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TOWARD ASSESSING THE NEED
FOR INTERNATIONAL RESERVES

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INTERNATIONAL FINANCE SECTION

DEPARTMENT OF ECONOMICS

PRINCETON UNIVERSITY

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The author, J. Marcus Fleming, was formerly a member of the League of Nations Secretariat, Deputy Director of the Economic Section of the U.K. Cabinet Offices, U.K. representative on the Economic and Employment Commission of the United Nations, and Visiting Professor of Economics at Columbia University. He is now Deputy Director of the Research and Statistics Department of the International Monetary Fund. His publications, in the form of journal articles, are mainly on welfare economics and international economics. The present essay, a revised version of a talk given before a graduate economics seminar at Harvard University, expresses the personal opinions of the author, and carries no implication as to the views of the International Monetary Fund.

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TOWARD ASSESSING THE NEED FOR INTERNATIONAL RESERVES

Over the past few years, increasing attention has focussed on the question of deliberate creation of international reserves. No aspect of this question has presented greater difficulties, both theoretical and practical, than that of assessing the world's "need" for such reserves.

In a paper published in 1961, I tried to develop a systematic approach to the problem.¹ This approach, which might be termed a teleological one, has won a measure of acceptance in official documents. Unlike the principal alternative approaches, it does not ask what amount of reserves each country would like to have, or what amount it would require in order to be able to follow desirable policies, and then add up the results to get a world total. Instead, it asks what would be the *effects* on world economic welfare—given the probable reactions of governments, central banks, and individuals—of increasing total reserves or rates of reserve growth, the increases being distributed among countries in some specified way.

On this approach the world's "need" for reserves or for reserve growth is determined at the point where the effects of further reserve increments on world economic welfare cease to be positive and begin to become negative. (Some, including the author, would assess the effect on economic welfare by taking account of effects not only on real income but also on income distribution, both within and between countries.) Such an approach, though traditional in welfare economics, is open to the charge of being "dictatorial." Instead of accepting the preferences of governments, it seeks to evaluate them in the light of ultimate criteria. In any event, consensus between governments is unattainable, and the dictatorial judgments of economists may help to provide the basis of a reasonable compromise.

Reserve changes generally exercise their effects on world real income through national monetary and fiscal policies, such as those affecting imports, capital exports, and exchange rates. There are some exceptions to this general rule. For example, such changes may act on the minds of private individuals by inspiring a greater or lesser degree of confidence in exchange stability. But even in this instance—and granting that hot-money movements have a direct impact on economic life—the ultimate effects on real income are largely mediated through national

¹ "International Liquidity: Ends and Means," *Staff Papers*, Vol. VIII (1960-61), pp. 439-463.

policies. However, as is explained later, if reserve changes as such act through national policies, the processes through which reserves come into existence or are acquired by countries may act more directly on the level of monetary demand.

CRITERIA FOR OPTIMIZATION

Other things being equal, the higher the level of a country's reserves and the better its prospects of increasing them in the future, the more inclined the country will be to adopt policies that, *inter alia*, worsen its balance of payments.

Thus, higher reserves will encourage a country to adopt more expansionary monetary and fiscal policies, relax restrictions on imports or even promote them, relax promotion of exports or even restrict them, relax restrictions on capital exports, restrict capital imports, be more willing to provide capital exports and aid in untied form, be more generous in the provision of foreign aid, or be less willing to devalue and more willing to revalue the rate of exchange.

The effect of a widespread increase in reserves on balance-of-payments equilibrium is ambiguous. Both the countries tending toward surplus and those tending toward deficit will be encouraged to expand demand, liberalize external expenditures, and compete less actively for external receipts. However, unless the distribution of new reserves is deliberately confined to countries in balance-of-payments surplus, stronger effects may be expected in deficit countries than in surplus countries, with the result that open payments imbalances will tend, on the whole, to increase. In other words, countries will have more extensive recourse to official compensatory or balance-of-payments financing, including the use of reserves.

The desirability of a particular change in reserves depends partly on whether the countries most likely to be affected are suffering from inadequate or excessive demand pressure, whether the degree of balance-of-payments restriction being applied to trade and capital movements offers scope for significant liberalization if reserves are increased, whether more or less recourse to official compensatory financing is appropriate, and whether more stability or more adjustment of exchange rates is required. It also depends, of course, on the relative effects that reserve changes may be expected to have on all these variables.

On further reflection, I consider that my 1961 paper treated desirable exchange-rate behavior too much as an ultimate objective, while paying too little attention to the desirability, other things being equal, of promoting balance in external payments, and thus minimizing recourse to official compensatory financing. The use of such financing, I would now maintain, provides *prima facie* evidence of a distortion of international capital flows. Although it is preferable, up to a point, to

the kinds of misallocation of resources that in some situations may provide the only practicable alternatives—namely, those associated with trade restrictions, unemployment, price inflation, etc.—the distortion of capital flows through official compensatory financing is, nevertheless, a disadvantage to be taken into account. (The welfare loss involved in official compensatory financing may not be negligible. *Prima facie*, assuming free capital movements and good judgment on the part of capitalists, it would be measured by the amount of compensatory financing times approximately half the change in the differential between home and foreign interest rates that would be required to induce private financing to take the place of official.)

Broadly speaking, and making the type of value judgments that economists usually make, I would say that reserves and reserve growth ought to be increased to the point at which beneficial effects in the form of higher employment and reduction of impediments to international transactions are outweighed by untoward effects in the form of inflation and recourse to official compensatory financing.

RESERVE NEEDS AND THE ADJUSTMENT PROCESS

It is sometimes argued that international-reserve regulation is to be judged by its contribution toward improving the process of balance-of-payments adjustment. From what has been said, it should be clear that this emphasis on payments adjustment, though not wrong, only pushes the question one stage further back. What is a good or a better adjustment process must itself be judged by criteria of the kind just discussed. For example, the array of policy propensities in the various countries that might add up to a good adjustment process in a time of general burgeoning of demand might not be conducive to a good adjustment process in generally depressed conditions. The emphasis on the adjustment process may also be dangerous if it leads to the conclusion that the supply of reserves should be brought closer to what would be needed if that process were more or less perfect. For if the adjustment process were perfect—and this involves near perfection in domestic financial policies—the use of reserves (and in a sense the need for them) would be small. (The optimal level of reserves would be indeterminate above a low level, since reserves above that level would have no effect on policies.) Yet with the world as it is, a reduction in the use of reserves might well entail a net worsening of the adjustment process in the form of increased resort to restrictions or to unemployment in deficit countries.

There is a closely related half truth which is quite popular nowadays, to the effect that an improvement in the adjustment process would necessarily reduce the “need” for—in the sense of the use of—reserves.

In fact, however, it all depends on what the improvement is. More effective incomes policies—better adjusted to the balance-of-payments situation—, more flexible exchange-rate policies, and demand policies that reacted more quickly to incipient inflationary or deflationary tendencies would all doubtless reduce the use of reserves. But less ready resort to restrictions on trade and capital movement, though it might also count as an improvement in the adjustment process, would probably intensify the use of reserves.

This being said, however, it is highly desirable that efforts to improve the supply of world reserves should be accompanied by efforts to improve the adjustment process in other ways. The fact that reserve creation has to take account of many different objectives means that it cannot pursue any of them effectively. For example, a stimulus to world-reserve growth now might well have good results in some countries and in some respects and bad results in other countries and in other respects. Thus, it might encourage some relaxation of restrictions on imports and capital exports in the United Kingdom and the United States, as well as a more generous flow of economic aid from industrial countries in general, while leading, on the other hand, to excessive inflationary pressures in deficit and surplus countries alike, and necessitating an excessive flow of official compensatory financing from Continental Europe to the reserve-center countries. This dilemma arises from the fact that the instruments available to national authorities for regulating the balance of payments are either too few or are not being so used in the various countries as to permit the simultaneous achievement of domestic and international objectives. Anything that can be done to enhance international control over national adjustment processes—to enforce the “rules of the game”—will simplify the task of international-reserve management.

The adjustment process is governed in some measure by the Articles of Agreement of the Fund and by the General Agreement on Tariffs and Trade. Attempts are now being made to improve the operation of this process, as between the principal industrial countries, through exchange of information, mutual consultation, and the informal adoption of “rules of the game” within the framework of the Organization for Economic Cooperation and Development. It is, however, very difficult to secure effective cooperative action of this kind without some sort of financial sanction. By long odds, the most effective method of improving the adjustment process—at any rate so far as countries in payments deficit are concerned—would be for a much higher proportion of international liquidity than at present to take a form, such as drawing facilities in the credit tranches of the Fund, that could be used only on condition that

appropriate policies were adopted. It is a tacit presupposition of the current enquiry into deliberate reserve creation, however, that countries are unwilling either to accept an increasing reliance on conditional liquidity for themselves or to provide the financial resources that would enable other countries to satisfy a markedly higher proportion of their liquidity needs in this form.

RESERVE STOCKS AND RESERVE GROWTH

So far, I have referred rather vaguely to the need for reserves, for reserve growth, for increases in reserves, etc. The time has come to distinguish more clearly between stocks and growth rates of reserves. In considering how they will act on those instruments of policy that exercise a significant effect upon the balance of payments, the authorities of a country will be influenced, *inter alia*, by the extent to which their minds are at ease with respect to the balance of payments. This degree of balance-of-payments ease, in turn, is affected by both the stock and the rate of growth of the country's reserves. A high reserve stock and a high rate of growth of reserves are, from this standpoint, substitutes for each other. More precisely, the higher a country's reserve stock, the lower the rate of growth of reserves—and the higher the rate of growth of its reserves, the lower the reserve stock—that will be required to create in the mind of its authorities a given degree of balance-of-payments ease. This is easily understood. The sense of balance-of-payments ease has to do with the confidence of the authorities in their ability to meet payments deficits. Now, the higher the reserve stock, the greater is the country's ability to meet current and future deficits. On the other hand, the faster the current rise in reserves, the smaller such deficits are likely to be in the immediate future and the higher reserves are likely to be in the further future to meet such deficits as may then occur.

All this, of course, represents a considerable oversimplification. The degree of balance-of-payments ease engendered by a given rate of reserve growth—and hence the rate of substitution between reserve stocks and reserve growth—will depend on such circumstances as

- (1) how long the reserve growth is expected to persist (which, in turn, depends on how it comes about);
- (2) the extent to which the growth of reserves is associated with a growth of liquid external liabilities;
- (3) the extent to which reserve growth is associated with transactions that are "above the line" in the balance-of-payments accounts of the country in question rather than among the financing items.

Less account is taken of changes in the rate of reserve growth if they are considered essentially temporary than if they are considered en-

during, if they are accompanied by liquid liabilities than if they are not so accompanied, and possibly if they are conventionally ranked "below the line" rather than above it. The bearing of liquid liabilities in particular is difficult to formulate. They are perhaps best considered as equivalent to negative reserves—and a rise in liquid liabilities as equivalent to a fall in reserves—but to the extent only of a fraction of their value. This fraction itself, however, varies according to the country's balance-of-payments strength: the stronger the country's balance-of-payments position, the more closely the fraction approaches zero. (Reserve stocks, likewise, will be less productive of balance-of-payments ease if they are accompanied by stocks of liquid external liabilities. However, even if the ratio of liquid liabilities to reserves were the same for stocks as for growth, it would not follow that the rate of substitution between reserve stocks and reserve growth would remain unaffected by the height of that ratio.)

To complicate matters further, a growth in liquid liabilities to official holders abroad, if it results from and helps to finance a payments deficit, may be taken as evidence that the country can expect to be able to finance future deficits in the same way. This expectation, so long as it lasts, is itself a substitute for reserves or reserve growth, and as such a source of balance-of-payments strength.

In addition to the distinctions mentioned above, reserve growth, quite apart from its effect on the degree of balance-of-payments ease and hence on balance-of-payments policies, may apply a direct stimulus to demand pressure in the country in which it occurs which will be greater,

- (4) the more it accrues through transactions that tend to add to the money supply, and
- (5) the more it accrues through current-account transactions which directly affect the level of incomes.

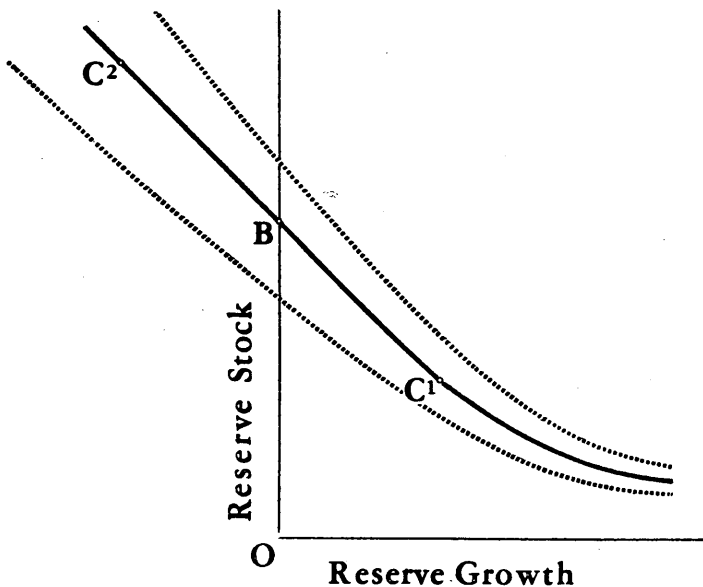
These distinctions assume considerable importance when we come to consider how the rate at which it is appropriate to create reserves by deliberate international action may be affected by the form in which they are created and by the proportions in which they are initially distributed among countries.

Let us assume for the moment, however, that any changes in reserve growth that may take place in a given country, other than those brought about by changes in its policies, exercise no direct effects on its incomes or money stocks, that they appear below the line in its balance of payments, and that they are expected to dwindle at a given proportionate rate over time. We can then derive certain propositions about the time shape of optimal reserve growth which, though highly abstract, have a certain practical relevance.

RESERVE STOCK, RESERVE GROWTH, AND BALANCE-OF-PAYMENTS EASE
IN AN INDIVIDUAL COUNTRY

First, let us look at the static relationship between reserve stock and reserve growth in a particular country, as illustrated in Figure 1, in the form of an indifference map, derived from the preference function of the authorities. In this, reserves are measured along the y-axis, and

Figure 1

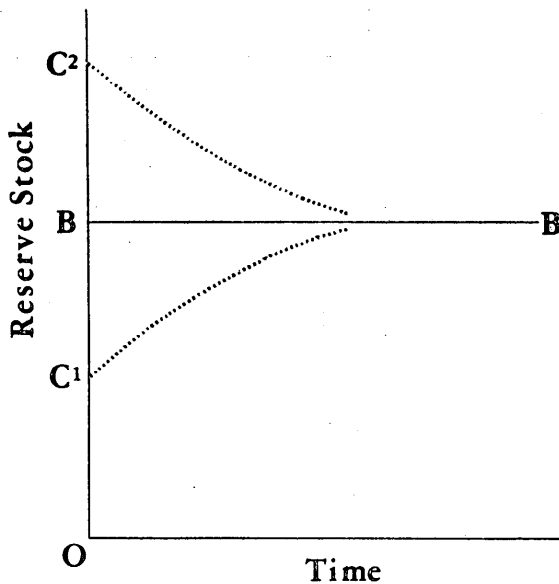


reserve growth along the x-axis, while the various contours represent degrees of balance-of-payments ease. The relationship between x and y is assumed to be linear over the greater part of the map, as would seem to be natural if, for example, any changes in the current reserve growth would be expected to dwindle at a given proportionate rate over time. However, there is assumed to be some minimum level below which reserves must not fall if confidence is to be preserved, and all the indifference contours tend to the horizontal as they approach that level. Assuming that substitution of reserves for reserve growth, or vice versa, does not affect the degree of attainment of domestic goals associated with a given set of national policies, each indifference contour, representing a given degree of balance-of-payments ease, will be associated with a given set of policies affecting the balance of payments. The degree of balance-of-payments ease rises northeastward on the chart, and, assuming that the interest cost of reserve acquisition is no greater than the interest

earned on reserve holdings, the increase in balance-of-payments ease will bring an increase in satisfaction to the authorities. There is no "desired" degree of payments ease, short of infinity; beyond a certain point, though, increasing ease may become a matter of indifference.

Now let us bring in the passage of time. If circumstances both inside and outside the country are sufficiently static, the country's indifference map, relating reserves and reserve growth, will remain constant through time. Each indifference contour will also continue to be associated with the same set of balance-of-payments policies. For each contour (that is, for each degree of balance-of-payments ease, or each set of balance-of-payments policies), it will then be possible to draw a family of paths illustrating how the country's reserves would have to develop from any given starting point in order to avoid disturbing these policies. (This is a *required* not an *actual* development of reserves—the meaning is not that constant policies would tend to bring about this development, but that the development is necessary if the policies are to remain constant.) This development is represented in Figure 2, where reserve stock is measured along the y-axis and time along the x-axis. Each path in Figure 2 corresponds to a different initial level of reserves, and the whole set of paths corresponds to only one of the contours—say the solidly-lined one—in Figure 1.

Figure 2



If the reserve level at time zero in Figure 2 corresponds to the point at which the solidly-lined contour cuts the y-axis in Figure 1 (point B), no change in reserves will be required to maintain over time the degree of balance-of-payments ease and the set of policies which that contour represents; the path starting from that level of reserves in Figure 2, therefore, remains horizontal. From any starting level of reserves lower than B, a positive rate of reserve change will be necessary to attain that degree of ease; this is shown by the position of point C₁ in Figure 1, or by the slope of the dotted line at C₁ in Figure 2. In order to permit the maintenance of the specified degree of ease, reserves must rise through time, but their rate of growth must decline, as shown in Figure 2, so that they move asymptotically toward level B. Similarly, if reserves start from level C₂, higher than B, they must decline asymptotically toward level B in order to permit the maintenance of the degree of payments ease in question. (See Mathematical Appendix.)

B, therefore, represents a sort of equilibrium level of the country's reserves in relation to a particular degree of balance-of-payments ease, that is, the level toward which its reserves must tend if this degree of ease is to be maintained indefinitely. We might call this an "equilibrium level of required reserves."

Now let us turn to the more interesting case in which, as time passes, the country, in order to maintain a given degree of balance-of-payments ease, requires either more reserves or a higher rate of reserve growth or both. (In a dynamic situation, maintenance of a given degree of balance-of-payments ease will lead to the maintenance of unchanged policies only if with such policies the degree of attainment of domestic policy targets also remains unchanged.) Reserve needs in this sense might rise either because of a rising propensity on the part of the authorities to worry about the balance of payments or because of a tendency for potential balance-of-payments deficits to increase in size, for example, because of a continuing growth in the value of international transactions. In either case, the contours in Figure 1 corresponding to given degrees of balance-of-payments ease will move northward, as time passes, at a rate corresponding to the growth in the need for reserves; in the latter case, in addition, the contours are likely, at any point of time, to be farther north than would otherwise be the case, on account of *anticipations* of rising potential imbalances.

Under the new circumstances, the various paths representing the manner in which reserve stocks, starting from different levels at the base date, would have to move in order to maintain a given degree of balance-of-payments ease, will still, if reserve needs grow in some steady and systematic way, tend to converge on an equilibrium reserve path. In Figure 3, the growth of reserve needs is defined by the curve BB,