions determining the relative desirability of these policies and their optimal mix should be a fruitful area for further research.

resources. To analyze this problem, it may be important to relax the assumption that stabilization policies work perfectly and to disaggregate absorption to explore the effects of alternative adjustment mechanisms on consumers' utility (i.e., real consumption) given fluctuations in the level of real autonomous spending. In empirical studies it will be important in determining real consumption to recognize both the limited substitutability between home goods and imports and the covariance between consumption of the two. A further problem will be dealing with imports that are intermediate rather than final products. Other useful work would be the establishment of a formal calculus of the welfare economics of the monetary-fiscal mix.

Moreover, from the standpoint of liquidity of the domestic currency unit and the advantages derived from stability of the international terms of trade, it is not clear that all countries should opt for fixed rates. Even if there were perfect wage and price flexibility (no money illusion), the world still might not constitute an optimum currency area. Price movements would still influence the liquidity value of money and, by McKinnon's (1963a) criterion of maintaining a stable internal price level, an economy might wish to adopt flexible exchange rates in order to protect itself partially from inflationary or deflationary trends in the rest of the world.[10] (On this point, see Keynes, 1923, p. 114 of 1971 ed., and Corden, 1972.) Thus, a country particularly prudent in its financial policies may find that it can increase the liquidity value of its currency by adopting flexible exchange rates. In so doing, it can insulate itself (at least partially) from inflation or monetary instability in its neighbors rather than joining with them in a currency area in which it would have only a partial say in the determination of the joint financial policy for the group.

For all these reasons, one cannot conclude that a movement to genuinely fixed exchange rates will necessarily increase microeconomic efficiency.[11] But it does appear that the collection of very open econo-

[10] This would remain a second-best argument to desirable world monetary management, however.

[11] Grubel's (1970) discussion of this topic can be somewhat misleading. He concluded that the fixing of exchange rates will necessarily increase the level of real income through increased microeconomic efficiency, but noted that the stability of income may be reduced and that members of a currency area may have to adopt less than optimal employment and growth rates. He failed to recognize that these latter effects may in turn tend to reduce average levels of real income, although in his (1973a) piece he notes that movement to a fixed exchange rate has an uncertain effect on price stability and that real income will be an increasing function of price stability.

We should note that there can be micro-macro feedbacks in the opposite direction also. For instance, as Lanyi (1969) has argued, it would be possible for a

mies into larger currency areas will increase the usefulness of money as a medium of exchange and enhance the microeconomic efficiency of allocation until the consolidated currency areas reach some minimum level of self-sufficiency.

2.3 Currency-Area Formation, the Need for External Reserves, and Allocational and Adjustment Efficiency

Mundell (1973) has recently argued that currency-area formation will reduce the demand for international reserves and thereby generate a seignorage gain for the countries forming the currency area.[12] When two currency areas join together to form a larger currency area with a common pool of external reserves, the law of large numbers implies that disturbances affecting each country's payments balance will partially cancel out, so that the new larger area will need fewer external reserves than the sum of the reserves held by the two areas before they joined together. Thus, the member countries can spend some of the reserves no longer needed, with a consequent gain in welfare. It should be emphasized, however, that this gain does not represent an increase in world welfare unless the external reserves are in the form of commodity money, so that economizing on reserve holding really does free resources in the aggregate. If the money has no commodity value, economizing on it will only enable the newly formed currency area to run a temporary trade deficit with respect to the rest of the world, while the rest of the world inflates in an attempt to prevent its ownership of real reserves from exceeding its target level. In such a case, the net effect of currency-area extension would be a temporary worldwide inflation accompanied by a transfer of resources from the rest of the world to the newly formed currency area.

Along these lines, there is an additional potential benefit from reserve pooling. Building on the literature on the optimum quantity of money, Johnson (1970a), Tower and Willett (1972), Clark (1972), and Grubel (1973b) have emphasized that there is an optimal rate of return on international reserves, although, as Tower and Willett stress, the determination of this optimum is complex because of the conflicting elements of an efficient international monetary system. If the interest rate on external reserves is less than this optimum, countries will find it advantageous to pool their external reserves while agreeing to set the

optimal interest charge on accumulated claims on one another, and this will enhance the efficiency of macroeconomic policy. Needless to say, this argument for currency-area formation is second-best to the payment of the optimal interest rate on reserves.

To summarize, if there are costs associated with the holdings of external reserves, either because they embody real resources or because the return on them is set improperly, currency-area formation may increase allocative efficiency and provide incentives for efficient economic policy formation. These benefits of currency-area formation might alternatively be achieved by improvements in the efficiency of the world monetary system, i.e., by demonetizing gold and paying the appropriate interest rate on reserves. Interestingly enough, these same considerations also improve the case for adopting variable exchange rates, for they too enable a country to economize on international reserves.[13] Thus, it is not clear that Mundell's contention or our related one really is an argument for currency-area formation as opposed to exchange-rate variability.

2.4 Summary

In this chapter we have argued that giving up membership in a currency area to adopt a variable exchange rate may affect the efficiency of resource allocation and the usefulness of money either favorably or unfavorably. Moreover, the more open the economy in question, especially in relation to the proportion of interest-sensitive domestic expenditure, the less favorable (or the more unfavorable) is the net effect likely to be. Figure 1A illustrates this idea. U_M shows the net benefit associated with switching from membership in a currency area to a system of variable exchange rates from the standpoint of the usefulness of money and the efficiency of resource allocation. To normalize for size, this net benefit (like all other costs and benefits treated in this paper) is expressed as a fraction of full-employment GNP,[14] and open-

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[13] Actually, there is some controversy on this point. Machlup (1964, pp. 267-270) cogently argued that a reduction in official holdings of foreign exchange may be at least partially offset by an increase in private holdings, and several writers have even argued that official reserve holdings might not decline under flexible rates. The majority view appears to remain, however, that the initiation of flexible rates should lead to a reduction in the demand for reserves. That this has not occurred during the recent generalized float may be at least partially explained by the offsetting increases in the demand for reserves caused by the uncertainties generated by the increases in oil prices.

[14] The net benefit may be thought of as being measured in terms of the utility of the effective decision makers of the countries in question. While such a concept obviously sidesteps a number of crucial aspects of social decision-making and utility functions, for the illustrative and qualitative purposes at hand it does not seem unreasonable.

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wildly fluctuating exchange rate to lead to an increase in overall unemployment by generating a large amount of frictional unemployment. Empirically, this seems much less likely to occur than the linkages discussed above.

[12] For a discussion of the impact of European monetary integration on the need for international reserves, see Salant (1973).
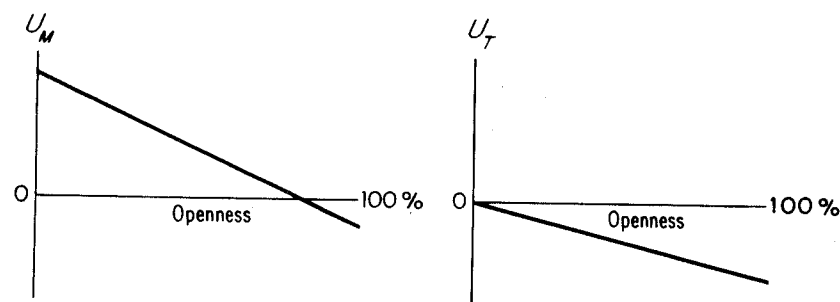
A. Net benefit from the standpoint of the usefulness of money and the efficiency of resource allocation.

B. Net benefit from the standpoint of the usefulness of money as a medium of exchange.

FIGURE 1. Some net benefits associated with switching from membership in a currency area to a system of variable exchange rates.

ness is defined as the ratio of imports or exports to GNP. Variable exchange rates enhance resource allocation and the usefulness of money in very closed economies, but they do more harm to the usefulness of money and less good to the efficiency of resource allocation as openness increases. Thus the curve is downward sloping, eventually becoming negative. Of course, the slope and position of the curve will depend on the type of exchange variability being contemplated. Figure 1B, which deals with only one aspect of the usefulness of money, illustrates that switching from membership in a currency area to a system of variable exchange rates causes the usefulness of money as a medium of exchange to decline; this reduction in usefulness is close to zero in very closed economies and increases with openness. Such a decline simply reflects the fact that the transactions costs associated with currency conversions in a system with multiple currencies will be closely related to the volume of international trade.

3 Constraints Imposed by Membership in a Currency Area

In the previous chapter, our focus was on the major potential benefit of a currency area—its effect on the usefulness of money. In this chapter, we discuss what is commonly felt to be the major cost of a currency area—the constraints imposed on macroeconomic policy by the need to maintain a fixed parity. These constraints may reflect both the effectiveness with which stabilization instruments can be used to achieve major policy targets and the limitations on the attainable targets themselves.

The political costs of these limitations depend both on the economic costs (or benefits) of giving up at least nominal sovereignty in these areas and the extent to which governments give weight to the welfare of their prospective partners in the currency area. The willingness to think more in group rather than strictly national terms will be influenced by such factors as cultural heritage, language, and political and ideological similarities. The smaller the likely economic costs (or the greater the likely benefits) and the greater the consideration given to the welfare of the other members of the group, the greater would be the willingness of the members to make the compromises necessary for successful operation of the jointly determined macro and regional policies required for a well-functioning currency area. Just how much national sovereignty, in both the selection of targets and the use of particular policy tools, would have to be given up to form an effective currency area has been the subject of considerable controversy.[1]

3.1 The Balance-of-Payments Constraint

Perhaps the most important condition for a successful currency area is that there be a reasonable degree of compatibility between the mem-

[1] Meade (1957) has been the major advocate of the position that a currency area would require government centralization over a broad range of activities. He argued: "The integration approach thus involves—in addition to the formation of a common market for goods and for factors of production and the provision of much greater international liquidity for European monetary authorities—a very extensive range of powers for what would amount to a single European government. Such a government would have to be able to control central-bank monetary policy and governmental budgetary policy throughout Europe, to determine a single European commercial and exchange-rate policy vis-à-vis third countries, and to carry out an effective special-area policy for depressed regions in Europe" (pp. 387-388). This conclusion became rather widely accepted in the subsequent literature. Ingram (1962a, 1962b), on the other hand, is a leading advocate of the position that such a high degree of centralization is unnecessary.

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ber countries' attitudes toward inflation, growth, and unemployment and their abilities to "trade off" between these objectives. Otherwise, the constraints imposed on domestic macroeconomic policies by the requirement of long-run balance-of-payments equilibrium could be enormous. The importance of these factors for the maintenance of fixed exchange rates without controls has been stressed by many writers (see, for instance, Emminger, 1967, and Haberler, 1966) and has been specifically related to optimum currency areas by Claudio Sergré (cited in Kindleberger, 1969), Grubel (1970), Whitman (1972), Willett and Tower (1970a and 1970b), Corden (1972), and Fleming (1971).

A nation with a low tolerance for unemployment and strong wage-push and price pressures from labor unions and concentrated industries would make a poor partner for a country with a low tolerance for inflation and/or high productivity growth, which gives it a very favorable "Phillips curve."[2] Likewise, the pace of technological advance and the income elasticities of demand for exports and imports may have an important impact upon countries' balance-of-payments trends. Where there are significant differences in the resultants of these factors, the formation of an effective currency area would prove extremely difficult.

In certain cases, however, a country's freedom to choose the optimal point on its Phillips curve may be more illusory than real, and so the costs of foregoing it are small. For a very open economy, flexible exchange rates may so reduce the liquidity value of the domestic currency unit that a foreign currency comes to replace the domestic currency as the unit of account and standard of deferred payment. If the foreign currency also replaces the domestic one in the calculations of participants in the labor market and in contracts between them, the Phillips curve becomes a relationship between domestic unemployment and the rate of inflation measured in the foreign currency unit. In other

words, the existence of a Phillips curve relating unemployment to inflation measured in domestic currency implies that domestic residents are subject to "exchange-rate illusion" in their perception of domestic money wages and prices. But the more open the economy, the less this illusion is compatible with flexible exchange rates. Hence, the more open the economy, the more any change in domestic prices will immediately evoke corresponding changes in domestic wages and the exchange rate, and the smaller will be the effect on domestic employment or other important real variables of a given alteration in the time path of domestic-currency prices. It appears, then, that the increased scope under flexible rates for manipulating the inflation rate to achieve real gains is more illusory the more open the economy.

McKinnon (1971, p. 343) has defined "money illusion" as "the maintenance of stationary expectations regarding the existing price levels by individuals in the face of aggregate price level movements," but we use it to mean that participants in the market act as if they are unaware of the effect on real wages of changes in the price level. Similarly, we define "exchange-rate illusion" to mean that participants act as if they are unaware of the effect of exchange-rate change on the purchasing power of domestic currency. While exchange-rate illusion and money illusion are not the same thing, it should be noted that they are related. When exchange-rate illusion declines and one gets into the habit of calculating the impact on real variables of changes in the exchange rate, it is only a small further step to begin to consider the impact on real variables of changes in the domestic price level. The relationship between money and exchange illusion and its implications for the extent to which exchange-rate adjustments are inflationary have not yet been fully resolved in the literature. For recent contributions, see Fellner (1973) and Sweeney and Willett (1975).

It is important to recognize that these types of illusion may not be irrational. Fellner (1973, p. 227) notes that "important as price changes are for determining the level of real wages, these changes hit all income recipients *in the proportion of their money wages.* Hence price [or exchange-rate] changes have no noteworthy effect on the relative 'real' positions of the employed." If, in each bargain, union officials are concerned with achieving or maintaining a given relative real-wage position, price (or exchange-rate) change need have no impact on money wages. Similarly, if currency depreciation or price inflation generally reflects an adverse shift in the productivity of home resources, and the Phillips curve is the outcome of rational search in the face of incomplete information, it may be rational for each participant to act as if he is subject to money or exchange-rate illusion, particularly if

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[2] There is, of course, considerable theoretical controversy concerning the concept of Phillips curves. The extent to which inflation is anticipated, for instance, may have an important effect on concomitant changes in employment. It is important to note in this context that Phelps (1967) has argued that even if past rates of inflation are reflected fully in expectations of future inflation (causing vertical shifts in the Phillips curve) the "optimal" rate of inflation will not generally be zero. It will depend on a number of different variables, such as the rate at which expectations of future inflation adjust to past rates, the shape of the Phillips curve, the relative costs of unemployment and inflation, and the utility discount rate of the policymakers. Thus, even if the Phillips curve is not stationary, desired rates of inflation may still differ between economies. Another reason for different optimal rates of anticipated inflation is given in the literature on the welfare cost of inflationary finance.

each participant thinks that other participants act as if they are subject to the same sort of illusion.

Despite these considerations, the basic point that openness reduces the scope for achieving real gains by manipulating the inflation rate under flexible exchange rates can be made by using a rather different analytical framework. As we argue below and Corden (1972) has also stressed, in the long run a current-account imbalance cannot be offset by capital flows. This rules out reliance on the monetary-fiscal mix as a long-run policy option, so that a payments imbalance can be eliminated only through either expenditure-switching or expenditure-changing policies. For the former to be successful, it must be possible to influence the differential between the prices paid for domestic and foreign goods. But if domestic costs are strongly dependent on foreign prices or the cost of imports, as would be the case in relatively open economies, such differentials would be very difficult to set up, whether through exchange-rate change or commercial policy. Thus, in highly open economies, expenditure-changing policies become the only tool for altering the balance of payments, which is to say that macroeconomic policy becomes subservient to the balance-of-payments constraint.

Finally, as Alexander (1952) has pointed out, the balance of trade can be improved only if real domestic expenditure declines relative to real domestic output. To the extent that expenditure-switching policies are not feasible, real domestic expenditure cannot be altered without affecting domestic output, which again establishes that the more open is the economy and the more dependent are domestic costs on import prices, the less can the balance of payments be altered without affecting domestic activity.

However, this argument does not mean that a crawling peg might not be appropriate even in rather open economies. For with a crawling peg and a very narrow band, wide swings in the exchange rate could be eliminated and much more of the domestic-currency illusion could be kept intact, with the tendency for the Phillips curve to remain a relationship between the unemployment rate and inflation measured in domestic currency remaining correspondingly greater (see McKinnon, 1971). Still, even under a crawling peg domestic-currency illusion could be maintained only if domestic financial policy is sufficiently adept to keep the purchasing power of the domestic currency fairly predictable relative to the foreign currency.

Our argument is summarized in Figure 2. U_P reflects the value of the additional freedom provided by flexible exchange rates for countries to determine their own time path of the domestic price level without

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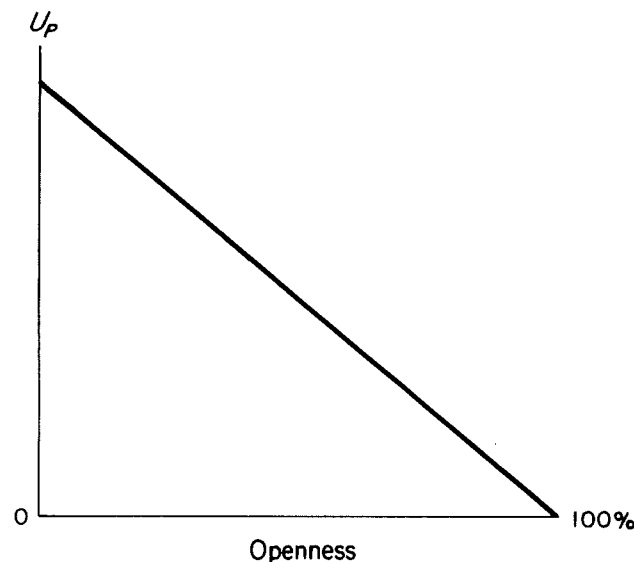
FIGURE 2. Net benefit associated with switching from membership in a currency area to a system of variable exchange rates from the standpoint of the freedom to choose the most desirable point on the Phillips curve.

regard to the balance-of-payments constraint. This curve is downward sloping because of our argument that the value of such freedom declines with openness and approaches zero in highly open economies.

3.2 The Importance of Independent Macroeconomic Policies and the Choice between Alternative Currency Systems

In assessing the importance of freedom to follow independent macroeconomic policies, we must distinguish between longer-run secular policies and those concerned with shorter-term "fine tuning."

Arguments that the freedom to engage in short-term discretionary policy is unimportant are frequently based upon the unpredictability of the effects of discretionary policy, either because the effects of policy changes are uncertain or because lags in the effects of policy are longer than the period over which the economy can be accurately forecast. Of course, as is stressed in the literature on the theory of economic policy under uncertainty, such uncertainties do in general reduce the optimal amount of discretionary policy action, but not to zero.[3] Arguments

[3] For a recent summary of this literature, see Okun (1972). As Fischer and

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for limiting the degree of discretion in macroeconomic policy may also rest on the belief that unconstrained government behavior will tend to be perverse. The discipline argument for fixed rates comes under this heading, although, as Haberler and others have argued, there is a serious empirical question whether the loss of reserves under fixed rates provides more discipline than a depreciation of the exchange rate under floating rates.

Disagreements concerning desirable exchange-rate systems have at times resulted from differences in explicit or implicit emphasis on short-term versus long-term aspects of macroeconomic policy. Such differences are reflected, for instance, in the contrasting views of Aliber and McKinnon on the relative desirability of wider bands and sliding parities.

Aliber (1972) has argued that on stabilization grounds floating rates are superior to either a wider band or a crawling peg, and that these in turn are superior to a fixed exchange rate. His contention is that, to the extent the exchange rate is pegged, capital will be mobile and will frustrate discretionary monetary policy, thereby making stabilization more difficult. Essentially, his argument focuses only on short-term stabilization questions and ignores the longer-term problem of freedom to set the general long-run trend of macroeconomic policies independently of the balance-of-payments constraint. Certainly, considerable macroeconomic costs would be attached to a wider band with a fixed parity in the longer run, except when the longer-term requirements for internal and external balance fortuitously coincide or when the long-run inflation-unemployment trade-off is vertical.

In contrast to Aliber's favorable evaluation on stabilization grounds of the wider band relative to the crawling peg, McKinnon (1971, p. 34) has taken the view that on these same grounds crawling pegs or sliding parities are decidedly superior. McKinnon adopts the growing academic view "that authorities should strive for stability in rates of monetary expansion and government budgeting and not attempt 'finely tuned' changes in short-run policies" (p. 344). This elevates the importance of retaining the efficient automatic stabilization provided by the external expenditure leakages of a fixed rate.[4] He then goes on to argue that "merely widening the band while keeping parities fixed, as has been proposed by many commentators, gives up short-run stability and does not provide for secular adjustment" (p. 351).

Cooper (1973) note, where long lags are known with certainty, they dictate a more active stabilization policy than would be the case with short lags.

[4] For more on this argument, see section 5.2.

We may conclude that for independence of secular macroeconomic policies some form of exchange-rate flexibility will be required. As will be discussed in later sections, the relative advantages of fixed versus flexible exchange rates in terms of short-term stabilization policy are less clear-cut and will depend both on the nature of the predominant pattern of disturbances facing the country in question and on views of the desirability of discretionary versus automatic stabilization policies.

3.3 The Efficacy of Monetary and Fiscal Policy and the Feasibility of Independent Monetary Policies in a Currency Area

The exchange-rate system also imposes certain constraints on the efficacy of monetary and fiscal policy. It is well known from the work of Mundell (1961) and others that both interest-rate policy and fiscal policy (holding the interest rate constant) are more effective under floating than fixed rates, in the sense that a unit increase in government expenditure or decrease in the interest rate will cause output to rise by more under floating than fixed rates. However, in a world of some interest sensitivity of capital flows, adoption of floating exchange rates increases the potency of interest-rate policy relative to that of fiscal policy.[5] This is because interest-rate reductions cause exchange depreciation by their effect on the capital as well as on the current account.

While, according to Mundell's analysis, an increase in capital mobility enhances the potency of interest-rate policy under flexible rates, it also makes the interest rate more difficult to control under fixed rates. Because of the offsetting effects of international capital flows, a greater change in the autonomous component of the domestic money stock would be required to induce a given short-term change in interest rates. In the extreme of infinite capital mobility, a change in the domestic component of the monetary base would change neither the interest rate nor the domestic money supply, its only lasting effect being upon the level of external reserves.

For fiscal policy, capital mobility increases the leverage under fixed rates, because it dampens the interest-rate changes that would be brought about by government fiscal imbalances. As a result, the net effects of government surpluses or deficits on aggregate demand will be reduced less by off-setting changes in private consumption and investment spending that is crowded out or stimulated by changes in fiscal policy. In other words, in the absence of sterilization policies, high capital mobility will "manufacture" money expansions to accom-

[5] This literature assumes that reserves are ample enough that the balance-of-payments constraint under fixed exchange rates is not binding.

pany budget deficits, thus converting a discretionary fiscal expansion into an expansionary monetary policy as well.

On the other hand, in the face of infinite capital mobility, a move to floating rates will always enhance the strength of monetary policy and completely emasculate fiscal policy. The condition for the strength of fiscal policy to be enhanced by a move to floating rates is that the capital inflow induced by the interest-rate increase accompanying the expansion of expenditures be less than the induced deterioration of the current account.[6] Under fixed rates, an increase in capital mobility will always increase the strength of fiscal policy and reduce the strength of monetary policy, while under floating rates just the reverse will occur; regardless of the degree of capital mobility, a move to floating rates will increase the comparative strength of monetary policy relative to fiscal policy.[7] However, as Caves (1968) and others have emphasized,[8] where private speculation is strongly stabilizing floating rates may generate little change in policy leverage as compared with fixed rates. On the other hand, destabilizing speculation can further increase the differences in policy leverages generated by a switch from fixed to floating rates.

It is sometimes argued (see, e.g., Sohmen, 1969a, p. 212) that, while floating rates make monetary policy more effective, they also increase the speed with which it operates. Effects of interest-rate changes on the capital account are immediate, whereas effects on the level of investment are subject to a considerable lag. This argument may be overstated, however. In the scenario under consideration, aggregate demand is influenced by changes in the current account, and the speeds of adjustment here may well be as long or longer than the responses to monetary and fiscal policies in a relatively closed economy. Indeed, with low short-run trade elasticities the initial effects via the current account could even be perverse, as Niehans (1975) has emphasized.

Finally, while most of the literature on the efficiency of monetary and fiscal policy under fixed and flexible exchange rates has concentrated on the leverage of policy tools (i.e., the multiplier effect on

[6] Where income mobility of capital is present, the condition is that the sum of interest- and income-sensitive funds attracted be less than the current-account reduction.

[7] For a recent review of the literature on the effects of fixed versus flexible exchange rates on the efficiency of monetary and fiscal policy under different degrees of capital mobility, see Willett (1975).

[8] See the formal models by Baguley in Caves and Reuber (1971) and Argy and Porter (1972), which show rigorously that inelastic expectations reduce the quantitative degree of difference between the leverages of monetary and fiscal policy under fixed and floating exchange rates, while elastic expectations increase these differences.

output of a unit change in a given policy tool), policymakers may be more concerned by the certainty with which the effects can be predicted. Indeed, in the absence of costs to using policy instruments, only the degree of certainty of effects, not strength, would be important. One would just apply greater dosage to weaker instruments. If expectations of exchange-rate change depend capriciously on the state of monetary and fiscal policy or if the time path of capital flows induced by a change in the interest differential is unpredictable, the stabilization authority may find its task considerably easier under a fixed rate. On the other hand, if capital flows and responses of the trade balance to changes in income and the exchange rate are more predictable than the responsiveness of investment to interest-rate change, the monetary authority may find its task easier when exchange rates are floating.

Much work remains to be done on the effects of fixed versus flexible exchange rates on the effectiveness, broadly construed, of monetary and fiscal policies. It is possible, however, to draw fairly strong conclusions about the constraints on monetary and fiscal policy imposed by joining a currency area, even if questions remain about the opportunity costs of these constraints.

Although some differences of opinion remain on the degree of policy centralization necessary to maintain a currency area, there does appear to be growing support for the intermediate view that while a full-fledged central government is not necessary for a currency area, there must be considerable limitation on the nominal sovereignty of member countries to pursue independent monetary and fiscal policies.

There also seems to be agreement that there could be greater independence of fiscal policy than of monetary policy. The high mobility of financial capital to be expected within a currency area would limit the range of possible independent interest-rate movements between countries.[9] As was discussed above in the limiting case of perfect capital mobility, independent interest-rate policy would be impossible with a fixed exchange rate. From this standpoint, one determinant of whether it would be desirable for a country to join a currency area may be the country's comparative efficiency in using monetary and fiscal

[9] Analogous circumstances would hold in the case of adoption of a crawling peg, where exchange-rate movements would be highly predictable. The degree of predictability of exchange rates is a major determinant of the degree of mobility of financial capital, and fixed rates can be considered as just a special case of completely predictable rates, where the expected rate of change is zero. On the interest-rate constraint under alternative exchange-rate systems, see Willett (1970) and Willett, Katz, and Branson (1970). It should be noted that even completely predictable exchange rates are not sufficient to guarantee perfect capital mobility. For reasons why capital arbitrage schedules may be less than perfectly elastic, see Officer and Willett (1970).

policy.[10] A country that has relied primarily on interest-rate policy for stabilization purposes, perhaps because of institutional constraints on the flexible use of fiscal policy, should be more hesitant to give up the independence of its monetary policy to join a currency area with decentralized fiscal policies than should a country with more efficient fiscal stabilization.[11]

3.4 The Need to Coordinate the Creation of Money and Debt

Some collective control or influence over the rate of creation of government debt, be it high-powered money or securities, would be a necessary postrequisite for the maintenance of a currency area. Otherwise, as Smith (1965) pointed out, the currency-area arrangement would imply that each central bank or government had, in effect, unlimited credit lines with the central banks of the other participating countries.[12] The inflationary potential of such an arrangement is obvious. Alternatively, rather strict agreement would have to be secured on the adjustment responsibilities of surplus and deficit countries.[13] Thus, to guarantee the maintenance of fixed rates without restrictions, countries would have to tailor their macro policies to external balance.[14] Of course, external balance would not have to be maintained at every point in time, and so the link of monetary and fiscal policies to external balance would not need to be rigid (see, e.g., Willett and Forte, 1969). But it is in the nature of the International Monetary Fund system, in which parities are not guaranteed, that the periods in which short-term financing is needed the most are the ones in which guarantees to maintain fixed rates and free convertibility are least credible, so that private financing funds are no longer easily available. Thus, it seems reasonable to conclude that monetary and debt-creating policies must be closely coordinated in order to achieve the benefits of private financing emphasized by the advocates of financial integration.

[10] Efficiency would be a decreasing function of the lags involved and the extent to which policies have undesirable sectoral or other side effects.

[11] See Caves (1963, p. 127). Of course, the effectiveness of countries' monetary policies will also vary.

[12] Even if official asset creation were rigorously controlled, some scope would still exist for manipulating output and the balance of trade through balanced-budget fiscal policy.

[13] We are not as optimistic as Ingram (1969) that Mundell's suggestion of tailoring monetary policy to external balance and fiscal policy to internal balance is a viable long-run policy (see Willett and Forte, 1969).

[14] For a discussion of the adjustment responsibilities of surplus and deficit countries, see Officer and Willett (1969, part IIIB) and references cited there.

3.5 The Feasibility of Independent Fiscal Policies

While some centralization of fiscal decision making is required in a currency area, the need is much less than for monetary policy. The allocational and distributional branches of government could retain virtual autonomy. However, the stabilization actions of closely integrated countries would have large spillovers, and the general conclusion of those who have studied the question of the appropriate government level for stabilization policy is that "the Stabilization Branch must do its job primarily at the central government level" (Oates, 1968, p. 44).[15] As Oates points out, in the United States the bulk of the attack on unemployment by state and local government has not been via debt issue (i.e., orthodox fiscal policy), but rather via special inducements to attract new industry to depressed areas. Such activities are largely of a beggar-my-neighbor character, in which independent behavior is likely to lead to suboptimal results. Thus, to achieve the advantages of extending the domain of a currency area, some degree of traditionally national control over the stabilization aspect of fiscal policy must be given up.[16]

Kenen (1969a) has pointed out that the treasury of a fiscal system that spans a number of currency areas will face a host of problems, such as in which currency to denominate tax rates and transfer payments, collect taxes, pay for goods and services, and issue its own debt. On the technical level, these problems do not seem to be much greater than those associated with transactions of any other type involving currency conversion. Moreover, since each decision the government is free to make is in effect a policy tool, some of the choices offered to a single fiscal authority spanning a number of currency areas could be used advantageously.

However, Kenen's argument seems to be primarily a political one, namely that there would be great political difficulties in making a fiscal agreement that would account for exchange-rate change in a fashion agreeable to all participants. In effect, he is arguing that adoption of a common currency will facilitate the growth of a centralized fiscal apparatus and make it possible to reap what may be important economies of scale in government activities. Thus, while it is necessary to give up some fiscal autonomy to form a currency area, Kenen's

[15] See also, Engerman (1968). The desirability of coordination becomes particularly strong when the objectives include growth as well as stabilization (see, for instance, Cooper, 1968, p. 182).

[16] For a recent discussion of the problem of policy coordination within a currency area see Arndt (1973).

argument indicates that this would be easier to do in conjunction with the formation of a currency area.

It is not necessary, however, that a currency area span the broadest domain of least-cost governmental arrangements. The domains of various types of collective action may vary considerably, and different levels of government may be appropriate for undertaking various activities. Collective actions are undertaken at local, state, national, and supranational (NATO, for instance) levels, and even at the local level several communities that are independent with respect to certain activities may combine in school or sewerage districts or other specific activities.[17] There is no reason why the domain for least-cost defense expenditures, for instance, should set the proper domain for a currency area. If for each activity there is an optimum scale, it would seem that there are greater gains to be reaped from combining many small currency areas into several large ones than from combining several large areas into an even larger one. In other words, the advantage of political integration through currency unification would seem to be subject to diminishing returns.

It has been argued in this chapter that to achieve the advantages of extending the domain of a currency area, some degree of traditionally national control over domestic economic policy must be given up. The decision concerning the formation of a currency area involves balancing the benefits of the former against the costs of the latter. These costs will in turn depend upon the efficiency of the policy instruments over which national control is being given up or loosened, the efficiency of the adjustment mechanisms that remain, the likelihood that conflicts will arise, and the size and nature of the disturbances to which adjustment is required. Most of the literature on this subject has concentrated on the national adjustment mechanisms that remain operative within a currency area and their costs. It is to this question that we now turn.

[17] For discussions along this line, see Musgrave (1969), Oates (1968), and Tullock (1969).

4 Factors Affecting the Ease of Adjustment under Fixed and Flexible Exchange Rates

4.1 Financial Capital Mobility and Adjustment under Fixed Exchange Rates

The adjustment mechanisms available within a currency area are of course the same as those which operate in interregional payments adjustment within a country. The apparent ease of interregional payments adjustment as compared with international adjustment has received considerable attention.[1] Writers such as Ingram, Kindleberger, and Scitovsky have emphasized the cushioning or financing role played by the high mobility of private financial capital between regions.[2] When influenced primarily by interest rates and not by other regional conditions, such highly mobile capital provides a ready source of financing for areas in payments difficulties and will at least temporarily prevent the multiple contraction of credit that would otherwise occur under a fractional reserve banking system.

The mechanism of adjustment envisaged by Scitovsky (1969, Chaps. 8 and 9) under conditions of high capital mobility is the same as that considered by McKinnon and Oates (1966) to prevail under fixed exchanges when capital is perfectly mobile: a prolonged payments imbalance will draw down the wealth of the deficit region and increase that of the surplus region. This process will tend to reduce spending in the deficit region and increase it in the surplus region, and can eventually restore payments balance.

Scitovsky points out that, if capital is imperfectly mobile, the transfer of assets from deficit to surplus regions will be accompanied by a fall in the prices of assets previously held by residents of the deficit region relative to those held by residents of the surplus region. He argues that these price changes are undesirable from two standpoints. First, falling asset prices imply rising interest rates, and Scitovsky considers that the sectoral impacts of such changes impose unnecessary hardship. Second, such price changes hasten the adjustment process, and he argues (1969, p. 113) that the "gentler and slower restrictive pressures" when it is feasible to finance regional payments imbalances

[1] As Pfister (1960) and Cooper (1967) have noted, at least a portion of the apparent ease of interregional adjustment is due to a lack of perception facilitated by the absence of regional balance-of-payments statistics.

[2] See, for instance, Ingram (1960, 1962a, and 1962b) and Scitovsky (1967 and 1969).

"allow more scope for producers to respond actively to the fall in effective demand they face and so to bring about the same payments adjustment with less change in income."[3] In addition, he argues, firms would be more likely to respond aggressively to a loss of markets within their national frontier than to a loss of foreign markets, so that adjustment between highly open regions tends to be easier than international adjustment.

These are interesting hypotheses that seem plausible and worthy of empirical study, and one must agree with Scitovsky that the scope for this sort of adjustment via wealth changes is much greater in interregional than in international adjustment because of the high degree of capital mobility required. However, Scitovsky seems to overstate the case for high capital mobility. It should be remembered that, in the context of standard Keynesian analysis, the changes in absorption and output necessary to effect a given reduction of imports do not depend on whether a change in wealth or an adjustment of autonomous expenditures is the motivating force.

As Cooper (1968, p. 183) has noted, "even a small country can borrow in a private international capital market for a prolonged period only if the proceeds are used for investments which are sufficiently productive, not only to pay interest on the debt but also to satisfy creditors that further lending is appropriate." Moreover, as has been emphasized by Whitman (1967 and 1972), a fall in a region's exports and in overall business activity will often come from a common cause; the same

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[3] We should note a difficulty with Scitovsky's distinction between the ability of firms and individuals as national aggregates to respond actively to balance-of-payments deficits and his argument that the latter group cannot do so. The brief discussion in his book (1969, p. 110) appears based on his earlier article, in which he argues (1967, p. 527) that individuals within a country may seek to correct personal payments imbalances either by reducing expenditures or increasing income by working additional hours, but a whole economy or region cannot choose between these two alternatives according to the preferences of its inhabitants: "the difference between an economy's aggregate receipts and aggregate payments must equal the difference between its external receipts and external payments, and external receipts are limited by the outside world's effective demand. This can be stimulated by price reduction, product variation, or advertising, but not by the sellers' increased willingness to work and to produce."

Scitovsky ignores in this argument that it is only in a Keynesian world of unemployment and inflexible wages that an increase in individuals' willingness to work and to produce will have no effect on prices. In a Phillips-curve world, the increase in aggregate supply engendered by increased willingness to produce would have a dampening effect on domestic price pressures, lowering domestic prices relative to those abroad. To the extent this improves the trade balance, adjustment can take the form of increased output rather than decreased expenditures. For critiques of certain other aspects of Scitovsky's analysis, see Haberler (1967) and Tower (1971).

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factor that causes deterioration in an area's balance-of-payments position may also lower the return on real investment, leading to worsening of the direct investment component of the area's capital account and impairing the ease with which extensive external financing may be secured (see also Fleming, 1971, pp. 472-473). Furthermore, where borrowing is significant enough to push up interest rates, the marginal cost of borrowing may rise quite rapidly because of the increased cost of refunding previous borrowings. In such a case, a country's borrowing could influence the level of interest rates in the entire community, affecting growth and possibly inducing an investment recession and unemployment in other countries. These considerations all limit the extent to which financing is feasible in the long run.

Thus, high financial capital mobility is not a perfect substitute for efficient adjustment mechanisms. High capital mobility may, however, be of some limited use even in the long run,[4] and it reduces the cost of adjustment both by making it unnecessary to adjust to temporary reversible disturbances and by allowing needed longer-run adjustment to be spread out over a longer period of time.[5]

4.2 Financial Capital Mobility and Adjustment under Fixed and Floating Exchange Rates

There is less agreement concerning the effects of the degree of financial capital mobility on the efficacy of the adjustment mechanism under flexible exchange rates. Disagreements occur both because of differing judgments as to how adjustment mechanisms would perform and because of the use of different criteria for evaluation. Both Mundell (1960) and McKinnon (1963a) have argued that it is desirable to have low capital mobility under freely floating exchange rates, although McKinnon notes that flexible exchange rates should themselves reduce the degree of capital mobility (hence, observed high capital mobility under fixed rates would not necessarily rule out the desirability of a movement to flexible rates). However, while Mundell found high capital mobility to be conducive to adjustment under fixed

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[4] One need not, however, identify financing solely as a short-run expedient. In a world of growing economies with ever-expanding portfolios, if capital mobility is sufficiently great one country can continually finance a trade deficit of limited size without drawing down its per capita wealth or ever precipitating a crisis of any sort. The problem is, as Willett and Forte (1969) have shown, that a higher domestic interest rate increases net interest payments to foreigners, and, unless domestic and foreign assets are fairly close substitutes in portfolios, this adverse payments flow may well swamp the salutary impact of the interest-rate increase on the capital account.

[5] This is discussed in more detail in section 4.4.

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exchange rates, Caves and McKinnon see high mobility of portfolio capital as frustrating monetary policy under fixed rates,[6] and Caves (1963) and Sohmen (1969a) point out that under floating rates monetary policy still retains its potency even under perfect capital mobility via its impact on the exchange rate and the trade balance. Moreover, Sohmen stresses that adoption of floating exchange rates when capital mobility is great will increase the speed with which monetary policy affects economic activity, although, as discussed above, the strength of this argument can be overstated.

The first formal treatment of this question was undertaken by Mundell (1960). He constructed a fairly simple model of an open economy, in which the domestic price level was flexible, capital flows responded to interest differentials, and the trade balance depended solely on the terms of trade. After demonstrating that in response to an exogenous disturbance the economy under either system might return to equilibrium only after cycling, he showed that high capital mobility reduced the likelihood of cycling in the fixed-exchange-rate case but increased it in the floating-exchange-rate case. He used these observations to conclude that "a flexible exchange rate system may not work smoothly for an economy in which capital flows are highly sensitive to interest rates, but may work better than a system of fixed exchange rates if capital is immobile."

[6] However, McKinnon argues that high capital mobility would be desirable under fixed rates insofar as it helped the financing of trade imbalances, but undesirable under flexible rates insofar as it forced trade flows to adjust to changes in capital flows. Fear of high capital mobility is perfectly valid in cases where capital outflows coincide with periods of what would be domestic boom in the absence of capital mobility, or even where capital flows are large and uncorrelated with important target variables, since capital volatility in these cases would aggravate macroeconomic instability. However, the greater the correlation between capital inflows and what the level of domestic activity would have been in the absence of any capital volatility, the greater the macroeconomic stability fostered by some capital volatility. Still, it may be that the most crucial implications of capital flows under flexible rates are that speculative short-term capital movements are likely to lend stability to the exchange rate, as they appear to have done in Canada, and that interest-sensitive capital movements will strongly affect the operation of financial policy. (Note that throughout the paper we use the term "capital mobility" to cover two phenomena—sensitivity to interest-rate differentials, and sensitivity to expectations about exchange rates; the reader must determine the meaning in each case.)

The criterion being applied here is not the efficacy of the adjustment mechanism but the degree of external restraint placed on the ability to follow an independent monetary policy. In other words, it is not that interest-rate policy would not be an effective tool to influence a country's external accounts, but that its use would be largely disturbed by external developments. Recently, this has been a major consideration in discussions of crawling-peg exchange-rate systems (see, for instance, Williamson, 1965, and Willett, Katz, and Branson, 1970). The insulating effects of flexible exchange rates will be considered in the next chapter.

Mundell subsequently explained that the above results are a consequence of the "principle of effective market classification." This principle dictates that, for smooth functioning of the economic system, each policy tool should be aimed at the target variable on which it exerts relatively more influence. In this case, the two policy tools are the interest rate and official purchases and sales of either goods and services (under floating rates) or foreign exchange (under fixed rates). The two target variables are the price level and either the exchange rate (floating rates) or the balance of payments (fixed rates). Hence, with low capital mobility interest-rate policy should be aimed at equilibrating the domestic market, and with high capital mobility interest-rate policy should be aimed at equilibrating the external market, with the other instrument aimed at the other target in each case. Thus Mundell's conclusion about the impact of capital mobility on the viability of floating exchange rates is misleading, because his analysis implies that there would be no objection to floating exchange rates even with high capital mobility, so long as interest-rate policy was assigned to maintenance of a target exchange rate.

Mundell's criterion for "smooth working" also seems artificial. As Sohmen (1969b, p. 260) has noted, in the real world price levels adjust more slowly to internal imbalance than do exchange rates to external disequilibrium (see also the discussion by Caves, 1963). Hence, even with Mundell's pairing, it is likely that a cycling floating exchange rate will bring the economy back to the neighborhood of equilibrium faster than a "smoothly adjusting" fixed exchange rate.[7] If disequilibrium exchange rates impose a welfare cost, as Hause (1966) and Johnson (1966) indicate, or if the unemployment associated with internal disequilibrium is undesirable, the floating exchange rate might well be the superior regime even under high degrees of capital mobility.[8]

In summary, it is difficult to derive broad generalizations about the

[7] This measure of the efficiency of adjustment under fixed exchange rates is, in fact, the one used by Cooper (1969).

[8] Mundell ignores an additional mechanism that causes cycling tendencies under fixed exchange rates. Recent empirical studies of freely fluctuating foreign-exchange markets have shown that speculation tends to be stabilizing where there is a strong belief in the permanence of foreign-exchange values (i.e., when the exchange rate changes, speculators expect it to return to its former level). By contrast, other studies have shown that changes in price levels and wage levels generate expectations of further changes in the same direction (see, e.g., Phelps et al., 1970). Hence, price adjustment in foreign-exchange markets may proceed much more smoothly than in domestic markets. In other words, price changes and wage changes appear to generate much more momentum than do exchange-rate changes, and this momentum may well cause overshooting with concomitant cycles. (Admittedly, such a difference rests on the sort of "money illusion" that Mundell assumes away.)

effects of the degree of capital mobility on the desirability of fixed versus floating exchange rates. One is probably not justified in applying the principle of equal ignorance to conclude that the effects of the degree of private capital mobility are completely neutral, but, given the substantial ability of government actions to influence private capital flows or substitute official flows in their stead, it appears that the degree of endogenous capital mobility is of only limited importance compared with other considerations.

Probably the greatest practical consequence of high capital mobility is that it sharply reduces the viability of a compromise system of adjustably pegged exchange rates. The potential for large speculative capital movements makes it more important to decide between genuinely fixed rates and a system with considerable flexibility of exchange rates. While such a conclusion is less clear-cut in connection with a system of crawling pegs or sliding parities, high capital mobility apparently also makes the operation of such a system more difficult (see Willett, 1975). Thus it appears that the increased capital mobility of recent years make the question of deciding between flexible and truly fixed exchange rates more important without perhaps having a great deal of effect on which system is more desirable for particular sets of countries.

4.3 Labor Mobility

The importance of capital mobility as a device for buying time under a fixed rate system is reinforced by the fact that labor mobility is considerably higher in the long run than in the short run. Hence, the longer the time period over which adjustment can take place, the greater would be the outward movement of factors. Both the greater relative wage-price flexibility and the higher mobility of labor in the long run would tend to reduce the sum of unemployment over time necessary to accomplish a given amount of adjustment when capital is highly mobile.

Factor mobility was, in fact, adopted by Mundell (1961) as the primary determinant of optimum currency areas. Recently, however, the effectiveness of labor mobility as an equilibrating mechanism has been questioned. Kenen (1969a) has pointed out that if labor intensities differ markedly between regions, labor migration may fail to resolve employment problems.[9] It seems, however, that Lanyi (1969) goes too far in rejecting the importance of labor mobility in interregional adjustment. Lanyi (p. 19) stresses that "the chief problem with labor

[9] Kenen's treatment is brief, and the mechanism he has in mind is not explicitly spelled out (see also the discussions by Snider, 1967, and Lanyi, 1969).

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mobility arises from barriers to interindustrial rather than interregional mobility." He argues that, as a consequence, labor mobility is not an effective adjustment mechanism in the short or medium run.[10] But this does not seem a sufficient basis for Lanyi's implication that interregional labor mobility is of little relevance. Financial capital flows are the primary component of well-functioning interregional payments mechanisms in the short run, but this does not negate the longer-run role played by labor mobility in easing adjustment where payments difficulties are not temporary.[11]

This is clearly illustrated by Ingram's (1962b) study of the Puerto Rican experience. Ingram (p. 200) concluded that "The employed labor force was slightly smaller in 1960 than in 1947, unemployment was about the same, and a large net emigration had occurred in the interim. Indeed, net emigration from 1947 to 1960 almost equaled the employed labor force in 1960. These facts suggest that traditional adjustments of price, income, wages and employment remain important even in full financial integration."[12] It should also be noted that complementary movements of labor and capital would help to reduce difficulties in absorbing additional labor in the surplus region (see, e.g., Borts and Stein, 1964, and Whitman, 1967).

High labor mobility also facilitates adjustment by helping to arrest the development of differential wage trends between regions. Scitovsky (1969, p. 118) points out that labor mobility "sets limits to divergencies of costs between regions. Management in a given region will not concede and labor will not press too hard for wages that would push costs beyond these limits, the former for fear of diminishing profits, the latter

[10] Kenen (1969a, p. 44) and McKinnon (1963a) have also emphasized that perfect interregional labor mobility requires perfect occupational mobility.

[11] Of course, outmigration, by reducing aggregate demand, may itself stimulate additional unemployment in the depressed region. However, Vanderkamp's (1970) empirical study of Canadian experience found that the process there was stable, i.e., outmigration stimulated a less than equivalent amount of additional unemployment so that, on net, unemployment declined as outmigration occurred.

[12] In some countries, movements of labor may also be a major short-run factor. It is, of course, possible that emigration may have a negative impact on a country's balance of payments because of the capital emigrants take with them (see Scitovsky, 1969, p. 93). But, on the other hand, repatriated earnings from emigrants may be an important source of foreign exchange. Likewise, in the surplus country the emigrant adds both to aggregate supply and to aggregate demand, so that the net effect could go either way. It is also possible that the migration of workers and professionals will hamper the adjustment process where, say because of differential tax structures, relative real wages are significantly different from relative marginal products. Generally, however, it appears that the movement of labor from areas of payments deficit to those of payments surplus will tend to aid the adjustment process (see, for instance, Needleman, 1968, pp. 14-15, and Mishan and Needleman, 1966).

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for fear of diminishing [its own] employment." He also adds in this context, "The pressure of such competition is the greater the more the area depends on and competes with the outside world which is one reason why such competition is so much more effective within an integrated economy than between different economies."

When considering the role of factor mobility in the determination of desirable currency areas, one must recognize the additional complication that areas of high mobility of labor, entrepreneurial capital, and financial capital need not coincide. In other words, the domains of different factors of production may differ. Thus, even on the basis of the factor-mobility criterion alone, we would have to weigh competing considerations in determining currency-area groupings. We would suggest, however, that where the domains of labor and financial-capital mobility differ, greater weight should be placed on the domain of labor mobility. It should be easier to compensate for an initial lack of capital mobility by direct official financing than to compensate for low labor mobility by regional and/or manpower policies.[13]

High internal labor or capital mobility makes structural change easier with less change in relative prices and concomitant Schultze demand-shift inflation. Higher factor mobility should also serve to increase the elasticity of supply in each sector. Since most imports compete to some extent with domestic production, factor mobility should also serve to make excess demands more elastic. Thus, internal factor mobility results in a better-behaved Phillips curve and higher foreign-trade elasticities, which will facilitate adjustment under both exchange systems.

High labor mobility also improves adjustment under flexible exchange rates by reducing the real wage changes required to adjust to a disturbance of a real nature (for example, a change in demand or productivity). But under fixed rates external labor migration acts as a substitute for the deflation or inflation necessary to adjust to a change in competitiveness in world markets, while under flexible rates (assuming away perverse capital flows) competitiveness is automatically maintained without price, wage, or employment changes. Thus, it appears that high labor mobility helps adjustment more under fixed

[13] A second argument buttresses this conclusion. While most of the arguments for the salutary effects of labor mobility on the adjustment process apply equally to capital mobility, an area suffering from economic decline may experience an outflow of real capital, which would further increase the reduction of the real wage necessary to restore labor-market equilibrium. Insofar as this effect is important, capital mobility would be undesirable.

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than under flexible exchange rates. It increases the comparative as well as the absolute efficiency of adjustment under fixed rates.

4.4 Relative Wage and Price Flexibility

The removal of a trade deficit through market forces under fixed exchange rates generally requires that the money income of the area in question decline relative to that abroad. Unemployment will be minimized if this fall in income takes place via a combination of wage and price reductions relative to foreign levels and outward migration stimulated by the decline in money incomes in the area. Allowing considerable time for full adjustment to take place may ease the cost of adjustment by increasing the degree both of relative wage and price flexibility and of factor mobility. Downward inflexibility of money wages and prices is, of course, a major reason why exchange-rate flexibility may be needed to allow adjustment to take place without an unnecessary cost in terms of unemployment. But, as Haberler has pointed out, in a world that displays some inflationary trend, an area's wages and prices could fall relative to those abroad without requiring an absolute decline. More generally, a country with a normally shaped short-run Phillips curve which keeps its rate of increase of money income 1 percentage point below normal for four years might face less aggregate unemployment than if it were required to reduce its rate of growth of money income by 4 per cent in one year.[14] Even if this were not so, the welfare losses associated with unemployment are generally considered to increase more than proportionally with unemployment, so that by spreading the adjustment out over a number of periods a clear welfare gain is achieved. Where adequate financing is available, adjustment can be stretched out over a long period of time and its cost may be eased.

It is important to distinguish between three different aspects of wage and price flexibility. The most common measure is the extent to which the Phillips curve is vertical. This is simply the degree to which wage and price changes respond to changes in output, and it is the most generally accepted measure of flexibility. For instance, the classical system with perfectly flexible wages and prices would exhibit a vertical Phillips curve. Also important is the extent to which the Phillips curve is bowed (measured by the absolute value of the curve's second derivative). The extent to which the curve is bowed or kinked measures the degree to which wages are less flexible downward than they are up-

[14] This conclusion retains its validity for Phillips curves in which recent inflation is reflected in expected future inflation.

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ward and thus the degree to which diminishing returns are reached in using deflation as a tool to lower prices and wages without affecting output, or in using reflationary policies to expand output without incurring adverse effects on wages and prices. Systems in which formal contracts or behavior patterns set a limit to downward wage flexibility but no limit to upward flexibility would exhibit pronounced kinks. A third measure of price flexibility is the rate at which expectations of inflation adjust to past inflation rates, shifting the Phillips curve. This is simply an inverse measure of how long it would take for the kind of equilibrium emphasized by Milton Friedman to establish itself or, as Keynes might have put it, the likelihood that we will be alive in the long run (i.e., after the money illusion associated with some initial equilibrium disappears).

Focusing solely on the first aspect, wage and price flexibility facilitates adjustment to all disturbances under fixed rates. Autonomous shifts in demand and supply will disrupt the economy less the greater the extent to which adjustments take place via price instead of quantity changes. Moreover, as we have argued above, price flexibility within individual sectors will favorably affect the aggregate Phillips curve. To the extent that the Phillips curve is bowed, inept stabilization policy or inefficient automatic stabilizers resulting in fluctuations in aggregate demand will worsen the trade-off between average inflation and average unemployment, although this worsening will be less important the more vertical the curve is.[15] Thus, price flexibility in either of the first two senses will substitute for efficient, flexible stabilization policy and partially preclude the need for automatic stabilizers.

While short-run stabilization is facilitated by price flexibility in the first two senses, flexibility in the third sense is likely to give rise to the destabilizing Wicksell effect in the short run. If price changes stimulate expectations of further price change, purchases will be postponed in periods of deflation until prices have a chance to drop even further, and purchases will be accelerated in periods of inflation, exacerbating the problem by giving rise to greater instability of prices and perhaps output. Thus flexibility in the third sense is not an efficient substitute for efficient, flexible stabilizers, either discretionary or automatic. However, in the long run all three components of flexibility should significantly ease the adjustment process within a currency area.[16] To the

[15] On this, see the superbly clear discussion by Fleming (1971).

[16] Thus adherents, like Parkin (1972), to the view that prices and wages are highly flexible and differential inflation rates primarily reflect differential rates of monetary expansion are more likely to support fixed rates than are those, like Hirsch (1972), who believe in money illusion in the labor market.

extent that prices are flexible in any of these senses, less welfare loss results from adjusting the trend rate of price change to conform to the exigencies of external balance, no matter how these requirements may change, and this will markedly reduce the political friction arising out of the need to settle on an appropriate rate of wage and price inflation for the community as a whole.

As Corden (1972, p. 12) has recently stressed, one type of wage flexibility is essential for exchange-rate adjustment to be effective. This is real-wage flexibility, for if real wages are not flexible, "a devaluation will be followed so quickly by an adjustment of wages and other factor prices designed to maintain real values that the effects of the devaluation will be quickly negated." Of course, real wage flexibility is also necessary to affect real adjustment under a fixed-rate regime. Real-wage inflexibility simply makes adjustment under flexible rates more like that under fixed rates.

Of course, the exchange-rate system itself may be an important determinant of the degree of wage and price flexibility and the trade-off between inflation and unemployment. The behavior of participants in the labor market depends on expectations about the future path of prices, and these will be different for a member of a currency area whose exchange rate is immutably fixed than for a country under a flexible exchange rate, where exchange-rate changes can ratify any change in wages and prices. Also, Schultze-type demand-shift inflation may be more of a problem under one system than the other, depending on the source of disturbance. If volatile capital flows are the problem, a country under a flexible rate will experience exchange-rate fluctuations which alter the price ratio between its importables and exportables. This will cause the country's position on its production-possibilities curve to vary and will worsen the Phillips curve. On the other hand, if changes in the home money wage are the source of disturbance, but the prices of tradeables are fixed by the dictates of competitiveness in world markets, fixed rates will induce changes in the price of services relative to tradeables that will worsen the Phillips curve, whereas under flexible rates such disturbances would induce no changes in relative prices. The exchange rate could fall by the increase in money wages, leaving all relative prices unchanged.

This possibility indicates that it is not necessarily true, as some writers have argued, that flexible exchange rates will yield less favorable inflation-unemployment trade-offs than will fixed rates. Arguments for the advantages of fixed rates on this score usually point either to the supposed operation of ratchet effects under floating rates and downward wage and price inflexibility, so that fluctuation of the exchange

rate around a given mean will ratchet up the domestic price level, or to the effects a trade deficit under fixed rates can have in dampening domestic inflation during a boom. Depending upon the pattern of economic disturbances and the structure of economies, it is easy, as was illustrated above, to construct alternative scenarios under which flexible rates yield more favorable inflation-unemployment trade-offs than fixed rates. To address this question satisfactorily, a more comprehensive analysis is needed in which a more complete taxonomy of possible scenarios is blended with the available empirical evidence (for tentative steps in this direction, see Sweeney and Willett, 1974, 1975, and 1976).

In developing a more comprehensive analysis, it will be important to keep in mind that the choice of exchange-rate system may affect the Phillips curve differently in the long and short runs. If labor bargains in terms of real wages, the Phillips curve will be worse under a fixed rate during periods when the domestic currency would be appreciated under a flexible rate. But when the domestic currency would be depreciated under a flexible rate, the transfer accomplished by the sale of reserves under a fixed rate would result in a better-behaved curve. Moreover, even if there is complete money illusion in the labor market, the Phillips curve, viewed as the relationship between unemployment and inflation of a price index which includes imports, will worsen under flexible rates when the domestic currency is depreciating and improve under flexible rates when the domestic currency is appreciating. If labor is not willing to take a cut in its real wage, so that a ratchet operates, that system which stabilizes the terms of trade most effectively will yield the best long-run Phillips curve, but one cannot tell on a priori grounds which system will be better without knowing the source of disturbance.

Finally, it must be noted that, in a multisectoral economy, exchange-rate adjustments are only a partial substitute for wage and price flexibility. Thus, an increase in wage and price flexibility would be expected to reduce adjustment costs under flexible as well as under fixed exchange rates.[17] However, it appears that the contribution of flexible wages and prices is potentially greater under fixed than under flexible exchange rates, since the absolute need for wage and price flexibility would be greater under fixed rates. Hence, an increase in flexibility would increase the comparative efficiency (or decrease the comparative inefficiency) of fixed rates.

[17] For a discussion of some of the difficulties wage and price rigidities can generate even when exchange-rate adjustments are possible, see Shields, Tower, and Willett (1975).

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4.5 Elasticities in the Foreign-Exchange Market

As indicated earlier, high elasticities of excess demand for, and supply of, foreign exchange are likely to reduce the exchange-rate change necessary to effect adjustment under flexible exchange rates, and thereby will tend to increase the liquidity value of domestic currency. Under fixed exchange rates, they perform an analogous service, by reducing the change in the domestic price level necessary to effect adjustment and thereby enhancing the liquidity value of money. Thus, high elasticities are substitutes for wage and price flexibility under fixed exchange rates, but in one sense they are only partial substitutes. Under fixed rates, high elasticities will tend to multiply the real consequences of monetary disturbances (due, for example, to cost-push pressures), whereas flexible wages and prices would simply enable the system to return to its previous equilibrium position. However, high elasticities also preclude much of the need for wage and price flexibility. Higher elasticities will reduce the monopoly power of both labor and management, which is a major cause of differential wage and price trends, and will help to transmit impulses rapidly throughout the whole currency area, thereby spreading more evenly the burden of adjustment to exogenous disturbances or policy mistakes. Since the marginal cost of adjustment tends to be upward sloping in each market, such spreading will also tend to reduce the total cost associated with the required adjustment.

Moreover, in practice there may be little need to choose between greater wage and price flexibility and higher elasticities. First, with high elasticities the wages and prices set by the private sector on the basis of self-interest will tend to diverge less from the levels that maintain full employment in the region, and the private sector will be more prone to adjust wages and prices automatically to changing competitive pressures. Second, when domestic and foreign goods are substitutes, bottlenecks will be less likely to appear. Both these factors will tend to imply a more favorable Phillips curve with a lower natural rate of unemployment.

In the limiting case of infinite elasticities, all countries will suffer from the same pressures at once. For two reasons, this should reduce potential conflict within a currency area. Since very high elasticities imply that price levels will be very close to equilibrium at all times, they also mean that the partners in a currency area will not be faced with the problem of deciding who should bear the responsibility for eliminating divergences between current and equilibrium prices. Instead, political energies can be directed to determining how rapidly the price level of the community as a whole should change.

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Moreover, to the extent that high elasticities dictate that the same price level must prevail throughout the whole currency area at any point in time, with high elasticities all members of the currency area will come to share the same past experience of price and wage change. This shared experience should be reflected in similar inflation-unemployment trade-offs[18] and similar attitudes toward the optimal inflation-unemployment trade-off,[19] which should foster agreement about optimal macroeconomic policy.

Of course, high elasticities constrain each member of the community to allow its price and wage level to follow the time path determined by group policies at all times, and this would be a potential source of increased conflict unless all members of the area feel the same commitment to macroeconomic stability.

All in all, it seems likely that high elasticities will improve adjustment under both fixed and flexible exchange rates but will probably increase the comparative advantage (or reduce the comparative disadvantage) of fixed rates. For relatively closed economies, higher elasticities are needed to achieve the degree of interdependence that destroys monopoly power, makes wages and prices flexible, and facilitates adjustment under fixed rates.

4.6 Openness

Another important factor influencing the amount of inflation or deflation necessary to correct a given payments imbalance is the openness of the area in question. The higher an area's marginal propensity to import (or its elasticities of excess demand and supply), the smaller is the change in internal aggregate demand and domestic output required to correct a trade imbalance equal to a given proportion of domestic output (see McKinnon and Oates, 1966). The relative openness and high elasticities of excess demand and supply of regions are listed by Whitman (1967, p. 24) as major reasons for the apparent relative smoothness of longer-run interregional adjustment within the United States. On the other hand, low marginal propensities to import or low elasticities of excess demand mean that considerable domestic deflation would be required to bring about a relatively small change in imports.

Furthermore, a high degree of openness of an economy may mean

[18] This is because a major determinant of the inflation-unemployment trade-off is the expected change of prices, and probably the most important determinant of this expected change is past experience with wage and price inflation.

[19] It is frequently argued that Germany's aversion to inflation is a product of its past experience with hyperinflation.

that a given degree of financial relaxation will tend to have less impact on employment. In a very open economy, excessive domestic inflationary pressure tends to spill over directly into increased imports rather than onto prices (see, e.g., Triffin and Grubel, 1962, and Whitman, 1969. Also see Bear, 1966). This is the situation Machlup (1966, pp. 40-41) and the Group of Ten have termed "the simple case" in which the maxim that balance-of-payments cures should be tailored to the cause of the disequilibrium is correct. But the case is simple only so long as excessive domestic expansion has led to overspending on foreign goods but has not yet led to an increase in wages or prices. Tighter financial policy can then reduce aggregate demand and remove the balance-of-payments deficit without increasing unemployment. In other words, this is a genuine nondilemma case or, as Fellner (1966, pp. 20-33) puts it, a pure case of nonfundamental disequilibrium.

As Machlup goes on to argue (p. 41), "The 'simple case' stops being simple as soon as the increase in demand leads to an increase in wage rates." At that point, demand can be deflated quickly only at the cost of unemployment. Of course, if productivity is increasing, prices may fall even though wages do not, but the scope for rapid adjustment in such a manner is very limited. Whether or not a mistake in demand management becomes irreversibly incorporated into a country's wage-price structure will depend in large measure on the openness of the economy. Given the same mistakes in demand management, the incidence of dilemma relative to nondilemma cases will be greater the more closed the economy in question. The more open the economy in question, the less costly is the use of demand management to correct payments imbalances.

Of course, high elasticities of excess demand and supply will also reduce the impact on wages and prices of most disturbances. In fact, it is very clear that many of the arguments for the desirability of high elasticities under fixed rates apply in equal measure to the desirability of openness to facilitate adjustment within a currency area. Like high elasticities, openness serves to reduce monopoly power and to transmit disturbances promptly, thereby preventing divergent wage and price trends from developing, forestalling some potential political conflict, and enhancing the believability of the currency-area arrangement. Thus, high elasticities and openness are partial substitutes.

However, as mentioned in Chapter 2, openness (unlike high elasticities) has adverse effects on the usefulness of money under floating exchange rates. Hence, openness increases the absolute efficiency of adjustment under fixed exchange rates and raises the cost of maintaining a freely floating rate—but not necessarily a crawling peg or any

other system where the exchange authority retains the power to buy and sell foreign exchange to mitigate swings in the exchange rate.

4.6.1 Currency depreciation versus deflation as a tool for improving the foreign balance. Kreinin and Heller (1974) have recently compared the cost in real income of using deflationary policy under a fixed rate with using exchange-rate adjustment with full employment to eliminate an incipient payments deficit. They show that the former cost is less than the latter if and only if $\eta_m + \eta_x - 1 < m$, where η_m and η_x are the elasticities of demand for imports and exports and m is the marginal propensity to import. They conclude that countries should join with other countries in larger currency areas if and only if this inequality is satisfied. But this conclusion does not follow from their calculation of adjustment costs. Suppose that their autonomous disturbance had been an improvement rather than a deterioration in their incipient payments balance. Then they would have discovered that countries should join currency areas only if the inequality is *not* satisfied! In fact, the inequality appears in the literature on immizerating growth as the condition necessary for economic growth to lower a country's real income (e.g., Caves and Jones, 1973, p. 58). In the Kreinin-Heller framework, the first-best policy for any country facing an imperfectly elastic foreign offer curve, regardless of whether the inequality is satisfied, is to impose the optimum tariff, float the exchange rate, and maintain full employment.[20] If tariffs are excluded as a tool of economic policy, a second-best optimum could be achieved by deflating the economy and appreciating the currency until the inequality becomes an equality, at which point price and income adjustments will become indifferent to one another. While Alexander (1951) concluded that import restrictions are superior to exchange depreciation as a tool for improving the balance of payments whenever the tariff rate is below the optimum level, Kreinin and Heller's criterion indicates when expenditure-changing policy will be preferred to exchange depreciation for a country facing an incipient payments deficit and forswearing the use of import controls.

4.6.2 Openness and the foreign-trade elasticities. Orcutt (1955), McKinnon (1963b), and Armington (1970) have all presented evidence that the relationship between openness and the foreign-trade elasticities is such that adjustment to a given percentage change in demand for domestic exports requires a larger exchange-rate change in relatively open, undiversified economies.

[20] Of course, the optimum tariff as a device for achieving a transfer of real income between countries is itself second best to an explicit transfer.

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In an important, but often overlooked, paper that anticipated much of the discussion in the optimum-currency-area literature, Orcutt (1955) showed that a given devaluation would improve the trade balance by a larger percentage if the devaluing areas were small, holding constant the level of self-sufficiency (openness) and elasticities of demand and supply by individual economic units, because in this case the foreign excess demands for and supplies of tradeable goods are likely to be more elastic. By contrast, he observed that as self-sufficiency decreases (openness increases), holding size constant, both domestic and foreign excess supplies and demands become less elastic, which reduces the efficiency of devaluation.[21] Since self-sufficiency tends to increase with area size, there is no necessary presumption that devaluation by large blocs will be less efficient than by small ones.

In fact, in the empirical portion of his paper, Orcutt concludes that, in general, exchange-rate adjustment between large blocs such as the dollar area and the rest of the world would be more effective than would exchange-rate adjustment between a small country and the rest of the world. While Weisbrod's (1956) comment provides convincing evidence that Orcutt's empirical work does not justify this conclusion, it does not provide any evidence that the contrary conclusion is necessarily true.

Recently, however, Armington (1970) has used a somewhat different model to provide evidence that can be used to support Orcutt's hypothesis. He has derived estimates for the elasticities of demand for exports and imports for fifteen major developed countries. He assumed the elasticity of demand for imports and import-competing products taken together to be unity in each country, and made the additional assumption that imports and import-competing goods were all differentiated products, with the common elasticity of substitution between them equal to 2. Using data on market shares and a formula derived in Armington (1969), it is easy to show that, with the elasticity of substitution in excess of the demand elasticity, relatively open economies (with imports commanding a large share of the domestic market) will have low demand elasticities for imports. However, such economies

[21] The essence of Orcutt's mathematics is the following. He postulates the existence of two tradeable goods and implicitly postulates the existence of a nontradeable, the price of which remains constant in each country. Assuming identical consumption patterns, and elasticities of the underlying demand and supply curves, Orcutt shows that in more open (less diversified) economies the elasticities of excess demands and supplies for the tradeables tend to be smaller, which reduces the effectiveness of devaluation. The same idea was articulated by McKinnon (1963b, p. 382), who wrote, "The larger the total foreign trade sector, the smaller will be the total effective elasticity of demand for imports compared to the weighted sum of the elasticities of demand for individual commodities."

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will tend to be small, supplying a relatively small portion of foreign demand for tradeable goods, so that the elasticity of demand for their exports will tend to be relatively high. Thus, on *a priori* grounds, it is not clear which consideration will dominate. However, Armington's empirical estimates yielded sums of these two elasticities that varied from 3.52 in the relatively closed United States down to 3.04 in relatively open Belgium-Luxembourg. While these statistics support Orcutt's hypothesis, the support is weak, for the sums of elasticities in both countries are surprisingly close. A rather casual survey of other published econometric literature likewise failed to yield evidence of any clear strong relationship. Thus, we very tentatively conclude that while there may be truth to Orcutt's contention that (on the basis of elasticities) exchange-rate adjustment (or adjustment in relative prices) between two large blocs is likely to be more effective than adjustment between one very large bloc and one very small one, it appears that the quantitative importance of this relationship may be slight.

4.6.3 Openness and the terms-of-trade effect. Another argument concerning openness and the effectiveness of exchange-rate adjustments is that devaluation will shift upward the expenditure function, measured in units of domestic output (or domestic currency), and this shift will be larger the more open the economy. Hence, in very open economies, exchange depreciation is likely to create inflationary pressures which partially nullify the impact on the balance of payments of the initial exchange-rate change. Several reasons may be offered.

In very open economies, domestic wealth measured in units of domestic currency is likely to rise, again for several reasons, whenever the domestic currency depreciates. From the arguments already given, exchange rates tend to vary more in open economies, and since in open economies imports comprise a larger proportion of the consumption bundle, it is clear on both grounds that the more open the economy, the greater is likely to be the variability of the real purchasing power of its currency. This encourages the risk averter to maintain large domestic holdings of assets denominated in foreign currency, which would appreciate in domestic-currency value as the result of a devaluation. Since highly open economies are likely to be the least diversified in production, in such economies the risk-averse investor is likely to invest a larger share of his wealth in foreign industry, and devaluation is also likely to cause the domestic-currency value of investment in foreign industry to appreciate.

Even if these diversification arguments are ignored, however, much of the domestically employed capital stock may be imported in very

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open economies and thus will appreciate in domestic-currency value when the domestic currency depreciates, again causing domestic wealth to be tied to the exchange rate in the same way. Given that this dependence is most important in relatively open economies and that expenditure depends positively on wealth (measuring both in units of domestic currency), we would expect currency depreciation in relatively open economies to stimulate expenditure increases via its impact on wealth.

Furthermore, as Laursen and Metzler (1950) have argued, if the vertical intercept of the consumption function is fixed in real terms, depreciation of the domestic currency, by causing the domestic-currency prices of imported goods to rise, will cause the domestic-currency value of that intercept to increase by an amount proportional to the average propensity to import out of consumption expenditures. Since this propensity is positively related to openness, devaluation in a more open economy is likely to cause a greater increase in nominal consumption, induced by absence of "exchange-rate illusion."[22]

Finally, in the short run domestic investment plans are likely to be rigid, and the rate of investment will be insensitive to changes in the prices of investment goods (for empirical support, see Bischoff, 1969). If this is the case, depreciation of the domestic currency will cause money investment to rise by more the larger the importance of imports in the investment bundle, another reason why the domestic expenditure schedule drifts upward by more when the currencies of relatively open economies depreciate.[23]

So far, we have focused primarily on the demand side, but many of these arguments are equally appropriate to the supply side and provide additional reasons why small, open, undiversified economies will find exchange-rate adjustment ineffective.[24] If wages are related to the cost

[22] Moreover, "money illusion" may reinforce any inflationary effects, for, on the basis of U.S. data, Branson and Klevorick (1969) recently concluded that, with real wealth and real income constant, a 1 per cent increase in the consumer price index would cause an increase of almost half a per cent (0.42) in real consumption.
Of course, currency depreciation should shift the expenditure schedule downward to the extent that the depreciating country has liabilities denominated in foreign currency.

[23] The argument is symmetric for currency appreciations. In that case, these same mechanisms operate to shift downward the domestic expenditure functions, thereby reducing the negative impact a currency appreciation can have on the balance of payments. It should be emphasized that "inflationary" or "deflationary" in this section refers to both price and income effects.

[24] We have also focused mainly on the IS (investment savings) schedule, which is reasonable if the monetary authority pegs the interest rate. For a corresponding discussion of the LM (liquidity preference = money stock) schedule, see Tower (1975) and McTeer (1968, fn. 50). We have couched our analysis in terms of

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of living, either directly through escalator clauses or indirectly through bargaining and market processes, wages will rise when the domestic currency falls in external value. (For a formal model incorporating this mechanism, see Almonacid and Guitian, 1973.) Similarly, the value of the imported component of the domestically employed capital stock will also rise when the domestic currency depreciates, thereby raising the user cost of a unit of physical capital. In a relatively open economy, where a large fraction of both consumer goods and the capital stock is imported, the rise in these two costs of production is likely to be particularly large and therefore to produce a huge boost in the prices of domestically produced goods.

This in itself will cause a further upward shift in the expenditure schedules in nominal terms and a need for an even larger exchange-rate change to overcome the initial trade imbalance. To conclude, in very open economies the dependence of expenditure and the domestic price level on the terms of trade is likely to be pronounced, so that exchange-rate changes are likely to be ineffective.

4.7 Government Transfer and Structural Policies

We have considered factor mobility, the degree of relative wage and price flexibility, elasticities in the foreign-exchange market, and openness as the primary market factors affecting the ease of adjustment within a currency area. As was previously indicated, the willingness and ability of the members of a currency area to adopt government policies to facilitate adjustment or reduce the need for it may also be important factors.

Both temporary financing of deficits and longer-run adjustment can be facilitated by policies which promote competition, make financial markets more efficient, and remove barriers to factor mobility (both institutional and due to custom and lack of knowledge) and by general manpower training and relocation programs (see, e.g., Ingram, 1962a, p. 190, and McKinnon, 1963b). Liberal unemployment compensation would lessen the social costs of depressed conditions, and direct intergovernmental official financing of deficits could supplement private financing if financial capital mobility were inadequate. In addition, specific regional development policies can and have been undertaken within countries to help ease the burden of depressed areas. Such

policies may be of two types: either work opportunities may be expanded in the depressed area by bringing investment to the worker, or workers in the depressed area may be induced to move to more prosperous areas.

The optimal design of such policies is a difficult question on which much further research is needed. Static economic efficiency conditions would generally call for aiding movements of factors out of the depressed region, but where strong local and cultural ties exist, such policies may create considerable social difficulties. It seems likely that an optimal strategy would contain elements of both programs. The economic returns from inducing a young worker to emigrate, for instance, would be much greater than for an older worker. Similarly, expected technological and demand trends might have a strong influence on an optimal regional strategy.[25]

While such government policies may reduce the costs of adjustment under fixed exchange rates, they are not a full substitute for factor mobility and/or wage and price flexibility. When mobility is extremely low, the costs of such programs could be quite high, exceeding the degree to which the rest of the currency area would be willing to subsidize the depressed region or regions. Thus, while specific government policies may facilitate adjustment, the natural mobility of factors of production remains an important determinant of the desirability of joining a currency area.

This conclusion also stands with respect to the role played by interregional transfers of federal funds in response to regional payments imbalances. Noting the consistently inverse relationship among Federal Reserve districts in the United States between Treasury transfer (net flows of public capital) and transit clearings (net flows of private capital), some writers (e.g., Hartland, 1949, 1950; Fels, 1950) have placed heavy emphasis on automatic equilibrating government transfers to explain the apparent ease of interregional payments adjustment within the United States. However, the quantitative importance of such automatic stabilizers has been strongly questioned by Ingram (1959) and Whitman (1967), among others.

Furthermore, in the short run central-government tax receipts and transfer payments could either lessen or worsen regional payments imbalances. Where there is a high positive correlation between inter-

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shifts of the nominal expenditure schedule and ignored the role of cash balances, whose nominal value is fixed. However, there is no inconsistency with the monetary approach to the balance of payments, which emphasizes that currency depreciation reduces the purchasing power or real value of domestic money by raising import prices, thereby shifting downward the real expenditure schedule.

[25] For a discussion and descriptions of policies that have been used in the United States and Europe, see, for instance, Borts and Stein (1964, Chap. 9), Cooper (1968, Chap. 7), Needleman (1968), and references cited in these works. For discussion of the welfare effects of migration on the areas of entry and exit, see also Adams (1968), Wonnacott (1968), Yeager and Tuerck (1966), Kenen (1971), and the references given in these sources.

nal recessions and external deficits (such as in the model of inter-regional payments advanced by Kenen, 1969a, where the initial disturbance is a change in demand for the region's exports), such government flows would reduce payments difficulties. But where a payments deficit is caused by an import surplus generated by an internal boom (the "nondilemma" case), automatic changes in government taxes and transfers would add to the payments deficit. This is discussed by Balassa (1962, pp. 254-255) and Whitman (1967, p. 22).

It seems likely, however, that such central-government transfers will have a net stabilizing effect. They would be "destabilizing" for a deficit region when that region is experiencing a boom induced by an increase in domestic spending, but, in this case, private financing should be easy to attract. Moreover, by dampening the boom they reduce the likelihood of the wage and price increases that would cause a dilemma situation. The case of internal depression coupled with external deficit is the one most likely to persist for long periods of time, making private financing difficult to secure, and this is a case in which automatic government transfers would be stabilizing.

5 The Effects of the Source, Type, and Strength of Disturbances on Adjustment and Stabilization Policies

In the preceding chapters, we discussed adjustment mechanisms in terms of the costs of adjustment to given imbalances, i.e., the cost per unit of adjustment. However, the total costs of adjustment will also depend upon the sources and magnitudes of the payments imbalances, and it is the comparison of anticipated total costs of adjustment that is relevant to the decision whether or not to join a currency area. Thus, expectations that countries have concerning the sources and magnitudes of the payments imbalances they are likely to face may also influence the choice of exchange-rate system.

A considerable body of literature has developed relating the influence of cyclical and microeconomic disturbances to the desirability of fixed versus flexible exchange rates, usually with respect to stabilization policy. Much of this literature focuses on the question of fixed versus flexible rates from a single-country rather than a global point of view (see, e.g., the comments by Kenen, 1969a, pp. 53-54, and 1969b, p. 363). However, these discussions can be extended to take into account any likely systematic covariances among the movements in employment and the balance of payments of prospective members of a currency area and between prospective members and the rest of the world. For instance, on stabilization grounds, countries which would tend to be cyclically out of phase in the absence of currency unification might be better candidates for union than those which tend to boom and slump together.[1] Even in its present form, this literature is directly relevant to the discussion of the desirable characteristics of currency areas, because two arguments that have been put forward with respect to the nature of balance-of-payments disturbances run counter to the conclusion that the case for fixed rates increases as the openness of an economy increases.

5.1 Kenen's Diversification Argument and the Need for Adjustment in Open Economies

One of these arguments is Kenen's (1969a) view that highly diversified economies make the best candidates for currency areas. (The other

[1] For discussions of the factors that tend to cause synchronization or divergence of cycles between countries, see Matthews (1959, Chap. 11) and Morgenstern (1959).

will be explored in detail in the next chapter.) Because of the insurance principle of risk spreading, the independent microeconomic disturbances influencing each sector will tend to have canceling effects on the aggregate trade balance.[2] In a highly diversified economy, fluctuations in the total trade balance would be much less than the sum of the fluctuations in its constituent parts. Thus, "From the standpoint of external balance, taken by itself, economic diversification, reflected in export diversification, serves, ex ante, to forestall the need for frequent changes in the terms of trade and, therefore, for frequent changes in national exchange rates" (p. 49).[3]

While the logic of this argument is incontrovertible, some empirical information sheds doubt on how quantitatively important export diversification is in reducing export instability.[4] It is true, however, that less diversified economies will also tend to be those which are smallest and most open, because diversification is costly in the presence of scale economies, and a diversified consumption bundle in an economy with an undiversified production bundle requires a relatively large dependence on imports. Thus, Kenen's result implies that some degree of exchange-rate flexibility is most important for relatively open, small, undiversified economies.

However, our analysis in earlier chapters of the effect of openness

[2] This point has also been stressed by others, for instance, Orcutt (1955, p. 7) and Cohen (1966).

[3] From his arguments that "a well-diversified national economy will not have to undergo changes in its terms of trade as often as a single product national economy," and that "when, in fact, it does confront a drop in the demand for its principal exports, unemployment will not rise as sharply as it would in a less-diversified national economy," Kenen also concludes (p. 49) that "the links between external and domestic demand, especially the link between exports and investment, will be weaker in diversified national economies, so that variations in domestic employment 'imported' from abroad will not be greatly aggravated by corresponding variations in capital formation."

[4] See, MacBean (1966, Chap. 2) and the references cited there to the studies by Coppock, Massell, and Michaely. Not only does MacBean find little association between export instability and the degree of export diversification (in terms of product types and geographic destinations), but he also concludes (p. 339) that "In most cases fluctuations in income do not appear to be at all closely related to fluctuations in export earnings," and "Instability of investment seems, at most, very weakly related to fluctuations in the importing power of exports." We do not wish to make too much of these findings, because the critical review of MacBean's book by Maizels (1968) has shed serious doubt on some of MacBean's conclusions. Also, Massell (1970) has published further results of regression analysis used to explain export instability which lead to the conclusion that the extent of export concentration by commodity classification is significantly positive at the 1 per cent level, but that the extent of geographical concentration of the destination of exports lacked significance altogether. A great deal of empirical work remains to be done before these questions can be considered settled, although for the time being we find Massell's evidence more convincing than MacBean's.

on the usefulness of money, the cost of adjustment, and the extent to which exchange variability enables a country to escape the balance-of-payments constraint suggests that competing considerations may well reverse this conclusion (particularly when a freely floating exchange rate is taken as the alternative to membership in a currency area). Furthermore, Kenen also concludes from his hypothesis that a flexible exchange rate would tend to fluctuate less for a more diversified economy than for a less diversified one, an argument which we believe to be correct and which contributes to the importance of these competing considerations.

5.2 The Source of Disturbances, and Insulation through Floating Exchange Rates

Another argument concerns the source of disturbances. It is rather widely accepted that a country has the strongest case for freely floating exchange rates when the disturbances to its balance of payments typically come from outside its borders and the weakest case when they come from inside.

One rationale for this view is that the effects of disturbances in one country in a currency area tend to be spread out over other member countries, while, under floating exchange rates, they are bottled up to a greater degree within the country of origin. Hence, floating rates tend to insulate a country from disturbances abroad but make it bear more fully the effects of disturbances that originate at home, while fixed rates make a country more susceptible to disturbances abroad but also give it greater scope to pass along to others the effects of domestic disturbances. From this argument it follows that countries that typically suffer from external disturbances should adopt floating rates, while countries that are victims of internal disturbances should join currency areas.

The case that a country has the strongest need for flexible exchange rates when disturbances originate abroad may also be made from another point of view—the requirements for domestic financial or expenditure policy to secure both internal and external balance. The need for an additional policy instrument, such as exchange-rate adjustment, arises when there is a conflict between the two requirements, that is, when a dilemma case exists. As Yeager (1966, p. 93) notes, in general, ". . . when a disturbance originates abroad, or in the foreign trade sector, the internal and external requirements clash."[5] Hence, this line of

[5] Yeager is careful to point out that "even when internal and external policy requirements coincide in *direction*, they may clash in *degree*. More precisely, they may coincide in direction until policy has changed conditions to the extent that

argument again leads us to the conclusion that *ceteris paribus* the case for exchange-rate adjustments is stronger the more likely are most disturbances to occur abroad or in the foreign-trade sector.

5.2.1 Insulation and capital flows. This conclusion of greater insulation under flexible rates is rather widely accepted, and we believe it to be generally correct, although, as McTeer (1968) notes in his excellent survey of this topic, the discussion has not always been at as high a level as one might like, frequently taking place in terms of models in which capital flows are entirely absent. In a world of capital mobility, the issue becomes more complicated. In this case, trade imbalances may occur even under floating exchange rates. Assuming that capital flows are stabilizing (tending to dampen movements of the exchange rate), a system of floating exchange rates tends to act more like a system of fixed rates. Moreover, disturbances to capital flows, no matter whether they originate internally or externally, will profoundly influence the domestic economy under floating rates when exchange-market intervention is not allowed, whereas under fixed rates or systems of managed flexibility they can be more completely neutralized by official policy.[6] Thus, the presence of capital flows makes clear-cut conclusions difficult to draw.

Indeed, in their recent analysis of the insulation problem, Modigliani and Askari (1973) have argued that the propagation of disturbances will be greater under flexible than under fixed exchange rates. Their reversal of the standard analysis rests upon two key ingredients. The first is the assumption of high capital mobility. The second is their exclusive focus on the Keynesian transmission mechanism.

Consider an autonomous boom in domestic investment. While under fixed rates the trade balance will move into deficit, tending to cushion the impact on GNP of the initial disturbance, the capital account is likely to move into surplus. Traditional analysis has tended to focus only on the trade account, but it is essential that the capital account

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the requirements then clash even in direction" (p. 92). As we argued above, the more closed an economy, the more likely it is that excessive internal demand pressures will become incorporated into wages and prices, thus changing the amount of restrictive financial policy required for either internal or external balance.

[6] If the major disturbances are private exchanges of foreign currency for domestic bonds, under fixed exchange rates or managed flexibility, the government can reverse the transaction by entering the foreign-exchange market and engaging in domestic open-market operations. But under freely floating rates it is forbidden from entering the foreign-exchange market, which hampers its ability to deal with this type of disturbance.

For a recent treatment of the effect of capital mobility on fixed and flexible exchange rates as automatic stabilizers, see Turnovsky (1976).

also be considered. In the absence of capital flows, movements in the exchange rate would maintain trade balance and eliminate the automatic stabilizing impact of trade imbalances induced by domestic disturbances. With capital mobility, however, incentives for capital flows would normally be such that, even with a freely floating exchange rate, the trade balance would be likely to fluctuate in the direction desired on stabilization grounds. Thus, as a number of authors have noted (e.g., Friedman, 1953, and Haberler and Willett, 1968, pp. 70-71), the existence of capital mobility reduces the difference between fixed and floating rates on this score.

Modigliani and Askari (1973) go further and consider the case where capital mobility is so high that the initial effect of a domestic disturbance on capital flows exceeds the change in the trade balance. Thus, when autonomous domestic investment falls, the balance of payments of the originating country would deteriorate under fixed rates and its currency would depreciate under floating rates. In this case, the country would secure a greater improvement in its trade balance under a floating rate than under a fixed rate. Under these circumstances, adoption of flexible exchange rates makes the international sector a more potent automatic stabilizer and increases the international propagation of disturbances.

Capital mobility will be high enough to transmit fluctuations in domestic expenditure to a greater extent under flexible than fixed rates if and only if a switch from fixed to floating exchanges decreases the strength of fiscal policy, i.e., if and only if the capital flows generated by a change in aggregate demand exceed the demand-induced change in the current account. The available evidence suggests that across countries or time the sensitivity of international capital flows to changes in income and interest rates does not strongly tend to be greater than or less than this critical value.[7] Furthermore, in many countries the state of the domestic cycle is not systematically related to the overall state of the balance of payments under fixed rates. Thus, while it appears likely that fixed rates still give greater Keynesian transmission on average, the outcome may vary from country to country and episode to episode.

Modigliani and Askari focus on the Keynesian transmission mechanism that operates on spending directly through changes in the current account. Perhaps more important, however, for the international trans-

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[7] Fleming (1975) makes this same judgment. For evidence on Canada, see Caves and Reuber (1971) and, on the United States, see Farrell (1975). Also, Tower and Courtney (1974) found deviations from trend of the official settlements balance and economic activity to be positively correlated in only 12 out of 28 cases.

mission of disturbances is the monetary transmission mechanism that operates on spending through changes in money supplies induced by central banks' intervention to stabilize a fixed exchange rate. Similarly, the wealth-transmission mechanism that causes the wealth of a region in current-account deficit to be transferred to regions in surplus, with a resulting fall of expenditure in the former region and rise in the latter, could be important under fixed rates.

Thus, Modigliani and Askari's unambiguous conclusion that, with high capital mobility, floating rates will be a stronger transmission mechanism necessarily holds only if the Keynesian mechanism swamps the others.[8] Their failure to focus on the effects of transmission through the monetary mechanism may have stemmed from their assumption that countries gear their total macroeconomic policies toward external balance.[9] In the extreme, such macroeconomic behavior would neutralize the monetary transmission mechanism under fixed as well as floating rates. Under these assumptions, the operation of the monetary mechanism is ruled out and the Keynesian transmission mechanism would clearly dominate.

We may question, however, the reasonableness of this assumption. One of the traditional functions of international reserves is to finance temporary or cyclical imbalances under fixed rates; external balance is a long-run rather than a short-run requirement. It would seem then that it is more relevant to compare the effects of payments imbalances and reserve flows under fixed rates with exchange-rate changes under floating rates than to assume the absence of payments imbalances under both systems, as Modigliani and Askari do.

5.2.2 *Nominal versus real insulation and terms-of-trade effects.* Another reason why flexible rates may not insulate perfectly is that, as Laursen and Metzler (1950) have argued, even when all disturbances originate in the foreign-trade sector and the exchange rate always adjusts to maintain equilibrium in the trade balance, exchange-rate

[8] For models of the effect of fiscal policy in a large open economy under fixed exchange rates, see Mundell (1964) and Kemp (1966). The conclusions of the two models differ slightly because Kemp, unlike Mundell, assumes that each country's demand for imports depends on the interest rate in addition to income. Thus, for Kemp, the marginal propensity to import out of investment may be different than for other types of expenditure.

[9] In general, it would make a considerable difference for the transmission mechanism whether such adjustment was always required by the deficit country or by the country in which the disturbance originates. In the example in the Modigliani-Askari paper, these are the same country. Their conclusions will generalize, however, only if it is the country of origin that must always adjust, a rule which would be most difficult to make operational.

changes cause shifts in domestic expenditure schedules which reduce the amount of insulation available.

This argument can easily be presented: Consider a two-country world, with the two economies linked by a flexible exchange rate, and suppose the price of each country's output is stable in units of its own currency. The home-expenditure function can be written as

$$A^* = cY^* + b \,, \tag{1}$$

where A^* and Y^* are real absorption and real income, respectively, and c is the marginal propensity to spend, with $1 > c > 0$. From the Slutsky equation, when nominal income Y and the price p of some good both change, the change in real income Y^* can be written as $dY^* = dY - Qdp$, where one unit of real income is defined equal to one unit of nominal income in the initial equilibrium and Q is the amount of the good consumed initially. The equation is clearly plausible, for only if $dY = Qdp$ will the consumer be barely able to afford his previous consumption bundle and experience no change in real income. Rewriting the relationship in terms of percentage changes yields

$$dY^*/Y^* = dY/Y - (Qp/Y)\, dp/p \,. \tag{2}$$

Similarly, the relationship between real and nominal magnitudes in an open economy is given by

$$dA^*/A^* = dA/A + ndr/r \tag{3}$$

and

$$dY^*/Y^* = dY/Y + ndr/r \,, \tag{4}$$

where A and Y are absorption and income measured in units of domestic output (defined in such a way that one real unit and one nominal unit are equal in the initial equilibrium, i.e., $A^* = A$; $Y^* = Y$), n is the average propensity to spend on imports (out of absorption), and r is the foreign-currency price of the domestic currency unit (the exchange rate). Combining (3) and (4) with the differential of (1) yields

$$dA/A = cdY/A - [1 - c(Y^*/A^*)]\, ndr/r \,, \tag{5}$$

which is to say that an appreciation of the domestic currency causes a downward shift in the domestic expenditure schedule, measured in units of domestic output.

Assuming away capital flows, the flexible exchange rate dictates equality between imports and exports, so that the national income identity implies the equality between income and expenditure:

$$A = Y . \tag{6}$$

Finally, combining the differential of (6) with (5) implies

$$dY/Y = -ndr/r , \tag{7}$$

and from it follows Laursen and Metzler's paradoxical conclusion that an autonomous increase in foreign spending (which appreciates the domestic currency) causes a fall in domestic output and employment. Here we see yet another reason why insulation under flexible rates may be imperfect, and much has been made of it. Perhaps, in fact, too much, for when (7) is combined with (4), it is clear that

$$dY^\circ = 0 . \tag{8}$$

In this model, domestic nominal income depends on the state of foreign economic activity, but domestic real income does not.[10] Thus we have shown that, when the domestic expenditure schedule is fixed in real terms and employment is variable, domestic real income is insulated from disturbances originating abroad,[11] which is analogous to the well-known result that the same proposition holds for nominal income when the expenditure schedule is fixed in nominal terms.

In a sense then, insulation under a flexible rate is actually more complete with the terms-of-trade effect than without it. An appealing aspect of this finding is that it makes the original Laursen-Metzler result easier to explain: with the trade balance always in equilibrium, income must equal expenditure whether they are measured in real or nominal terms. If the expenditure schedule relates real expenditure solely to real income, and the marginal propensity to spend is less than unity, then real income is uniquely determined without reference to the terms of trade. Since any improvement in the terms of trade means that less physical domestic output will purchase the same basket of goods as before, that is, amounts to the same real income, an improvement in the terms of trade due to a disturbance in the foreign economy must be accompanied by a fall in domestic employment.

Tower (1973) has argued that, when the effects of the terms of trade on investment are taken into consideration and consumption is homogeneous of the first degree in income and wealth, the terms-of-trade effect becomes less important and may even reverse its sign. Thus, a foreign boom translates into domestic boom under flexible rates, even in the

absence of capital mobility. Finally, when the money stock rather than the interest rate is held constant, Tower (1975) shows that the LM schedule may depend either positively or negatively on the terms of trade, so that again on this ground a foreign boom may either expand or contract the domestic economy. However, this effect is probably not very important unless intermediate goods are imported or wages depend negatively on the terms of trade, so that currency depreciation substantially raises the prices of domestically produced goods. Currency depreciation, in this circumstance, would raise the demand for nominal balances at full-employment output, and this would be deflationary.

Of course, Friedman (1953) has emphasized that, even without capital movements, a flexible exchange rate cannot completely insulate an economy from "real," as opposed to monetary, developments abroad. But, even in the case of real disturbances, it may ease the adjustment of resources to the change in situation because of the higher effective price flexibility it makes possible.

The most important contribution a flexible rate can make to a country desiring to insulate itself as much as possible from events abroad is probably not the automatic insulation that it provides, but rather the freedom it gives to policy makers to set domestic policies as they see fit without need for explicit concern over the balance of payments. As McTeer concludes in his survey:

> The insulation problem is thus seen as dependent on domestic economic policy rather than a purely automatic mechanism. Flexible exchange rates may provide some degree of automatic insulation even with a high degree of capital mobility. However, it is more likely that any greater independence or freedom for domestic policy-makers under flexible exchanges would derive less from automatic insulation and more from the broader range of policy alternatives brought about by the elimination of an official commitment to peg the price of gold or foreign exchange (p. 129).[12]

5.3 Global Stability and the Transmission of Disturbances under Fixed and Floating Exchange Rates

Looking at the problem from a global standpoint, Laffer (1973) recently argued that, on balance, fixed exchange rates are likely to have

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[10] Laursen and Metzler (1950, p. 291) are wrong when they write, "The effect on real income of the change in terms of trade is thus opposite to the effect of the change in output, and the net effect of the two changes together remains indeterminate."

[11] Our analysis also implies that, under a flexible exchange rate, domestic real income is unaffected by foreign tariff policy.

[12] Logically, however, the polar cases of fixed and freely floating exchange rates are symmetrical. In both cases, the government loses a degree of freedom. In the former, it must enter the foreign-exchange market to keep the price of foreign exchange constant. In the latter, it is not permitted to enter the market at all. Which constraint is more onerous is not clear on *a priori* grounds. But our own judgment, based on historical evidence, is that in the presence of reasonable interest-rate policies, at least for relatively closed economies, private capital flows will largely preclude the need for official flows if the exchange rate is set free.

more to contribute to worldwide stability than floating exchange rates. He notes (p. 31), "Insofar as some countries have internal shocks that are inflationary by nature and other countries have shocks that are deflationary by nature, there will be some netting out of adverse effects under a fixed exchange rate system where disturbances are more readily transmitted to other countries."[13] However, as Haberler (1973) and Balassa (1973) have emphasized, this argument assumes that the disturbances are so small, or are neutralized so rapidly, that they never alter price levels and affect the equilibrium exchange rate. It is only when price levels change that the restoration of equilibrium under a fixed rate is far more costly than under a flexible one. It therefore seems to us that Laffer's argument for exchange stability applies in the short run and that Haberler's and Balassa's argument for exchange flexibility applies over a longer time horizon.

As indicated in the previous section, however, it must also be recognized that changes in the current-account position are not the only international transmission mechanism. It is possible, for instance, that efforts to constrain exchange rates in the short run that prove stabilizing in terms of Keynesian trade-balance effects would be destabilizing in terms of the monetary transmission mechanism. Thus, in the face of high capital mobility and widespread skepticism in the private market concerning the appropriateness of a country's target exchange rate, it would prove desirable on balance to sacrifice some of the possible stabilizing trade imbalance effects of maintaining a fixed parity in order to avoid the destabilizing influence of large speculative capital flows and the monetary effects of the concomitant overall payments imbalance.

5.4 Disturbances and the Gain from Exchange Flexibility

In section 5.2, we investigated the cost of adjustment to internal and external disturbances. However, most countries can expect to suffer from a mix of these disturbances, and we now proceed to develop a rule relating the optimal choice of exchange system to the pattern of disturbances. As we shall see, the rules relating to the optimal choice between fixed and flexible exchange rates developed by Stein (1963), Kenen (1969a), Whitman (1967), and Giersch (1970) are special cases of our more general one. Throughout, we assume that the stabilization authorities are passive and wish to find the exchange system that

[13] Mathieson and McKinnon (1972) found for a sample of underdeveloped countries that those which were more open tended to be more stable. Since most of the countries in their sample had fixed rates over the period in question, this lends empirical support to Laffer's contention.

serves best as an automatic stabilizer of output. This passivity could be due to some sort of lag in perception or action, some sort of political constraint, or perhaps explicit recognition of the welfare costs associated with using the stabilization tools they have at their disposal.

As a first step, we illustrate the ideas of section 5.2 more formally, using a very simple model. This model will form some of the basis for some of the discussion in the next section and Chapter 6. Admittedly it is simple, for capital flows have been assumed away and either the interest rate is assumed constant or the model is sufficiently short run that investment does not respond to changes in the interest rate. Also, we have assumed that the economy in question is small, so that foreign repercussions can be ignored, and we have assumed that nominal expenditure depends on nominal income, thereby ignoring the various terms-of-trade effects of section 4.6.3. Still, it is a convenient starting point, as we are able to use it to derive conclusions that go well beyond the current literature.

The standard identity

$$Y = A + X - M \tag{9}$$

must always hold, where Y is output, A is absorption, and $X - M$ is the trade balance. For the change in absorption, we can write

$$dA = cdY + iF, \tag{10}$$

where c is the marginal propensity to spend and iF is a disturbance term representing a shift in the expenditure schedule equal to a fraction i of full-employment GNP (i standing for internal disturbance and F standing for full-employment GNP). Under flexible exchange rates when capital flows are absent, the trade balance must always be in equilibrium, so $X = M$ and $Y = A$. This means, from equation (10), that

$$dY_l = iF/(1 - c), \tag{11}$$

where dY_l is the change in output under the flexible exchange rate, and for stability $1 - c > 0$. Under fixed exchange rates, the trade balance can be written as

$$d(X - M) = eF - mdA, \tag{12}$$

where m is the marginal propensity to import out of absorption and eF is a disturbance term representing a shift in the demand for exports (our prototype external disturbance) equal to a fraction e of F. Combining (12) with (9) and (10) yields

$$dY_x = [e + (1 - m)i] F/D, \tag{13}$$

where $D = 1 - c(1 - m)$ and dY_x is the change in output under the fixed exchange rate. Note that e does not even appear in (11). This is the basis of the proposition that a flexible exchange rate insulates an economy from external disturbances. Also, the coefficient of iF in (11) is larger than the corresponding coefficient in (13), which means that a flexible rate bottles up internal disturbances more than a fixed rate does.

The correlation between internal and external disturbances is assumed to be given by ρ, and so we can use equations (11) and (13) to write the variances of output as fractions of full-employment GNP under the two systems as

$$
\begin{aligned}
\text{var}(Y_x/F) &= [\text{var}(e) + (1 - m)^2 \, \text{var}(i) \\
&\quad + 2(1 - m)\,\text{cov}(e,i)]/D^2 \\
&= \{\text{var}(e) + (1 - m)^2 \, \text{var}(i) \\
&\quad + 2\rho(1 - m)[\text{var}(e)\,\text{var}(i)]^{1/2}\}/D^2
\end{aligned}
\tag{14}
$$

and

$$
\text{var}(Y_I/F) = \text{var}(i)/(1 - c)^2 . \tag{15}
$$

Thus, the variance of output (as a fraction of full-employment GNP) under fixed exchange rates minus that under floating (in a sense the cost of adopting a fixed rate) is

$$
\begin{aligned}
\triangle = \text{var}(Y_x/F) - \text{var}(Y_I/F) &= \{\text{var}(e) - z\,\text{var}(i) \\
&\quad + 2\rho(1 - m)[\text{var}(e)\,\text{var}(i)]^{1/2}\}/D^2 ,
\end{aligned}
\tag{16}
$$

where $z = D^2/(1 - c)^2 - (1 - m)^2 > 0$ and clearly $d(z/D^2)/dm > 0$ and $d[(1 - m)/D^2]/dm < 0$. Kenen (1969a, p. 54) has argued that "diversification serves to average out external shocks and, incidentally, to stabilize domestic capital formation." Given that the variance of fluctuations in the domestic expenditure function does not decrease strongly with increased diversification, the more diversified the economy, the smaller is the variance of e relative to the variance of i. If ρ is not negative, equation (16) implies Kenen's (p. 54) conclusion that "Fixed rates . . . are most appropriate—or least inappropriate—to well-diversified national economies."

However, equation (16) also points up that, for several reasons, this conclusion is not always valid. Consider the case where internal disturbances tend to be large and have a strong negative correlation with external disturbances, so that under fixed rates the dampening effect of depressed exports tends to coincide with the expansionary effect of increased domestic demand. Under these circumstances, a reduced degree of diversification that is reflected in a higher variance for the

external disturbance may actually improve the case for retaining membership in a currency area, if floating rates are considered to be the only alternative to fixed rates.[14] Differentiating (16) with respect to $\text{var}(e)$, we see that this is the case if and only if $\rho < -[\text{var}(e)/\text{var}(i)]^{1/2}/(1 - m)$, a condition unlikely to be satisfied in the real world. Moreover, Kenen quite clearly believes this is not the case, because he postulates that fluctuations in domestic investment are highly correlated with exports. This implies a tendency for upward shifts in the domestic expenditure schedule to be positively correlated with increased demand for exports, and, if ρ is positive, equation (16) implies that an increase in the proneness to suffer from external disturbances a fortiori improves the case for floating rates.

Even more important, a diversified economy is more likely to be closed. In a very closed economy, $m \to 0$, so (16) becomes

$$
\triangle = \{\text{var}(e) + 2\rho\,[\text{var}(i)\text{var}(e)]^{1/2}\}/(1 - c)^2 , \tag{17}
$$

and, in a very open one, $m \to 1$ and (16) becomes

$$
\triangle = \text{var}(e) - \text{var}(i)/(1 - c)^2 . \tag{18}
$$

Thus, the more open the economy, the greater are the potential benefits to be reaped from the leakages of a fixed-rate system when internal disturbances do occur, as emphasized in section 4.6, and this effect may outweigh Kenen's consideration. However, with respect to external disturbances, we now show that the opposite conclusion holds when it is assumed that the standard deviation of external disturbances is proportional to the volume of trade. Assuming balanced trade initially and equality between the average and marginal propensities to import, initial imports equal mF. Letting ε be the constant of proportionality, $eF = \varepsilon mF$, so $\text{var}(e) = \text{var}(\varepsilon m) = m^2\text{var}(\varepsilon)$. Thus, letting $m \to 0$, (17) becomes

$$
\triangle = 0 \tag{19}
$$

and, letting $m \to 1$, (17) becomes

$$
\triangle = \text{var}(\varepsilon) - \text{var}(i)/(1 - c)^2 . \tag{20}
$$

Clearly, then, if we assume that the standard deviation of external disturbances is proportional to the size of the foreign-trade sector, external disturbances can significantly disrupt the domestic economy under fixed rates only in relatively open economies, but it is openness which enables the leakage of a fixed-rate system to soothe an economy

[14] Kenen (1969a) does not specify the form of the variable-exchange-rate system that he considers as an alternative to membership in a currency area.

suffering from internal disturbances. Thus, the choice of exchange-rate system on automatic stabilization grounds makes much more difference to relatively open economies.

Finally, to the extent that the disturbances are macroeconomic rather than microeconomic in nature and consist of random shifts in the willingness to save by each household, we would expect that for a small open economy the disturbances originating at home would cancel out less than would the disturbances originating abroad, while as the economy becomes larger, there is more canceling out of random shifts in the propensities to save of foreign households, so that on this ground $\text{var}(i)$ is likely to fall relative to $\text{var}(\varepsilon)$, and flexible rates become more appropriate.

Rather than focusing on the source of disturbances, some authors, notably Stein, have couched the question of which exchange-rate system is appropriate in terms of the covariance between output and the state of the balance of payments under fixed exchange rates. Stein's (1963) rule prescribes a floating rate for any Keynesian economy in which the covariance is positive, because the currencies of such economies under floating rates would tend to appreciate in times of domestic boom and depreciate in times of recession, thereby acting as an automatic stabilizer. Let us now follow this approach to determine the extent to which exchange rates should respond to payments imbalances (for commentary on Stein, see Cheng, 1965, and Willett and Tower, 1971).

Output under flexible exchange rates, Y_l, is the sum of output when the exchange rate is held constant, Y_x, plus the impact on output of the exchange-rate change included by B, which is the excess demand for domestic currency in the foreign-exchange market at the initial exchange rate. Thus, we can write

$$Y_l = Y_x - aB , \qquad (21)$$

where $a > 0$ is the multiplier showing the reduction in output under flexible exchange rates due to the appreciation of the domestic currency induced by a unitary increase in the excess demand for domestic currency in the foreign-exchange market.[15]

Finally, we assume that a fraction k of changes in the balance of payments induced by exchange-rate change is accounted for by exchange-rate-sensitive capital flows, where $|k| < 1$ and k is positive if

[15] We can express the multiplier as $a = -(dY/dr)/(dr/dB)$, where dY/dr is the multiplier effect of a unit appreciation of the domestic currency on output, and dr/dB is the appreciation of the domestic currency necessary to eliminate a unitary balance-of-payments disturbance.

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capital flows are stabilizing and negative if they are destabilizing. Therefore,

$$a = (1 - k)/(1 - c) .[16] \qquad (22)$$

Thus the multiplier is smaller the greater the exchange-rate sensitivity of the capital account relative to that of the balance of payments as a whole.

From equation (21) the variance of output under flexible rates can be written as

$$\text{var}(Y_l) = \text{var}(Y_x) - 2a \, \text{cov}(Y_x, B) + a^2 \text{var}(B) , \qquad (23)$$

so that

$$\text{var}(Y_l) - \text{var}(Y_x) = -2a \, \text{cov}(Y_x, B) + a^2 \text{var}(B) . \qquad (24)$$

Movement to a floating exchange rate reduces the variance of output if and only if $\text{var}(Y_l) < \text{var}(Y_x)$, so this expression is negative. Since a is positive, the right-hand side of (24) can be rearranged to show that adopting floating rates will make output more stable if and only if $a < 2 \, \text{cov}(Y_x, B)/\text{var}(B)$. Clearly, a positive covariance is necessary for this to happen but not sufficient to assure that it will. Thus, the smaller the multiplier a, the more likely is a floating exchange rate to reduce macroeconomic instability.

5.5 The Optimal Degree of Exchange-Rate Flexibility for Stabilization Purposes

From the standpoint of maximizing economic stability, there will always be an optimal intervention strategy under perfect knowledge by the intervening authorities, and the polar cases of fixed and floating exchange rates are both second-best solutions. Interpreted correctly, Laffer's (1973) analysis of the stabilizing benefits of fixed exchange rates does not show that fixed rates are first-best on stabilization grounds. Rather, it shows that the costs of foregoing the option of following optimal exchange-stabilization policies in favor of fixed exchange rates may not be large and will be less than under a policy of

[16] This expression is derived in Tower and Courtney (1974) and is shown to hold for a large country where trade is not initially balanced and foreign repercussions are taken into account as well as for a small country.

Sweeney (1976) uses a two-country model to argue that the results of a shock to one country's goods market will depend crucially on the markets that are simultaneously shocked, as implied by the fact that the sum of the values of the excess demands must equal zero. He concludes that, even if the usual shock is to one country's aggregate demand, the locus of the accompanying shock has crucial implications for both countries' views on exchange-rate regimes.

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complete abstinence from intervention in the foreign-exchange market. Laffer's analysis, like Stein's, treats only the relative efficacy of fixed versus freely floating exchanges as systems of automatic stabilizers. While both fixed and freely floating rates rule out discretionary intervention in the foreign-exchange market for stabilization purposes, floating rates allow countries to retain greater freedom of discretionary domestic macroeconomic policies. Thus, even if the choice were limited to fixed versus freely floating exchange rates and fixed rates were found to be the superior automatic stabilizer for a particular country, it would not necessarily follow that fixed rates were more desirable on overall stabilization grounds. The greater automatic stabilization would have to be balanced against the lesser freedom for discretionary domestic macroeconomic policy under fixed rates.

Flexible rates also enable countries to vary the amount of their discretionary intervention in the foreign-exchange market to a considerable degree without changing the basic character of the exchange-rate system, whereas this would be impossible under fixed rates within a currency area. A switch back from fixed rates within a currency area toward exchange-rate flexibility would be certain to undermine confidence in any subsequently determined parities, whereas under flexible rates authorities can vary the amount of their intervention without violating a basic commitment. This greater freedom for policy changes under flexible rates suggests that risk-averse governments will maximize expected utility by tending to choose flexible over fixed rates unless the case in favor of fixed rates is clear-cut.

Where discretionary intervention in the foreign-exchange market is permissible, a can be treated as a tool of economic policy. If stabilizing official capital flows are permitted and the government automatically neutralizes a fraction w of the excess supply of or demand for foreign exchange by compensatory official capital flows (by buying w units of foreign exchange per unit of unanticipated payments deficit), the resulting payments imbalance drops to a fraction $1 - w$ of its former size, reducing a by the same proportion. Thus, a becomes $(1 - w)(1 - k)/(1 - c)$ and can be thought of as a tool of official policy. Moreover, given the pattern of disturbances, there is a value for a that maximizes the stability of output under flexible rates. To find this optimum a, (24) is differentiated with respect to a, and the result is set equal to zero. This yields

$$0 = -2 \operatorname{cov}(Y_x, B) + 2a \operatorname{var}(B) . \tag{25}$$

Thus the multiplier associated with the optimal responsiveness of the exchange rate to balance-of-payments pressures is given by

$$a^\circ = \operatorname{cov}(Y_x, B)/\operatorname{var}(B) . \tag{26}$$

When a° is positive, some responsiveness in the direction dictated by market forces is desirable. However, when a° is negative, fixed exchange rates are superior to any degree of responsiveness in this direction. When a° is negative, on stabilization grounds the government should intervene sufficiently strongly to move the exchange rate in the opposite direction from that dictated by market forces. Only when $a^\circ = 0$ [i.e., where $\operatorname{cov}(Y_x, B) = 0$] does a passive fixed-rate policy yield optimal stabilization results. Thus, although Stein's criterion that floating rates are superior if and only if $\operatorname{cov}(Y_x, B) > 0$ may lead one to conclude incorrectly that a given degree of exchange-rate responsiveness is better than none at all, it is the correct criterion for deciding whether some automatic responsiveness of the exchange rate to balance-of-payments pressures is superior to fixed rates. Of course, in actual decisions on exchange-market intervention, a broader range of considerations and more intervention strategies than discussed here should be taken into account.

5.6 Openness and the Source of Disturbance

The argument that the case for floating exchange rates is greater the more likely are disturbances to originate abroad has been coupled by Giersch (1970 and 1973) with the proposition that the smaller and more open the economy, the more likely it is to face cyclical disturbances from abroad. From this he concluded that small, open economies should have a particular interest in exchange-rate flexibility. Whitman (1967) provides a complementary argument that in a very open economy disturbances originating in the foreign-trade sector are particularly likely. She notes that in such economies a positive covariance between balance-of-payments surpluses and inflationary pressure is to be expected and is much more likely to occur than in a relatively closed economy.[17] The combination of these propositions is another possible

[17] Her reasoning is that, in relatively open interdependent economies, goods and factors are more likely to be highly mobile across regional boundaries, thereby preventing the development of significant differentials in wage and price trends, which she believes to be the major explanation for negative covariances between the balance-of-payments surplus and inflationary pressure. Her second argument appears to be that the same percentage shift in the demand for exports (via both multiplier effects and accelerator effects on investment) will cause a greater change in inflationary pressure in a highly open economy. Kenen (1969a) has argued that "when [a well-diversified economy] . . . does confront a drop in demand for its principal exports, unemployment will not rise as sharply as it would in a less-diversified national economy." In fact, this is similar to Whitman's point, for as Flanders (1969, p. 104) has noted (and Kenen has agreed), Kenen's demonstration

argument against the conclusion that the case for flexible exchange rates increases as the openness of an economy decreases, although, as argued in section 5.4, there is reason to believe that, in a highly open economy, macro disturbances may be more likely to arise at home than abroad.

However, even assuming that more open economies tend to exhibit larger positive correlations between output and the supply of foreign exchange, it seems likely that in the presence of capital flows the variance of the balance of payments (under fixed rates) relative to the variance of output would be much larger for highly open economies. Referring back to equations (24) and (26), the latter consideration may outweigh the former. If this is true, adoption of a floating exchange rate would generate greater burdens or smaller benefits for the stabilization authority the more open the economy. This would mean that a^*, the optimal degree of exchange responsiveness, is smaller the more open the economy in question.

Tower and Courtney (1974), using essentially the same model as developed in this study, recently tested the Giersch-Whitman hypothesis for fourteen developed countries. They used annual data consisting of deviations from trend of the series for output and payments imbalances, as their study was designed to reflect considerations of short-term stabilization policy. Their tests were admittedly primitive, and their conclusions are very tentative. The basic problem is determining what transactions occurring under the fixed rate would also have taken place under flexible rates, especially whether the capital flows observed under fixed rates would also have taken place under flexible rates. To the extent that this correspondence does not hold, the amount of official settlements imbalance under fixed rates may not correspond to the *ex ante* excess demand or supply that would have existed in the foreign-exchange market under a floating-rate system.[18]

Because of these major conceptual difficulties in identifying observable payments imbalances with the state of private excess demand or supply in the foreign-exchange market, the Tower-Courtney paper used several alternative measures. If one believes either that short-term capital flows and errors and omissions under fixed rates reflect pressures that would not be present under floating rates or that they would be neutralized under a variable-exchange-rate system by official intervention in the exchange market,[19] then:

1. The more open the economy,
   (a) the more likely it is that $\mathrm{cov}(Y_x, B) > 0$, so that giving up a fixed exchange rate to adopt a small degree of exchange flexibility will enhance macroeconomic stability, and
   (b) the higher a^*, the optimal degree of flexibility, tends to be.
2. Given a range of plausible values for the effect on output of an exogenous balance-of-payments disturbance, more open economies appear to gain more or lose less from floating their exchange rates.

But if one believes that short-term capital flows and errors and omissions reflect pressures that also would be present under flexible rates and that they would not be neutralized by official intervention, then:

1. There is no significant relationship between openness and the probability that a small degree of exchange flexibility will be desirable, and the optimal degree of exchange flexibility is not positively related to openness.
2. Moreover, again using plausible multiplier values for the effects of exogenous balance-of-payments disturbances on output, more open economies appear to lose more or gain less from adopting floating exchange rates. This runs counter to the Whitman-Giersch argument that, from the standpoint of macroeconomic stability, relatively open economies make better candidates for flexible exchange rates.

We lean toward the view that, with the exception of occasional large speculative flows, the disturbances to short-term capital flows and errors and omissions observed under fixed exchange rates would tend to be present under flexible rates. Thus, the existence of short-term capital flows and errors and omissions causes us to doubt the empirical correctness of the Giersch-Whitman hypothesis, or at least to conclude that it is probably not of overriding empirical importance.

These studies of the relationship between sources of disturbance and optimal adjustment mechanisms have provided important insights, which amount to a collection of conclusions about special cases. Most analyses have assumed fixed prices (e.g., Modigliani-Askari, 1973; Laursen-Metzler, 1950; and some chapters of Mundell, 1968) or else

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of his proposition really relies on contrasting economies with different degrees of openness, rather than with different degrees of diversification.

[18] Official demands for foreign exchange and government control of private foreign-exchange positions in some countries are further reasons why measured official settlements imbalances may not correspond to the economist's concepts of private excess demand or supply in the foreign-exchange market.

[19] Changes in errors and omissions are generally assumed to reflect in large part unrecorded capital flows, so it seemed reasonable to lump them with short-term capital flows.

fixed outputs (e.g., Hause, 1966; Johnson, 1966; and other chapters of Mundell, 1968), and for the most part they have looked at only one criterion, for example, the stability of prices, absorption, or output. In general both prices and outputs vary. Also, stability in all three of these series is usually desirable, and the policy that stabilizes one may destabilize another. A case in point is section 5.2.2's analysis of how the terms-of-trade effect can decrease the stability of output while increasing the stability of real absorption under flexible exchange rates. In our view, the Hause-Johnson approach to evaluating welfare costs needs to be integrated with judgments about the sources and covariances of disturbances and various assumptions about the character of the adjustment mechanism in order to yield policy prescriptions that we can hold with greater confidence.

6 Synthesis

6.1 Graphic Summary

In this chapter we present a graphic synthesis of the major elements of our framework for determining the desirability of joining two independent currencies into a currency area. We also use this analysis to consider alternative forms of limited exchange-rate flexibility.

Figures 3 and 4 examine the efficacy of adjustment to both internal and external disturbances under fixed and flexible exchange rates. Our prototype external disturbance is a shift in demand for exports equal to 1 per cent of full-employment GNP, and our prototype internal disturbance is a shift in domestic expenditure equal to that same fraction of full-employment GNP. As argued in Chapter 2 and sections 4.4 and 4.6, adjustment to a disturbance is for a variety of reasons most effective or least costly when the multiplier effect of that disturbance on output or the price level is small or when the change in official expenditure necessary to offset its impact on domestic employment is small.

Under fixed exchange rates, the larger the marginal propensity to import, the smaller will be the effect on domestic output of shifts in the foreign demand for exports. This is because a larger fraction of induced changes in domestic spending leaks out into the international sector in relatively more open economies. Thus, to a member of a currency area the cost of adjustment to an external disturbance is a decreasing function of openness, as shown in Figure 3A.[1]

Under flexible exchange rates, if we assume away capital flows and postulate that the expenditure schedule is fixed in nominal terms, so that we can ignore the considerations raised in section 4.6.3, it is clear from equation (11) in section 5.4 that domestic output will be unaffected by external disturbances. However, in relatively open economies the sum of the elasticities of demand for imports and exports is smaller (see section 4.6.1), so on this ground larger variations in the purchasing power of domestic currency accompany adjustment. According to the logic relating to the terms-of-trade effect considered in section 4.6.3, this means that a given external disturbance will have a larger effect

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[1] We are excluding from the cost of adjustment to disturbances the costs associated with the disturbances themselves. For example, even if (a) wages and prices were completely flexible, (b) sectoral imbalances could be assumed away, and (c) policy makers were indifferent to changes in the price level, a loss of real income would still accompany a shift of foreign demand away from exports, but the cost of adjustment per se to such a disturbance would be zero.

C_{ex}

Openness

100%

A. Cost under fixed rates.

C_{el}

Openness

100%

B. Cost under flexible rates.

$C_{ex} - C_{el}$

E

E

Openness

100%

C. Cost under fixed rates minus cost under flexible rates.
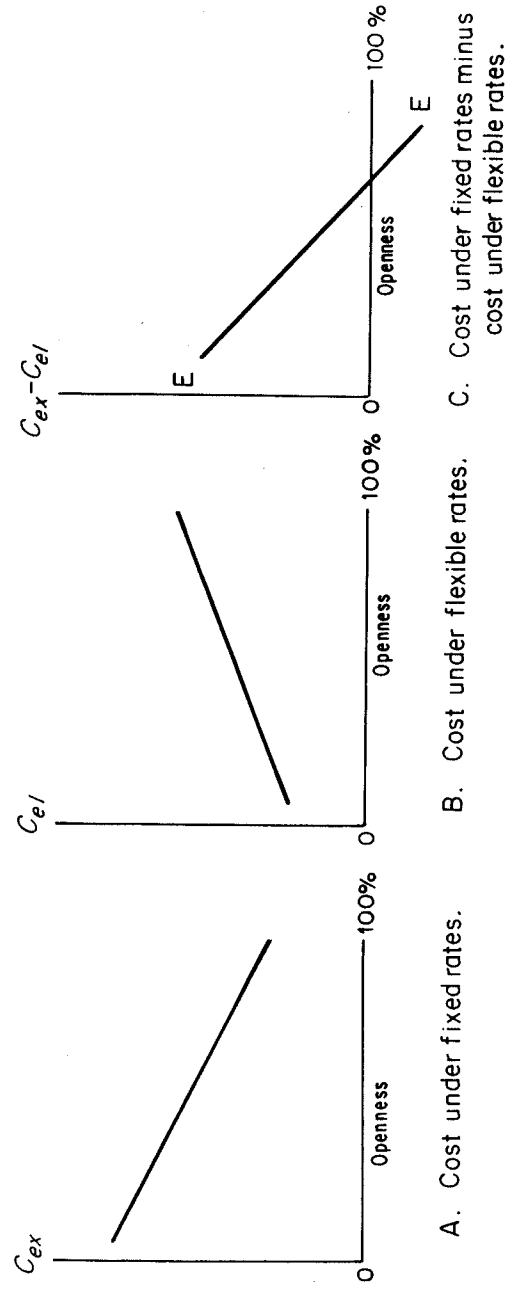
FIGURE 3. Cost of adjustment to a unitary external disturbance under fixed and flexible exchange rates.

C_{ix}

Openness

100%

A. Cost under fixed rates.

C_{il}

Openness

100%

B. Cost under flexible rates.

$C_{ix} - C_{il}$

I

I

Openness

100%

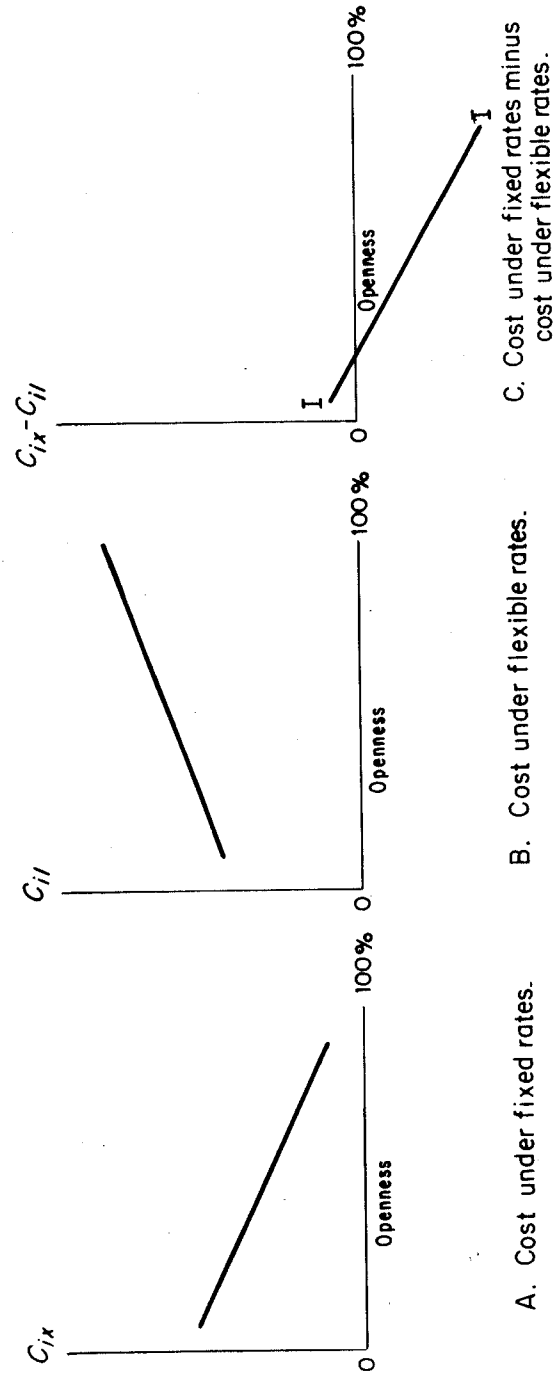C. Cost under fixed rates minus cost under flexible rates.

FIGURE 4. Cost of adjustment to a unitary internal disturbance under fixed and flexible exchange rates.

on income the more open the economy. We assume, therefore, that the cost of adjustment to external disturbances under flexible exchange rates is upward sloping, as shown in Figure 3B.[2]

It was argued in Chapters 2 and 3 that in very open economies exchange illusion disappears, so that, in the limiting case of 100 per cent openness, adjustment under both systems is identical, except for the detrimental effects of disturbances on the stability of the domestic currency's purchasing power under floating rates. Thus, the absolute advantage of floating rates in adjusting to external disturbances decreases with openness and becomes negative in very open economies. This finding is reflected in Figure 3C.

Figure 4A shows the cost of adjusting to an autonomous change in domestic demand (an internal disturbance) in a currency area to be an inverse function of openness, dropping close to zero as the marginal propensity to import approaches one. This primarily reflects the fact that the more open the economy, the less will changes in domestic expenditure fall on domestic suppliers and affect wages and prices.

Figure 4B shows this same curve for floating exchange rates. When the expenditure schedule is fixed in nominal terms, the change in output does not depend on openness. However, when the expenditure schedule is fixed in real terms or other considerations of section 4.6.3 are reckoned with, the effect of an internal disturbance on domestic output increases with openness. This relationship will be strengthened to the extent that the sum of the foreign-trade elasticities decreases with openness, for that also causes the response of the exchange rate to internal disturbances to increase with openness. Thus, since changes in purchasing power and output are assumed to be undesirable, the cost of adjusting to internal disturbances under flexible exchange rates will increase with openness. However, after some very high degree of openness is reached, exchange illusion begins to decline significantly, and when 100 per cent openness is reached, this illusion disappears entirely. In such a highly open economy, adjustment under floating rates and within a currency area will be very similar.[3] However, dis-

[2] To derive this conclusion rigorously, recognize that under a flexible exchange rate with no capital flows the trade balance is always in equilibrium, $X = M$. Consequently, $Y = A$. Then modify (12) to permit exchange-rate change: $d(X - M) = eF - mdA - (\eta_m + \eta_x - 1)Mdr/r$. Combining these relationships with (7) yields $dY/Y = -e/\{[(\eta_m + \eta_x - 1)/n] - m\}$. Since $[\eta_m + \eta_x]$ falls with openness and n and m rise with it, $|dY/Y|/e$ will vary directly with openness.

[3] We assume that, even in very open economies, factors continue to be paid in domestic money, so that the domestic currency continues to be used for transactions purposes even after losing its usefulness as a unit of account or its desirability as a store of value. If domestic money ceased to be used at all in very open economies, there would be no difference between joining a currency area and

turbances under floating rates will still adversely affect the stability of the purchasing power of domestic currency, and in a very open economy there will be a considerable cost attached to this. Thus, Figure 4B shows the adjustment cost under floating rates to rise with openness throughout the entire range and to lie above the curve in 4A for highly open economics.

As openness approaches zero, the multiplier effects of internal disturbances become identical under flexible rates and in a currency area. However, to the extent that internal disturbances affect price levels, adjustment will be more expensive within a currency area, because of the Hause-Johnson welfare cost of disequilibrium exchange rates discussed in Chapter 2 and the costs associated with the need to set macroeconomic policy in order to reverse continually induced changes in the price level for the sake of long-run balance-of-payments equilibrium. For all these reasons, Figure 4C shows that flexible rates have an advantage for adjusting to internal disturbances in relatively closed economies. This advantage is assumed to wane as openness increases, and for sufficiently open economies fixed rates have the advantage.

Figure 5 shows Figures 3C and 4C superimposed and inverted. It indicates that the advantage of fixed rates over floating rates is greater (or the disadvantage is less) for adjustment to an internal disturbance than for adjustment to an external disturbance, and that the advantage for dealing with both types of disturbance increases with openness.

6.2 Freely Floating Exchange Rates versus Membership in a Currency Area

We now complete our graphic system to illustrate how the ideas developed earlier tie in with one another to affect the choice between a floating rate and membership in a currency area.

In Figure 6, weighted averages of the frequency and size of both types of disturbance are assumed to be increasing functions of openness. This is because open economies tend to be smaller and less diversified and, as a result of the insurance principle of risk bearing, suffer from larger and more frequent disturbances. The frequency and magnitude of external disturbances relative to internal disturbances is an increasing function of openness, as Whitman, Giersch, and Kenen argued.[4]

adopting a flexible exchange rate except to the extent that, when a foreign currency is the medium of exchange, the domestic economy loses the seignorage that might be divided up between participating economies with a common currency.

[4] In Figure 6, the curves need not intersect. The assumption is merely that the slope of II is less than that of EE over the entire range.
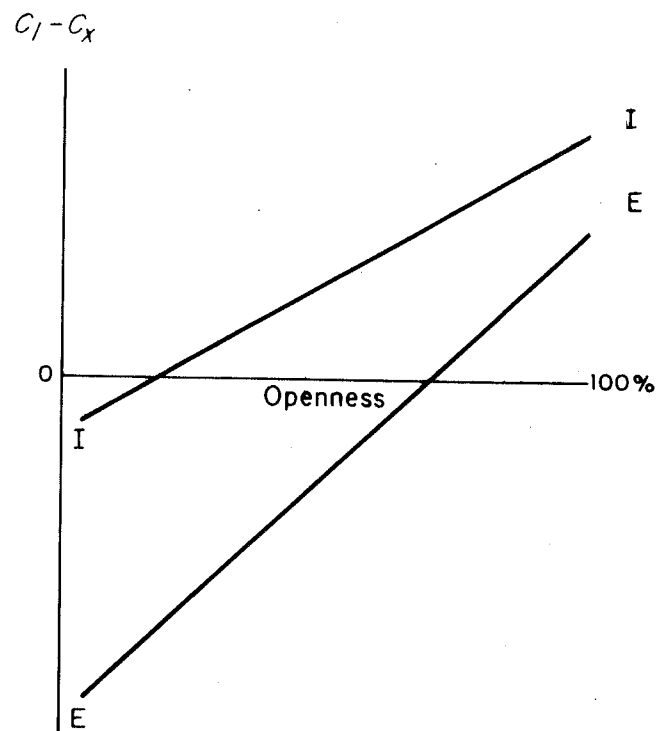
$C_I - C_X$

FIGURE 5. Cost of adjustment to a unitary external (EE) or internal (II) disturbance under flexible exchange rates minus that under fixed exchange rates.
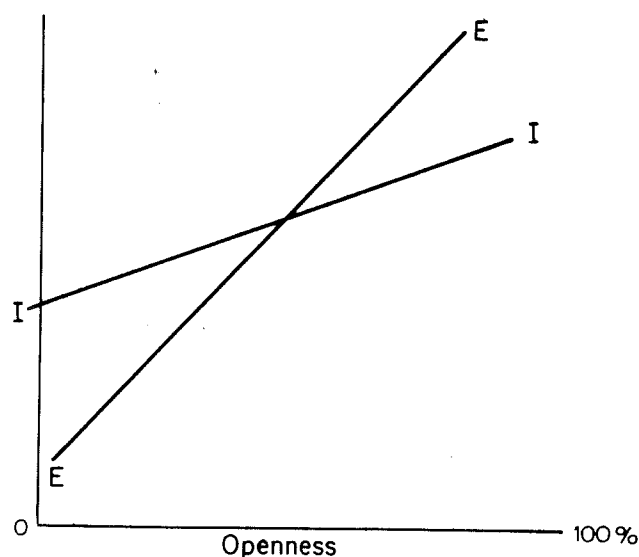

FIGURE 6. Weighted averages of the frequency and mag-

In Figure 7, U_A is the benefit derived from the improvement in the adjustment process generated by entry into a currency area. It is obtained by adding the product of the heights of II in Figures 5 and 6 to the product of the heights of EE in the same two figures. This is the sum of the cost reduction per unit of each type of adjustment multi-
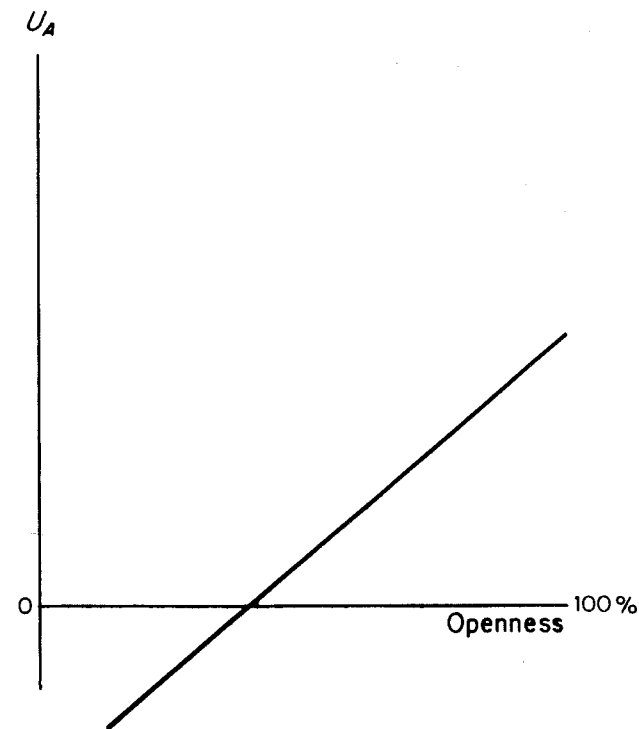
FIGURE 7. Improvement in total adjustment efficiency associated with entry into a currency area.

plied by the need for each type of adjustment. U_A is negative in very closed economies, becoming positive in very open economies. It would be an increasing function of openness throughout its entire range and intersect the horizontal axis only once if the Giersch-Whitman-Kenen argument were weak, but that argument causes the curve to be flatter than it would otherwise be and means that the curve need not have a positive slope throughout its entire range.

Figure 8 describes the other net benefits (U_B) associated with exchange-rate flexibility. It reflects the fact that transactions cost under a system of floating rates rises with openness, as shown in Figure 1B,

FIGURE 8. The "other" net benefits of flexible exchange rates.

and that the utility associated with the increased freedom to select the optimum trade-off between inflation and unemployment declines with openness, as shown in Figure 2. The shapes of both curves imply that U_B will be downward sloping, falling from positive values for very closed economies to negative ones for very open ones.[5]
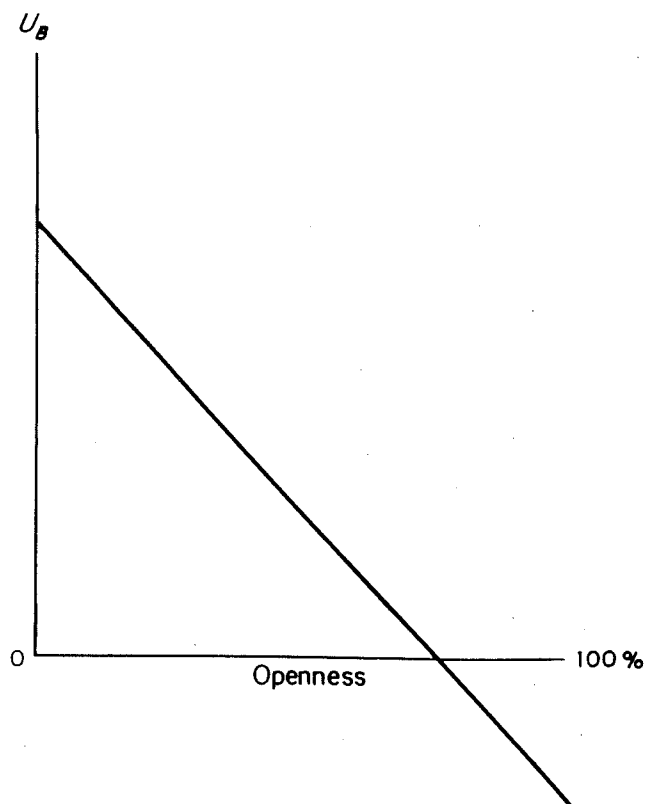
According to Figure 9A, where both U_A and U_B are shown, the benefit of giving up exchange flexibility to join a currency area exceeds the cost if and only if the economy is more open than O'. Assuming that the slope of U_A is always greater than the slope of U_B (which seems reasonable but not necessarily valid), the gain from joining a currency area is greater the more open the economy. On the other hand, Kenen

[5] Thus Figure 8 is essentially the vertical summation of Figures 1B and 2. Figure 7 takes into account the effects of disturbances on the usefulness of money and the efficiency of resource allocation. As a result, many of the considerations underlying the construction of Figure 1A also underlie Figure 7.

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A. Fixed rates versus market flexibility.

B. The Giersch-Kenen-Whitman hypothesis.

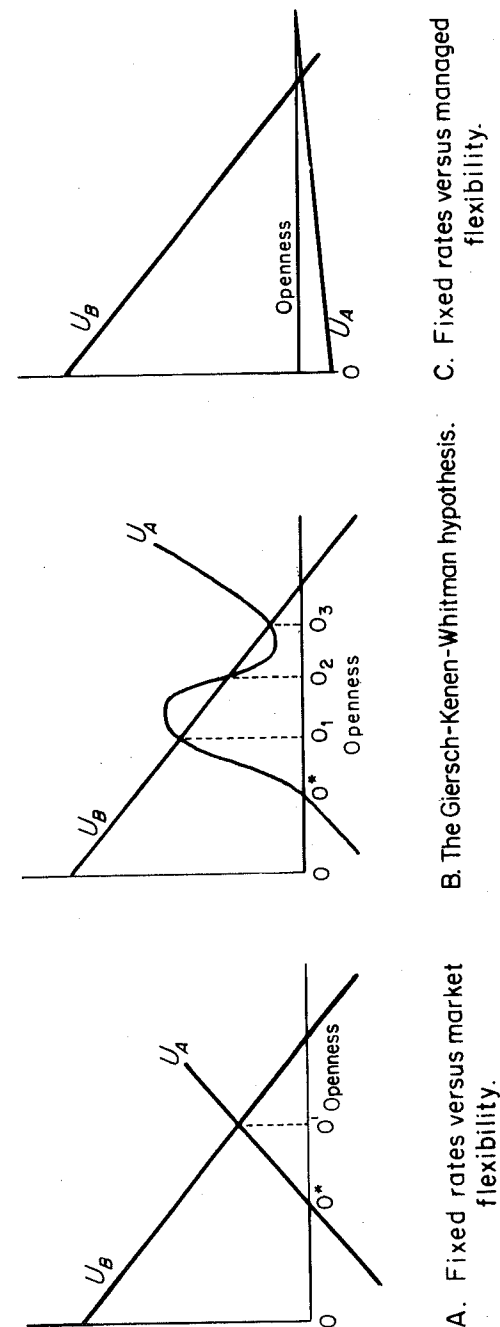C. Fixed rates versus managed flexibility.

FIGURE 9. Synthesis: fixed versus variable exchange rates.

has argued that relatively more open economies make better candidates for currency areas. If one accepts the Giersch-Kenen-Whitman hypothesis, U_A might have the shape shown in Figure 9B. In that case, if a freely floating rate is the only alternative to membership in a currency area, Kenen's view may well be appropriate in a local sense but not in a global one according to the judgments we have built into our analysis.

Figure 9B shows three crossovers between the two curves. According to this figure, for economies with openness less than O_1 or between O_2 and O_3, floating exchange rates are preferable to membership in a currency area, but for economies with openness between O_1 and O_2 or greater than O_3, membership in a currency area is preferable to freely floating exchange rates. Thus, within a certain range increasing openness improves the case for flexibility. Still, the fact remains that, given what we believe to be sensible assumptions about the end points of our curves, very open economies (greater than O_3) should join currency areas, and very closed economies (between 0 and O_1) would do better to float their currencies.

6.3 Applications of the Model

A few applications of this graphic model will illustrate some of the conclusions worked out in earlier sections. Suppose that the foreign economy is particularly disturbance prone, or that the foreign authorities are particularly unwilling or unable to stabilize their economy. This shifts EE in Figure 6 upward and U_A downward. These disturbances should also cause the purchasing power of the foreign currency to be unstable. This low liquidity of the foreign money means that adopting a floating rate will be more likely to improve the liquidity of the domestic currency and increase domestic-money illusion. With domestic residents less likely to use the foreign money as a standard of deferred payments in explicit and implicit contracts, the Phillips curve is more likely to remain a relationship between unemployment and inflation denominated in the domestic currency, even under a flexible exchange rate. As a result, adopting a floating rate is more likely to result in a real increase in autonomy for domestic policy makers. Thus, U_B shifts upward, and the shifts in both U_A and U_B increase the desirability of floating rates.

Now suppose that for some reason discretionary fiscal policy is ineffective, so that the interest rate is the only policy tool available to the stabilization authority. If capital mobility is high within a currency area, adopting floating exchange rates will increase the efficacy of monetary policy and greatly enhance the ability to adjust to all disturb-

ances. This will shift U_A downward and increase the gain from adopting floating exchange rates.

High labor mobility between regions facilitates adjustment by reducing disequilibrating differential wage trends between regions, and enables a region to adjust to a change in the equilibrium terms of trade with less change in real per capita incomes or unemployment. While labor mobility improves adjustment under both systems, it confers a greater improvement upon a country under fixed rates. Thus it causes U_A to rise. It should also increase the liquidity of domestic money under both systems, but more under fixed rates, resulting in a downward shift of U_B; on both counts it makes membership in a currency area seem more advantageous. As indicated in Chapter 4, an increase in internal labor mobility, price flexibility, or elasticities in the foreign-exchange market would have these same effects, as would an increase in government transfers and structural policies designed to facilitate adjustment or reduce the need for it. Thus, while openness is the variable on the horizontal axis in each of our graphs, we do not mean to imply that it is the only determinant of the choice of an optimal exchange-rate system. Quite the contrary: each of the factors we have considered causes the configuration of these curves to be altered, and it may well be that certain relatively open economies should opt for variable exchange rates while other economies that are considerably less open should join currency areas.

6.4 Managed Flexibility versus Membership in a Currency Area

Now let us consider the effect of managed flexibility. First, we consider adopting a predictable crawling peg with a very narrow band and a very slow rate of crawl. U_A in Figure 9C shows that the cost of adjustment under a crawling peg minus that for a member of a currency area is negative throughout the entire range, because under a crawling peg money illusion could be maintained even in very open economies. U_A would be very close to zero, however, falling only slightly below the horizontal axis, since adjustment under a predictable crawling peg and within a currency area would be similar. The advantage of a crawling peg is that it makes possible the selection of the most desirable point on a Phillips curve without much sacrifice in the usefulness of money. Thus, as shown in Figure 9C, U_B for a crawling peg versus a currency area would have the same basic shape as for a freely floating rate versus a currency area, positive for low openness and negative for very open economies. It would lie above the U_B of Figures 9A and 9B to the extent that a crawling peg does not reduce the usefulness of money and money illusion by as much as it

would under a regime of market flexibility. However, U_B would lie below the U_B of Figures 9A and 9B to the extent that a crawling peg does not permit the same freedom as market flexibility to choose macroeconomic targets and use certain policy tools for internal balance.

Under a wider band, where the limits of permissible fluctuations are fixed for eternity, a sufficiently wide band will cause adjustment to resemble that under freely floating exchange rates except where a strong trend is present. This is also true of the costs associated with the use of domestic money. However, the major benefit offered by unlimited flexibility but not by a wider band alone is the freedom to select the time path of the price level entirely on the basis of domestic considerations. As the band width becomes smaller, adjustment under fixed rates and the wider band becomes more similar; just as with the crawling peg, U_A shifts closer to the axis from its position when a freely floating rate is being considered as the alternative to membership in a currency area. U_B (as for the crawling peg) may shift either up or down, because a wide band may entail more domestic-currency illusion than freely floating rates but it destroys the power to choose the optimal point on the Phillips curve without regard to the balance-of-payments constraint.

Of course, this series of graphs does not prove anything, because any change in the circumstances facing a country is likely to cause many of these curves to shift to some extent, often in conflicting directions. However, it does provide a framework, albeit imperfect, for dealing with the choice between fixed and flexible exchange rates. It forces us to consider the effects of any change in parameters on the most important aspects of the system within a more general framework than has previously been available. Therefore, it may at a minimum help prevent us from jumping to premature or erroneous conclusions based upon more partial analysis.

7 Concluding Remarks: The Need for Merging Empirical Research with Theoretical Constructs

To maximize the usefulness of money, there should probably be a single world currency.[1] This would not require a full-fledged world government, and the high capital mobility fostered by a world currency would greatly ease the financing of deficits. The institution of a world currency would not be without costs, however. At a minimum, constraints would have to be placed on the freedom of each country to create money as it desired, and countries would forfeit the ability to use external measures such as exchange-rate adjustments to escape domestic deflation in the face of payments deficits. High capital mobility would not eliminate the need for explicit adjustment policies under all circumstances, as is indicated by the problems of depressed regions within countries. For many countries, the costs of relying for international adjustment upon existing mechanisms for interregional adjustment and financing within a country would be too great to be outweighed by the benefits of a world currency. Thus the world is not, at least at present, an optimum currency area.

The literature on optimum currency areas focuses upon the factors which make countries better or worse candidates for joining together to form a currency area. These include both systematic tendencies in the size, nature, and source of the disturbances countries face and the factors influencing the ease of adjustment to imbalances, such as the degree of wage and price flexibility, labor and capital mobility, openness, and the size of the economy.

To consider these factors, we have attempted in this paper to present a more general framework than is currently available in the literature. However, as has been indicated in our critical review of the literature, there is no general agreement on the relative quantitative importance of many of these factors. It is rather widely accepted that the United States should not be divided into smaller currency areas and that "banana republics" are too small to adopt freely floating exchange rates, but there is still considerable disagreement over the best exchange-rate system for most intermediate countries, even those as large as Canada and Germany.

Nor can we be satisfied with the theoretical treatment of all the issues raised in this study. Among the topics that need considerably

[1] Possible exceptions to this conclusion are discussed in Chapter 2.

more treatment are the effects of alternative exchange-rate systems on inflation-unemployment trade-offs under different types of disturbances and the effects of alternative exchange-rate systems on a broader range of macroeconomic objectives, including trade-offs between employment and optimal patterns of consumption and investment. Our theoretical understanding of many of the most important trade-offs affecting the desirability of joining a currency area and our qualitative analysis of the major relevant factors far exceed our empirical knowledge of the key parameters.

In part, this is because of the difficulty of obtaining such knowledge. In part, it is due to a failure to undertake feasible empirical investigations of the key determinants of optimal or desirable exchange-rate arrangements for different types of economies. We hope that the framework of analysis laid out in this paper, far from definitive as it is, may prove useful in focusing studies on these questions.

Careful case studies may be particularly useful in this regard to build up data points for comparisons across countries of different size and structure.[2] Likewise, it would be useful to extend Cooper's recent analysis of the inflationary impact of currency devaluation in a number of developing countries (1971a and 1971b) to attempt to ascertain how strongly openness affects the impact of exchange-rate changes on domestic price levels. Several recent studies of the international transmission of inflation and the inflationary impact of exchange-rate adjustment have yielded some useful information on this subject. For a review of recent studies, see Sweeney and Willett (1975).

Study of questions related to the theory of optimum currency areas may contribute to our understanding of the pure theory of money and the relative importance of the functions money performs (e.g., see Klein, 1974). For instance, how large are the economies of scale of a currency domain? Are they so substantial that one national currency will eventually dominate the entire world, as some foresee, or would the economies of further extension become so slight after some point that many independent currencies would continue to exist, even though one currency might dominate international transactions? Or, as Grassman's (1973) work suggests, have many theorists tended to overestimate the tendency for a single currency to dominate even in

international transactions? Grassman found that while the dollar tended to be the most dominant third currency used in the financing of trade, the bulk of trade for the countries in his sample was denominated in the currency of either the exporter or importer. Such evidence would support the view that individual national currencies have considerable durability and that the tendencies toward the development of a single world currency are considerably weaker than has been implied in many discussions of the benefits of international money. Another important question is the relative importance of size and of various measures of openness in determining the usefulness of domestic currency. The evolution of the use of composite currency units may provide useful information on some of these questions. For instance, various composite currency units such as the Eurco (a weighted average of nine European currencies) and the basket SDR (a weighted average of sixteen major currencies including the dollar) should be superior to national currencies as a standard of deferred payments, but they should at least initially carry greater transactions costs. Likewise, within the realm of composite currency units, standardization of units would reduce transactions costs, while a multiplicity of units would provide individual transactors with stores of value and standards of deferred value that more closely fit their individual needs. Careful study of developing patterns in the use of composite currency units may thus offer valuable information on the relative importance of some of the functions performed by international "monies" (see, e.g., Aschheim and Park, 1976).

How is the relative importance of the unit-of-account and store-of-wealth functions of a currency affected by alternative varieties of increased exchange-rate flexibility, both directly and indirectly via the effects of different systems on financial policies (e.g., greater or lesser disciplinary effects)? For example, switching from an adjustable to a crawling peg might substantially increase the liquidity of a currency, especially if it were combined with generous official financing of short-term fluctuations in the balance of payments. Furthermore, to the extent that exchange-rate movements are the result of differing rates of inflation, there would be a tendency for interest differentials to adjust in a manner that would stabilize the external purchasing power of domestic interest-bearing assets.

Such considerations suggest that it would be fruitful to extend the optimum-currency-area approach to consider optimal arrangements for limited exchange-rate flexibility between different types of economies, both in the long run and during transition periods, and, in paraphrase of Grubel (1973b) and Makin (1975), to consider the "optimum time

[2] See, for instance, Maynard's (1970) study of the likely effective scope for monetary independence in Liberia (he concluded that there was little) and Dunn's (1970) study of the effects of flexible exchange rates on internal prices in Canada. Dunn found that there was little, and on this count Canada would appear to be relatively closed. However, the relatively small range of fluctuation in Canada's exchange rate may account for this lack of effect.

dimension of fixed exchange rates." Indeed, as is particularly evident from the sections of this paper on macroeconomic stabilization, when pushed to any extent the question of optimum currency areas quickly becomes the more general question of optimum exchange-rate arrangements, for whether the formation of a currency area is desirable or not may depend crucially in many instances on what type of exchange-rate system will be used if the currency area is not formed. For instance, it is not difficult to conceive of circumstances under which the formation of a full-fledged currency area would be more desirable than maintenance of an adjustable-peg system but inferior to a system of sliding parities or perhaps even floating rates.

The theory of optimum currency areas provides theoretical insights that can be applied directly to such questions and forces researchers to attack the issues not in the abstract all-or-none terms of much of the debate over fixed versus floating rates, but rather in terms of the search for the major factors that influence the relative desirability of alternative exchange-rate systems. In this way, the concept of optimum currency areas has made a powerful contribution to the mode of scientific inquiry into some of the major theoretical and policy questions of international finance.

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