

L.5.2

RFD 306

Board of Governors of the Federal Reserve System

Division of International Finance

REVIEW OF FOREIGN DEVELOPMENTS

June 24, 1958

Notes on the Measurement of International  
Liquidity

12 pages

Robert F. Gemmill

NOT FOR PUBLICATION

This Review is intended primarily for internal circulation and should in no case be cited or quoted. It consists of personal and informal contributions by the author, which in many cases represent tentative analyses of the subject considered.

June 24, 1958.

Notes on the Measurement of International Liquidity

Robert F. Gemmill

It has recently become fashionable for economists and others associated with the field of international finance to attempt to assess the adequacy of the supply of international means of payment. Most of the participants in these efforts seem to be pessimists -- prepared to argue that the supply is inadequate in some sense -- but perhaps more distressing than this attitude is the absence of any real discussion of the factors considered in selecting the method of measurement which led to the conclusion. It is the purpose of this paper to consider certain of the methodological problems encountered in measuring international liquidity.

These problems should be examined not only because accuracy in measurement is desirable in itself, but perhaps more importantly because the selection of a method of measuring liquidity implies something about the means by which the degree of liquidity can be improved. Any given method of measurement will treat certain types of changes as representing an increase in liquidity, and other changes as not doing so. Since the surveys of international liquidity are almost invariably followed by policy recommendations, the different results associated with different techniques are of more than academic interest.

Approaches to measurement

Two fundamentally different approaches have been employed in analyzing supplies of international means of payment. On the one hand, the position of a country or area at a given time may be compared with that of the same area at another time; on the other hand, the position of the country or area may be examined with respect to a particular set of assumed conditions.

The first approach, although widely used, appears to be generally inappropriate for measuring adequacy of international means of payment. The difficulty is inherent in the index-number technique, which necessarily focuses discussion on the merits of different base years. Thus, the pessimists point to the relative decline in the volume of international means of payment since 1937, while the optimists counter by calculating the volume of such means of payment relative to the position in 1928. However, neither side can demonstrate satisfactorily -- nor do they attempt to do so -- that the supply of international means of payment was in fact adequate in either of the two base years or that the base it employs is comparable in all, or even most, important respects to 1956 or 1957.

This approach to measurement thus cannot shed much light on the question of adequacy and does not appear to be very useful in evaluating changes in reserve positions over periods of time in which significant institutional changes have occurred. It does, however, offer a method of measuring short-term changes in reserve positions and we shall consider below its usefulness in this capacity.

A considerably more promising method of assessing the reserve position of a country or area lies in drawing up a set of assumptions relating to a specific type of foreign exchange drain and evaluating the reserves in the light of this drain. <sup>1/</sup> In many instances rather rough models may suffice; assuming a temporary reduction of a given size and duration in a country's export earnings, are reserves sufficient to maintain imports at the existing level? In other cases, complex models and extensive calculations may be required. In every case, however, adequacy can only be discussed in relation to a specific type of imbalance. Obviously, the reserves of a country or area may be adequate to meet some types of imbalance (e.g., that resulting from a recession in the United States) but inadequate to meet other types (e.g., a crop failure). Furthermore, the international means of payment available to a given country or area may vary substantially with different types of payments imbalances.

The two approaches are, therefore, not alternatives in any real sense; rather, they are complementary. An analysis of a country's reserve position for a recent year in relation to various specific types of foreign exchange drains would provide a bench-mark, and year-to-year changes in the reserve position could probably then be evaluated satisfactorily by some version of what we have termed the index-number technique, at least over a number of years. Certain specific issues which must be resolved before either of these approaches can be used are discussed below.

#### Bases for evaluating reserves

We have argued that a country's holdings of international means of payment -- broadly defined here as gold, dollars, and sterling -- must be examined in relation to a specific type of exchange drain, and have suggested that one way of proceeding is to draw up a set of assumptions on the important variables associated with the particular type of imbalance, and to measure the absolute amount of the country's holdings against this hypothetical drain. Where we are interested in evaluating changes in a country's holdings over time, a simpler method is possible. The usual procedure is to compare holdings with a figure (in practice, almost invariably that for imports) which presumably reflects changes in the country's payments on current account, on the assumption that the severity of an exchange drain is likely to be measured by changes in current account positions. The corresponding calculation may be made for an area, using as a basis for comparison imports from countries outside the area.

For a country acting as an international banker an exchange drain may often be unconnected to its current account transactions, and a different basis for comparison is required. Changes in a country's balance of payments position vis-a-vis those countries for which it acts as banker are (by definition) likely to be reflected in changes in its (short-term) liabilities to, or claims on, those countries, while changes in its balance of payments

<sup>1/</sup> An illustration of one specific model is presented in the Appendix.

with countries for which it is not a banker will most probably be accompanied by changes in its holdings of international means of payment. If the country acts as banker for a large area, major shifts in its holdings are likely to stem from uncertainties regarding its position as banker; if it is banker for a small area, current account transactions for the entire area with the rest of the world may prove to be a better indicator of a potential decline in the banker's holdings of international means of payment.

Thus, depending on the type of exchange drain one is considering, time series comparisons should either (1) relate those holdings of international means of payment of the entire banking area which may be used in settling transactions with the rest of the world to the current account transactions of the area with the rest of the world, or (2) relate the holdings of the country acting as banker to its liabilities. In the case of the United States, this latter measure would be the ratio of the gold stock to foreign dollar holdings, while for the United Kingdom the ratio would be one of gold and dollar holdings to sterling liabilities. <sup>2/</sup>

#### Net versus gross holdings

The choice between computing a country's holdings of international means of payment on a net or a gross basis must be made in the light of the problem under study. As a general principle, those claims against a country by the United States or the U. K. which are likely to result in reductions of the country's holdings under any given type of payments disequilibrium should be deducted from the country's resources in evaluating its ability to meet this type of disequilibrium. In addition, it appears inherently reasonable to compute a country's international currency resources net of any liabilities which represent commercial arrears. Exchange controls may make it impossible for such claims to lead to a reduction in a country's resources, and it might therefore appear justifiable to compute reserves without taking these claims into account, except for the fact that they are purely substitutes for reductions in holdings of international means of payment. We would clearly not wish to show a country's position unchanged if the country were able to avoid drawing down its holdings solely by the accumulation of payments arrears.

In practice, it seems unlikely that time-series comparisons would be seriously distorted by the use of figures for gross dollar or sterling holdings, unless there were substantial shifts in the volume or composition of a country's dollar or sterling liabilities. Where such shifts did occur, any time-series comparison would be suspect, and a new bench-mark liquidity position, established through the use of specific models of payments disequilibria, would have to be computed.

<sup>2/</sup> The calculations which have recently appeared, comparing British gold and dollar reserves with the volume of world trade financed by sterling, are therefore inappropriate. (See, for instance, The Debate on Sterling, P.E.P., Vol. 24, No. 421, p. 83.)

In calculating the position of an international banker, it appears essential to use gross short-term claims on the country acting as a banker as a measure of its liabilities. Claims by a banker on one country are not likely to be of use in meeting obligations to other countries; and in fact the existence of claims on a country may not even prevent the authorities of that country from employing all their claims against the banker to draw down the resources of the banker.

Official versus total holdings

Computations of international currency resources have at some times employed official holdings of certain specified types of assets and at other times both official and private holdings. <sup>3/</sup> Where one assesses the volume of international currency relative to specific types of imbalance, the choice as to which concept is the more appropriate can readily be made in the selection of assumptions (or in the definition of "adequacy"). For time-series comparisons, the use of total holdings appears preferable.

The principal reason for using figures for total holdings, in either approach to measurement, is that private holdings are in many circumstances a close substitute for official; and if the measurement is associated with a concept of adequacy which implies continued movement toward increased convertibility of currencies, the substitution may be especially close. The main argument against including private holdings is that they are not always accessible to the authorities; however, as has often been pointed out, such holdings may be mobilized by the authorities either by indirect means (monetary and fiscal policies) or by the introduction of exchange controls. In fact, it is because the distinction between official and private holdings reflects a country's exchange control policies that the use of total holdings is preferable.

Comparability among measures for different countries, difficult enough to obtain under the best circumstances, is rendered even more difficult if the figures reflect differences in exchange controls as well. More important, comparisons of the position of a single country or area at various points in time may often be worthless unless changes in total holdings are taken into account. Where both official and private holdings move in the same direction at about the same rate, use of either official or total holdings will yield approximately the same conclusion as to the extent of improvement or deterioration in the exchange position. Where the two series do not move in the same direction, or where they move at widely differing rates, neither series by itself provides a satisfactory measure.

<sup>3/</sup> The International Monetary Fund, for example, has consistently defined reserves as official holdings, while in published Federal Reserve statistics official and private holdings (and in published U. S. Treasury statistics official and commercial bank holdings) of certain types of dollar assets are combined.

Given no change in official holdings, a decrease in private holdings does represent a deterioration and an increase an improvement in a country's liquidity position, and this fact needs to be recognized. Where the choice is between treating private holdings on a par with official or ignoring them altogether, the former approach appears to involve less error.

Types of financial resources

Total dollar holdings (components of which are published in the Federal Reserve Bulletin) are defined as short-term liabilities to foreigners as reported by banking institutions in the United States, and estimated holdings of U. S. Government bonds and notes. Data on liabilities to foreigners by non-financial institutions are available after a lag, but the reporting procedures are considerably less comprehensive, and the figures thus of less statistical reliability.

Because claims on and liabilities to foreigners by non-financial institutions are more directly and exclusively associated with trade than are banking claims and liabilities, they represent a rather different type of resource. Presumably, they would tend to change in periods of exchange drains mainly through the operation of leads and lags in payments and receipts; and if so, the net change in a country's position with respect to these claims would appear to be more appropriate than gross changes in calculating a country's position with respect to all international means of payment. However, because of the statistical limitations of the data, noted above, and because the amounts involved are small relative to the margins of error inherent in any calculation of the adequacy of international liquidity, it appears appropriate to omit these data from calculations.

The other types of dollar assets held by foreigners are not so large, so liquid, nor likely to be so accessible to the authorities as those mentioned above. In general, their omission will not affect conclusions significantly. Recognition should be made of special cases, such as the U. S. corporate securities held by the Government of the United Kingdom, but where reliable reports on the value of such holdings are not available, it is advisable to keep any estimates of holdings of securities separate from data on dollar holdings.

Sterling holdings published in the United Kingdom Balance of Payments, for various areas, consist mainly of "net holdings of sterling or sterling area currencies . . . with banks in the United Kingdom, British Government securities held for the account of banks and official bodies, and sterling funds held with Crown Agents for Overseas Governments and Administrations and by Currency Boards." Estimates of holdings by country -- in some cases rather rough ones -- can be derived from the data on foreign exchange holdings of governmental agencies and banks which is published by the International Monetary Fund in

International Financial Statistics. While the data on estimated holdings thus derived will not always be on a strictly comparable basis, and will not be fully comparable with the figures on dollar holdings, they may be of sufficient accuracy to be of assistance in evaluating the liquidity positions of those countries which hold a substantial share of their resources in the form of claims on sterling.

In addition to holdings of gold, dollars and sterling, countries have a variety of types of liquid assets which may be employed to meet foreign exchange claims. The most important of these other resources is the country's quota in the International Monetary Fund. Under present Fund policies, a country making a "reasonable" effort toward achieving internal as well as payments stability can count on being able to draw up to 50 per cent of its quota, subject to the availability of the currency in the Fund; if the country requires further resources, and if its stabilization program is approved by the Fund, additional tranches of the quota may be made available.

Thus, while a country's quota in the Fund cannot be viewed in the same light as its holdings of gold and dollars, it is meaningful to determine the level of a country's gold, dollar and sterling resources plus potential claims on the Fund if one is interested in the resources which a country may have to meet foreign exchange drains. The gold, dollar and sterling resources of a country may be calculated to include the unused portion within the first half of a country's quota, or even including the unused portion of its full quota, in the case of certain types of exchange drains.

From the point of view of an individual country, it appears possible to assume that the country would not be prevented from drawing the full amount of its quota because of the limited resources of the Fund; however, the larger the area for which we attempt to assess the available international means of payment, the less reasonable such an assumption becomes. If deficits occurred in the payments positions of a large group of countries vis-a-vis countries outside this group, a calculation which aggregated the quotas of the individual members of the area would overstate the resources available to meet the foreign exchange drain since substantial drawings by many members would reduce the resources available for the remaining members, and (by hypothesis) the foreign exchange losses of some members would not accrue to others within the area. The limiting case of this type is probably where one wishes to determine the gold and dollar resources available to meet the disequilibrating effects of a depression in the U. S. In this instance, the maximum amount of gold and dollars which the Fund can supply is the sum of its gold and dollar holdings.

A country may have at its disposal other types of financial resources for meeting specific sorts of imbalance. These resources range from credits available under regional payments arrangements such as the European Payments Union to swing margins under bilateral payments agreements for those countries which still engage in this type of practice. So long

as a country is in deficit to the EPU, any unutilized credit which it may have in the Union obviously serves as a substitute for holdings of gold or convertible currencies, and therefore any such credits could logically be included in a calculation of the resources available to a member to meet an imbalance with the EPU area. If we are considering the resources of an EPU member in relation to its over-all payments position, outstanding credit facilities with the EPU could be included only if the country is running a deficit with the EPU area; and, in fact, if the country is in surplus with the EPU area, it may have to extend credit to other members. Because of the conditional nature of resources of this type, it may generally be more appropriate to omit them from calculations where we are interested in a country's over-all payments position.

#### Domestic cover requirements

In about half the countries of the free world, the central bank is required by law to maintain reserves of gold or foreign exchange against specified liabilities, while in the remainder some such obligation on the part of the central bank has evolved as a matter of practice. The existence of these requirements, whatever the legal status, poses the question of whether they should be added to external requirements in assessing a country's supply of international means of payment. The question is important for any quantitative conclusions, since for many countries domestic and external requirements are of the same general order of magnitude. However, the two requirements are of rather different character, and are not directly additive.

External requirements for international currency resources represent funds to finance payments imbalances; to the extent that these imbalances are temporary, the resources will be replenished at some later date. Domestic cover requirements, on the other hand, represent amounts to be held rather than spent, and the fact that these requirements can be, and have been, suspended means that international currency resources ostensibly serving as domestic cover may in practice be available to meet exchange drains. <sup>4/</sup>

It is frequently argued that recognition by the central bank of an obligation to maintain or re-establish an appropriate ratio between its holdings of international means of payment and its liabilities may contribute to confidence in the country's currency. However, so long as a domestic cover can be suspended, it merely represents one aspect of the general problem of

<sup>4/</sup> For example, in April 1957 Belgium re-established cover requirements, under which an amount equal to about seven-eighths of the current gold reserves was to be held against note and deposit liabilities of the central bank. If one treated this part of the gold stock as unavailable to meet any payments emergency, one would have to conclude that Belgium's gold and dollar position (excluding the quota with the Fund) had deteriorated by over 60 per cent; yet there is no evidence that anyone reached this clearly unwarranted conclusion.



maintaining confidence, and there is no appropriate method for disentangling domestic and external elements. A concept of adequacy cannot be based on an assumption that a country's gross holdings of international currency may fall to zero, but apart from this extreme case there appears to be no reasonable basis for establishing a minimum figure for holdings. The question of confidence is necessarily related to the nature of the hypothesized exchange drain and allowances can most appropriately be made in the construction of the specific model.

### Summary and some implications

We have emphasized that in the last analysis measurement of the supply of international means of payment can only be meaningful in relation to some particular hypothesized exchange drain, and that temporal comparisons should be made only against this background. Furthermore, it is necessary that the method of measurement should recognize the essential difference in the position of a country acting as an international banker. Finally, we have suggested that in general it will be preferable to use gross (rather than net) figures on a country's total holdings of dollars and/or sterling. Net figures lead to a liquidation-value approach to measurement, and are likely to be unsatisfactory as a basis for evaluating changes in an international payments system still in operation.

For example, a change in the status of an international banker may lead to significant changes in international liquidity. An increase in quotas in the International Monetary Fund is clearly a means of improving the ability of all members to meet exchange drains. Similarly, a transfer of gold from an individual country to the international banker will generally improve the liquidity position of the banker without affecting the reserve position of the country selling gold.<sup>5/</sup> Thus, while concentration of the world's gold and dollar resources may have an adverse effect on international liquidity, centralization of gold reserves may very well improve it. This effect is analogous to the increase in liquidity in the domestic economy which arises from the transfer of cash from the public to the commercial banking system.

So long as the volume of international means of payment is measured in relation to specific exchange drains, it is possible to develop a concept of efficiency in connection with an improvement of the liquidity position of a country or area. The efficiency of a given method is determined by the extent to which a country's position may be improved with respect to those types of drains for which it is inadequate without also being improved with

<sup>5/</sup> A transfer of gold to an international banker will increase both the assets and liabilities of the banker. Arithmetically, such an increase would represent an improvement only where the banker's assets were less than its gross liabilities and the ratio thus less than 1; however, where the banker's assets exceed its gross liabilities, the problem of adequacy does not exist.

respect to those drains for which it is already deemed adequate. The concept of efficiency derives its significance from the proposition that the volume of international means of payment can be too great -- that is, that the danger of international inflation cannot be disregarded. If a country takes into account its holdings of international means of payment in formulating monetary and fiscal policies, increases in holdings may lead to more expansionary policies. The concept of efficiency does not depend for its significance on whether the holdings of a country or group of countries are already considered adequate, and it is equally applicable to the problem of increasing the resources of a particular country or a large area.

It will often prove more efficient to take steps to reduce the requirements for international means of payment rather than to increase the supply; however, efficiency, as defined above, is hardly likely to be the basis on which such measures would be decided. Of the various methods of increasing the supply of international currency resources, increases in Fund quotas tend to be among the most efficient. Under current Fund policies, the second quarter of a country's quota may be drawn if the country is making "reasonable" efforts to achieve stability, and the third and fourth quarters only if the country has agreed to a stabilization program. Thus, that part of a country's resources represented by the last half of its Fund quota (and to a lesser extent the second quarter of its quota) is available only after the country has taken measures to curb expenditures. To the extent that the stabilization measures are effective, there is a lessened probability that all the available resources would be utilized. An improvement in a country's ability to meet a crop failure, for example, through an increase in its Fund quota would therefore be less likely to contribute to inflation than would a similar increase in its gold holdings. The superior efficiency of an increase in Fund quotas in meeting specific exchange drains is most striking when this increase is compared with the effect of raising the price of gold; Fund quotas may, or may be adjusted to, correspond roughly to the payments problems of individual countries, while a higher gold price would increase the resources of the gold-holding and gold-producing countries regardless of the adequacy of existing holdings.

The relative efficiency of any particular method of increasing the total supply of international currency resources is not independent of the supplies of various types of such resources, however. In particular, as the proportion of Fund quotas to the total resources of individual countries rises, a larger proportion of the Fund's resources will probably be committed at any one time. As an increasing share of the Fund's resources becomes committed, countries that have not drawn on their quotas are less able to assume that the entire amount of their quotas may be made available in time of need. Thus, beyond some point, efforts to increase the supply of international means of payment exclusively by raising Fund quotas may encounter a type of diminishing return, at least with respect to certain types of potential exchange drains. Even after that point has been reached, however, an increase in Fund quotas may still be the most efficient method of increasing international currency resources.

APPENDIX

As an illustration of one of the simplest forms of models for assessing some aspect of the adequacy of the supply of international means of payment, we may take the calculation found in Measures for International Economic Stability (United Nations, 1951), which evaluates gold and dollar holdings of foreign countries and international institutions against the potential drain from a depression in the United States.

The assumed depression is one involving "a twelve-month reduction in dollar supply of the same relative severity as that in 1937 and 1938 ... followed by a quick and full recovery in the following twelve months." United States imports of merchandise (on a quarterly basis) are assumed to fall nearly 50 per cent over the course of five quarters, and then to recover, so that annual imports in each of the two depression years would be one-third less than the pre-depression level. United States payments for services and remittances are assumed to be about lower by one-seventh in each of these two years.

Using some U. S. balance of payments data for 1950 and 1951, the United Nations experts estimated that the decline in imports might lead to a decrease in dollar earnings by foreign countries of \$8 billion in the two-year period, and the lower payments for services and remittances to a decrease of another \$1 billion. The report also made an allowance of about \$1 billion for a possible decline in the outflow of U. S. private long-term investment and for short-term capital movements into the United States. The total reduction in the dollar earnings of the rest of the world over the two-year period was thus put at \$10 billion. If dollar payments to the United States were to be maintained at an unchanged rate in such a depression, the total loss to foreign countries in gold and dollar holdings would approximate this figure, except to the extent that their gold and dollar holdings had risen in the base period. <sup>1/</sup>

The report estimated that in October 1951, gold and dollar reserves of countries other than the United States were, on the average, equal to about 25 per cent of their annual rate of imports, and, while not attempting a precise definition of what would constitute adequate levels of reserves, concluded:

Reserves of countries other than the United States, even when supplemented by recourse to the Fund, are in general barely sufficient to meet the unforeseen emergencies (such as crop failures, political changes and rumors, and foreign exchange speculation) that arise in the affairs of most countries from time to time, even in periods of general world prosperity. Existing reserves would not enable countries, in addition, to maintain their imports in the face of

<sup>1/</sup> In 1951, the increase in their holdings was only about \$0.1 billion.

a recession in one or more major countries that sharply, though only temporarily, reduced the demand for exports throughout most of the world. Statistics apart, a substantial reduction in the supply of dollars would inevitably lead to widespread exchange crises and a rapid growth of trade restrictions and exchange control.

Thus, although no precise definition of adequacy was formulated in the report, the apparent criterion established by the U. N. group is that holdings should be at least 25 per cent of imports plus an amount sufficient to meet a U. S. depression. <sup>2/</sup>

The position of foreign countries at the end of 1957 may be evaluated on the same basis. Imports of foreign countries rose by \$15 billion from 1951 to 1956 and by an additional \$8-1/2 billion to 1957. The \$15 billion increase in imports from 1951 to 1956 would imply an increased requirement of \$4 billion, while using the 1957 figure would raise the requirement by another \$2 billion. Because 1957 was a year in which many countries imported at what were generally considered excessively high rates, some sort of adjustment is appropriate; we shall therefore assume an increase in requirements of \$5 billion, a figure corresponding to the average 1956-57 level of imports.

The increase in gold and dollar holdings of foreign countries and international institutions from December 1951 to December 1957 was \$9.4 billion; thus, the aggregate rise in holdings exceeded the increase in requirements for general reserve purposes by about \$4-1/2 billion. The percentage declines in U. S. purchases of goods and services assumed in the U. N. report would lead to a decline in dollar availabilities over the two-year period of about \$10 billion if based on the average level for 1956-57, which differs only slightly from the 1957 figure. An allowance would have to be made for the decline in the outflow of U. S. private long-term capital; we might for purposes of argument assume a reduction of \$3 billion for the two-year period, equivalent to a cut of 50 per cent in capital outflow. The reduction in U. S. dollar payments over the two depression years would therefore be on the order of \$13 billion. If foreign countries were to maintain their purchases from the United States at the 1956-57 level, the loss in gold and dollar holdings in the two-year period would be about \$11.5 billion, since during 1956-57 holdings rose by \$1.5 billion. However, it would be unrealistic to assume that United States exports would remain unchanged in the event of a major decline in the outflow of U. S. private long-term capital. If exports declined by half the

<sup>2/</sup> It might be noted, parenthetically, that the requirements as calculated in the report were based on preliminary data. Actually total gold and dollar holdings of foreign countries and international institutions at the end of 1951 were about one-third of total 1951 imports, but some allowance must be made for random factors in the distribution of holdings. (In a more sophisticated analysis, one should also avoid applying the same percentage to countries which hold sterling and those which hold dollars.)

assumed \$3 billion decrease in capital outflow, for example, the drain on foreign holdings of international means of payment projected as resulting from a U. S. depression would be of essentially similar size (\$10 billion) whether based on 1951 or 1956-57 magnitudes.

Thus, in the period from 1951 to 1957 there has occurred a significant improvement in the position of foreign countries as a whole with respect to international means of payment. In fact, the improvement would appear to have made up roughly half of the deficiency implied in the United Nations report. It might be noted that by the end of 1957 the holdings of several foreign countries did not fully reflect recovery from the payments disequilibria which had occurred earlier in the year, and in the first half of 1958 gold and dollar holdings of foreign countries and international institutions are estimated to have risen by more than \$1 billion.

It has frequently been pointed out that the gains in gold and dollar holdings during the past few years have accrued principally to a few countries (especially Germany) and while we have as yet taken no specific account of the distribution of holdings, it is clearly possible to make any appropriate allowances at the expense of complicating the model. For example, we might assume that during the hypothetical U. S. depression the resulting drain in gold and dollar holdings would not be met in any part by reductions in German holdings. In effect, we could construct a similar model without Germany.

Excluding Germany, the increase in gold and dollar holdings from 1951 to 1957 amounted to \$5.7 billion, while imports rose by more than \$15 billion if we measure to the average for 1956-57. In this model, therefore, requirements associated with the general level of imports rose by slightly less than \$4 billion and the additions to holdings over and above these requirements -- the amounts available to meet a depression in the United States -- were less than \$2 billion.

The addition of special assumptions of this sort will often result in making the model more realistic, although care must be taken to insure that an unrealistic model does not emerge from the combination of various assumptions which are in themselves unexceptionable. Since the number of assumptions which may be introduced into any general form of model is, at least theoretically, infinite, there is a distinct possibility, if this approach became accepted, that we might be treated to an increased diversity of opinion on the adequacy of supplies of international means of payment. However, any such discussion would focus attention on the differences in assumptions, and hence on the various potential sources of exchange drains, rather than on the selection of base years and similar technicalities. It would therefore probably be more productive than current arguments.