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The Function of Central Bank Reserves  
and Reserve Requirements  
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## Introduction

This paper may be divided into three principal parts, although no such formal division has been made. The first part discusses the function of central bank reserves of gold and foreign exchange, and how the conception of the purpose of such reserves has changed over time. The principles which should determine the amount of reserves needed by a central bank are then explored.

The second part of the paper is concerned with the subject of the traditional statutory reserve requirements for central banks, the countries in which they have been adopted, their present status, the forms in which required reserves may be held in different countries, and the value of the traditional type of reserve ratio as a check against inflation, as an indicator of the adequacy of reserves and as a guide to appropriate central bank credit policy. The conclusion is reached that the classical type of central bank reserve ratio has little value for any of these purposes.

The third part of the paper consists of a rather detailed appraisal of the features and value of certain new types of central bank reserve ratios that have been adopted in Paraguay, Guatemala, the Dominican Republic and Ecuador during the past decade to serve as a measure of the adequacy of reserves. The paper ends with some concluding comments on the value of reserve ratios of all sorts, in which the value of all such devices is seriously questioned.

### The function of central bank reserves

Central banks traditionally have acted as the custodians of their countries' international reserves and as residual buyers

and sellers of gold and foreign exchange in order to maintain convertibility of their currency issue into gold and other currencies at stable rates of exchange. At times when circumstances have made the maintenance of complete convertibility and stability of the currency impossible, central banks have endeavored to attain these objectives insofar as it was practicable. In some countries, the responsibility for maintaining the foreign exchange value of the currency is, or at one time was, entrusted to the Treasury, or to Stabilization Funds or Conversion Offices, but usually there has been a very close operating relationship between the responsible agency and the central bank.<sup>1/</sup> Nevertheless, in a large majority of countries, and particularly in the underdeveloped countries, the central bank is the custodian of the international reserves and the residual buyer and seller of foreign exchange.

In the absence of compensatory purchases and sales of foreign exchange by a stabilizing agency, any tendency toward inequality between current demand for and supply of foreign exchange would result in movements in the exchange rate. Fluctuations in the exchange rate could be minimized by appropriate use of credit and fiscal measures, or trade and exchange restrictions, but they could not be entirely prevented.

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<sup>1/</sup> In the United Kingdom and Canada, special stabilization funds have been created for the purpose of holding the nation's international reserves and of stabilizing the foreign exchange value of the currency; the central bank is no longer primarily responsible for these functions. In France, Spain, Cuba and Italy, special funds with resources of their own have also been assigned primary responsibility for exchange stabilization, although the central bank still plays a role.

No country places quantitative limitations on its central bank's authority to issue currency for the purpose of purchasing gold and foreign exchange.<sup>1/</sup> Consequently, it is always within the power of the central bank to maintain convertibility of gold and foreign exchange into the domestic currency, and in this manner prevent an appreciation in the international value of the currency. On the other hand, the extent to which convertibility of the domestic currency into gold and foreign exchange can be maintained, at a stable exchange rate, is limited by the size of the central bank's reserves.<sup>2/</sup> Traditionally, therefore, the function of

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<sup>1/</sup> Although no quantitative restrictions are placed on central bank acquisitions of foreign exchange, many countries have qualitative restrictions which limit the acquisition of foreign exchange which is not freely convertible into gold or dollars. For example, Section 75 of the Philippine Central Bank Act of 1948 states that "The Central Bank shall avoid the acquisition and holding of currencies which are not freely convertible and may acquire such currencies in an amount exceeding the minimum balance necessary to cover current demands for said currencies only when, and to the extent that, such acquisition is considered by the Monetary Board to be in the national interest."

<sup>2/</sup> "Obviously, a loss of gold is a much more serious matter than a gain. If the Central Bank receives an abnormal amount of gold, it suffers a diminution of profits and possibly a loss of control over the market in discounts and short loans. But the loss of control, leaving the community free to borrow and lend, will tend to cheapen the currency and to restore equilibrium, and the restoration of equilibrium will itself enable the Central Bank to get rid of the superfluous gold.

"On the other hand, a loss of gold may exhaust the reserve altogether and incapacitate the Central Bank from discharging its duty of selling gold at a fixed price." R. G. Hawtrey, (The) Gold Standard in Theory and Practice, Fifth Edition, 1947, p. 36.

central bank reserves has been to provide a fund of international means of payment from which the bank could draw in order to maintain convertibility of the domestic currency into gold or foreign currencies at a stable rate of exchange at times when demand for gold and other currencies exceeded the supply available from other sources.

During the days when gold coin was commonly used as a domestic means of payment, central banks had to have adequate reserves to provide for fluctuations in the demand for gold for domestic circulation as well as to finance deficits in the country's balance of international payments. It is now generally recognized that the use of gold as a domestic means of payment is a wasteful use of an asset that should be conserved for international payments. With the almost universal prohibition of domestic circulation of gold coin, central banks have been relieved of the need for holding reserves against potential demands for gold as a domestic means of payment, and one source of currency instability has thereby been removed.

Convertibility at an unchanging rate of exchange was the prime objective of central banking in England and in countries which established central banks in the English tradition. By itself, this objective seems rather narrow and sterile by today's standards. Fundamentally, however, it was sought as a means to a much broader end. There was a more or less universal belief that the operation

of the gold standard, the keystone of which was stability of exchange rates without restrictions on the international flow of money and goods, would produce the optimum utilization of physical and financial resources in all countries. It would facilitate world trade and an international division of labor on the basis of the comparative advantages of each country, thereby raising the real incomes of all countries. Currency convertibility and stability would also facilitate the international flow of funds from countries having a surplus of capital to countries having inadequate capital resources.

These considerations were quite real and practical to a country like England in the 19th and early part of the 20th centuries. The British economy required inexpensive sources of foreign raw materials and foodstuffs and an extensive foreign market for its finished goods. It also needed foreign outlets for its surplus savings. Thus, the gold standard theory provided the intellectual and moral superstructure for a mechanism which very effectively met the contemporary needs of the British economy and seemed to be compatible with the best interests of other countries as well.

The economic disturbances of the Great Depression in the 1930's spread scepticism of the validity of the classical norms of monetary policy. It became apparent that a country could have great unemployment not because its prices and costs were out of line

with those of other countries, but because of a world-wide depression. Great doubts arose as to whether the monetary and fiscal measures necessary to assure stability and convertibility of currencies in terms of gold actually were identical with, or even compatible with, the measures needed to promote the ultimate objective of optimum utilization of physical and human resources.

Most countries today believe that strict adherence to the principles of the gold standard would involve greater fluctuations in domestic income and employment than is socially tolerable, and would not assure the optimum utilization of resources, even over the long-run. Nevertheless, maintenance of fixed exchange rates for considerable periods of time is still regarded as highly desirable, in nearly all countries, in order to minimize the uncertainties of various kinds and the distortions in resource allocation which result if exchange rates are allowed to fluctuate widely or are changed frequently. In many cases, however, the prevailing rates of exchange are stabilized only by limiting convertibility of the domestic currency into foreign currencies and gold.

Thus, the objective of exchange stability has been detached from the objective of exchange convertibility in many countries. The former objective is quite generally regarded as desirable and necessary. The latter, however, is subject to considerably varying degrees of acceptance in different countries, although most will agree that it is a desirable long-range objective.

This revision of the classical guiding norms of monetary policy has been accompanied by a change in attitude toward the purpose of central bank reserves in most countries. Reserves are still held for the purpose of enabling the central bank to prevent short-run fluctuations in exchange rates, but major emphasis is now placed on the need for reserves to provide for an adequate flow of imports at times when current receipts of foreign exchange are insufficient for the purpose. This may be called the "ever-normal granary" concept of reserves.<sup>1/</sup>

For countries highly dependent on imports, domestic policies to sustain incomes and employment and to promote developmental investment can be effective only if an adequate volume of goods, materials and equipment can be obtained from abroad without substantial interruption. In periods of low exchange earnings, measures designed to allocate export proceeds in a manner which will do the country as a whole the most good may be able to soften the impact on the country's economy of the reduction in the total

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<sup>1/</sup> The mercantilists stressed the importance of gold to enable a country to obtain essential imports in times of war, and referred to gold as one of the "sinews of war." Keynes, in the Treatise on Money, also mentions this aspect in the following sentence (p. 278): "The conclusion is that a country now holds a reserve in gold and foreign currency for no other purpose than as a war-chest and as a safeguard against being unduly sensitive to unexpected indebtedness." Thus, in a way, contemporary thinking on the subject of gold reserves is a reversion to the norms of the mercantilists.



volume of imports. Most countries, however, and especially the underdeveloped countries, also require large reserves, acquired in earlier periods, if they are to be able to counteract the effects of a decline in exports on their domestic incomes and their rate of economic development.

The accumulation of reserves for the purpose of sustaining a vital flow of imports will, of course, tend to maintain stability of the exchange rate over longer periods of time than would otherwise be possible. Nevertheless, this effect on the exchange rate is somewhat incidental to the main purpose of stabilizing the inward flow of goods, just as import controls help prevent exchange depreciations even though their real purpose is not this so much as it is to limit the use of the country's scarce exchange resources for expenditures not in the public interest.

Principles determining the amount of reserves a central bank needs

The adequacy of a central bank's reserves depends mainly on three considerations:

- (1) The probable fluctuations in the availability of foreign exchange. These depend on the prospective intensity and duration of exogenous fluctuations in the country's foreign exchange earnings, and on the ability of the country to offset a decline in its earnings by borrowing abroad. Clearly, the smaller and briefer

the fluctuations in the availability of foreign exchange, the less the need for a large reserve, and vice versa.<sup>1/</sup>

(2) The policies which the Central Bank and the Government desire to follow in future periods of reduced exchange availabilities. The level of reserves that a country will need will be importantly influenced by the policies on certain questions that the central bank and the Government would propose to follow in future periods of reduced exchange availability. One of these questions is whether the official objective will be to stabilize incomes and to maintain an uninterrupted or accelerated rate of developmental investment, or whether the country would be prepared

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<sup>1/</sup>In the Treatise on Money (p. 277), Keynes states that "The Bank of a country the exports of which are largely dependent on a small variety of crops highly variable in price and quantity - Brazil, for example - needs a larger free reserve than a country of varied trade, the aggregate volume of the exports and imports of which are fairly stable. The Bank of a country doing a large international financial and banking business - Great Britain, for example - needs a larger free reserve than a country which is little concerned with such business, say, Spain." The use of Great Britain as an example may seem surprising in view of the slenderness of the reserves with which the Bank of England customarily operated. Keynes recognizes this apparent inconsistency in the paragraph following the one quoted above, in which he says that this state of affairs (the slender reserve) was justified by the consideration that the City of London was acting as a lender in the international bill market on a larger scale than as a borrower of foreign deposits, so that it was always within its power to redress the situation at short notice by revising the terms on which it would lend or borrow. Great Britain no longer has such a strong creditor position, however, and this is one of the reasons why the matter of accumulating gold and foreign exchange reserves is presently of such vital importance to the British economy.

to allow domestic consumption and investment to fall when exchange earnings decline. The other question is whether the country will aim at avoiding exchange control or devaluation, except in the case of a fundamental disequilibrium, or whether the country would be prepared to resort to exchange controls or devaluation in support of its other objectives even in the absence of a fundamental disequilibrium.

If the country desires to avoid exchange control or devaluation, it will of course have to accumulate large reserves in prosperous times. Even where this is not the main objective, substantial reserves would still be needed if the country wants to offset the effects on national income of lowered activity in its export industries by expanding the rate of domestic investment. Investment could be increased, and incomes stabilized, only if the necessary imported materials and equipment could be obtained.

On the other hand, in the unlikely event that the central bank and the Government were prepared to allow domestic consumption and investment to fall as exchange earnings declined, and especially if they planned to devalue the currency and/or to impose exchange controls promptly, the need for international reserves would be smaller.

Thus, the question of the amount of reserves a central bank needs cannot be divorced from a consideration of the policy objectives which it intends to pursue in periods of reduced

availability of foreign exchange, and of the means which are to be employed for the purpose.<sup>1/</sup>

(3) The speed with which credit and fiscal measures and other remedial action can be taken if their use is considered desirable, and the speed with which the economy responds to such action. The more quickly measures can be taken to stem an outflow of gold, and the more effective they are, the smaller is the need for a large reserve. Thus, to some extent, the adequacy of a central bank's reserves depends on the scope of its existing statutory authority to impose credit and/or exchange controls, and to change the gold value of the currency.

Application of these principles to underdeveloped countries

The fluctuations in the export receipts of the underdeveloped countries are usually of greater amplitude than those of the industrialized nations. This follows from their dependence on the export of a very small number of primary products, the prices of which are more unstable than the prices of manufactures and the output of which is less subject to human control. Moreover, the export earnings of some of these countries, at least in the past, have been supplemented by rather large amounts of

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<sup>1/</sup>"... a Central Bank must, in determining the normal level of its free reserves, consider the probable maximum amount of (a) the sudden fluctuations in the balance of international indebtedness which may occur before there is time to bring other safeguards into operation, and (b) the temporary fluctuations against which it ought to be unnecessary to make any fundamental readjustments." J.M. Keynes, A Treatise on Money, Vol. II, p. 276.

foreign investment, which is characteristically irregular in its timing and amount.

Whenever an underdeveloped country has a deficit in its international balance of payments on current account, it ordinarily must pay in gold or in the currency of one of the world powers. On the other hand, when the United States has a deficit on current account, the creditor countries ordinarily do not insist on full settlement in gold or some currency other than dollars; in considerable part they are willing to enlarge their holdings of dollars. In other words, the adjustment takes the form of an equilibrating inflow of short-term capital rather than an outflow of gold. The same favored status was formerly--and to some extent still is--characteristic of the United Kingdom and some of the European countries.

The foregoing considerations all tend to increase the need of underdeveloped countries to accumulate reserves in times of prosperity, especially if they desire to maintain a stable rate of exchange, to minimize the use of exchange restrictions, and to bolster domestic investment and consumption in periods in which foreign exchange earnings are low.

The accumulation of adequate foreign exchange reserves in periods of prosperity requires the formulation of central bank (and government) policies on a long-range basis. This is not easy to do. The monetary authorities, in all countries, face

vociferous opposition whenever they insist on moderation in times of high business activity. It is difficult to make the public fully understand the long-range consequences of unrestrained credit expansion.

In some countries, however, the monetary authorities purposely base their policies on short-range considerations, because they do not regard the prospect of greater economic stability in the future as adequate compensation for the sacrifices that would be attendant in the present. The norms of exchange stability (except over the short-run) and convertibility are given quite low priority in these countries.

This attitude is usually justified on the grounds that an accumulation of reserves in times of prosperity limits the rate at which economic development can proceed. Inasmuch as most underdeveloped countries use a substantial part of their exchange earnings in periods of prosperity for importation of non-essential consumer and producer goods, however, it is open to serious question whether an accumulation of reserves in prosperous times need be at the expense of imports essential for sound economic development. A selective credit and fiscal program, including high tariffs on non-essentials, could, in most countries at least,

permit reserves to be built up without any encroachment on the volume of investment of a development nature.<sup>1/</sup>

Substantial reserves would act as a cushion which would enable a country to maintain a more stable level of consumption and domestic investment when exchange receipts declined from higher levels. The maintenance of a more stable level of real income, in turn, would tend to produce a more attractive climate for long-run private investment of the sort which would contribute to sound economic development. Moreover, it also might enable the country to get its real capital formation at a lower real cost, because foreign materials and equipment would be bought at times when their prices would tend to be lower, with dollars earned during a period of higher prices, thereby improving the "ex post" barter terms of trade.

The third consideration which has been mentioned as governing the amount of reserves needed by a country is the speed with which remedial measures can be imposed, and the responsiveness of the economy to such measures. In general, the demand for foreign exchange in underdeveloped countries can be sharply curtailed by a tight credit policy. The business community is largely

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1/ One of the limitations on measures to curb expenditures on non-essential foreign goods, however, is that "essentiality," in terms of public interest, depends on the use to which an article will be put, and does not depend merely on the nature of the articles itself. Thus, a refrigerator may be "essential" for a doctor (for the preservation of drugs and serums) but would be unessential for a musician. This sort of problem constitutes a basic and very serious weakness of exchange and import control systems which do not distinguish between users as well as articles.

dependent on bank credit--much more so than in the United States, where there are many alternative sources of financing. Moreover, the propensity to import is very high in relation to changes in money incomes and money holdings. As a consequence of these characteristics of underdeveloped economies, the demand for foreign exchange can be curbed very quickly, in most circumstances, by a restrictive credit policy. In some countries, however, the central banks lack adequate authority to tighten credit. In such cases, the central bank requires larger reserves, other things being equal, than in countries in which the central bank has adequate authority to regulate credit and is prepared to use it.

Exchange and import controls are devices that are commonly used nowadays in developed as well as underdeveloped countries to limit the effective demand for foreign exchange. Notwithstanding the imperfect administration of these controls, they have been reasonably effective in limiting the outflow of reserves in most cases in which they have been employed. If the central bank has authority to impose or to tighten such controls at its own discretion (or if some ministry of the government has the authority to do so), the "minimum adequate level" of central bank reserves would be somewhat lower, other things being equal, than in a country in which lengthy legislative processes would have to be completed before such measures could be applied.

In general, therefore, the economies of underdeveloped countries are quite responsive to measures to reduce or block demand



for foreign exchange. Moreover, most of these countries have established mechanisms for applying such measures quickly when needed. On the whole, much more use has been made of exchange and import controls, and only limited and occasional use has been made of monetary and fiscal measures.

Statutory reserve requirements for central banks

So far, this discussion has been limited to a study of why central banks need reserves of international means of payment and what considerations should influence their estimation of the amount of reserves needed. In most countries, however, the question of the appropriate size of the central bank's reserves is not left entirely to the discretion of the bank. The central banks are required by law to hold a prescribed minimum reserve of gold and/or foreign exchange against their note issue, and usually against their demand deposit liabilities as well.

Usually, the required reserves must be at least equal in amount to a specified percentage of the total note issue of the bank or of its total demand liabilities. The legislation of the United Kingdom, however, does not establish the fractional system used by most other countries which have central bank reserve requirements. Instead, it authorizes the Bank to issue a fixed amount of notes not backed by reserves--the so-called "fiduciary issue"--and requires the Bank to hold reserves equal to the full amount of any notes issued in excess of the authorized fiduciary issue. In recent years, the authorized fiduciary issue has represented all but a negligible fraction of the total note issue.

Data on the gold and foreign exchange reserve requirements of individual countries as of the end of 1951 are presented in Table I.

As of the end of 1951, the central banks of Bolivia, Colombia, Cuba, the Dominican Republic, El Salvador, Mexico, Portugal, South Africa, the United States, and Venezuela were required to hold gold and/or foreign exchange reserves against their note issue and their demand liabilities, and the requirements were in effect. Argentina, Belgium, Chile, France, Greece, Italy, and Peru had similar requirements against the note issue and demand liabilities of the central bank, but the requirements had been suspended.

Brazil, Ethiopia, Haiti, India, Iran, Iraq, Ireland, Lebanon, Pakistan, Switzerland, Syria, and the United Kingdom had gold and/or foreign exchange reserve requirements against notes alone, and the requirements were in effect. The United Kingdom is a special case, however, as was noted at the beginning of this section. Denmark, Iceland, Israel, Morocco, and Norway also had reserve requirements against notes alone, but the requirements had been suspended.

Australia, Austria, Canada, Ceylon, Costa Rica, Finland, Germany, Honduras, Japan, Korea, Netherlands, New Zealand, Nicaragua, the Philippines, Spain, Sweden, Thailand, Turkey, Paraguay, Guatemala, and Ecuador had no specific gold or foreign exchange reserve requirements, although the last three countries listed did have legislative provisions which endeavored to provide measures of the adequacy of reserves. These provisions will be discussed later on.

Statutory reserve requirements should not be regarded as establishing a minimum level below which reserves must not be permitted to fall under any circumstances. It seems preferable to regard them as standards which can be suspended or reduced by appropriate authority if extreme circumstances make this desirable. As many economists have noted, the rigid observance of minimum reserve requirements in periods of exchange crisis would defeat the very purpose of reserves, since it would have the effect of locking up a substantial portion of the central bank's holdings of gold and foreign exchange. In such circumstances, only the reserves in excess of the legally required minimum could be considered available to perform the function for which reserves exist. Moreover, the rigid observance of minimum reserve requirements might also prevent the central bank from discharging its responsibility as lender of last resort in times of financial crisis. Consequently, although reserve requirements have at times been regarded as establishing absolute limits on the availability of reserves, it is generally recognized that there are times in which the minimum reserve requirement must be suspended or reduced if the central bank is to be able to discharge its primary responsibilities.

Penalties on reserve deficiencies

In the absence of formal suspension or reduction of reserve requirements, central banks in most countries can draw their reserves below the prescribed minimum but in such event they must pay a penalty

to the Government. In some countries, the central bank is also required to raise its rediscount rate by a specified amount whenever there is a reserve deficiency. The purpose of provisions of this sort is to force the central bank to pursue a tight credit policy whenever its reserves reach or approach the legal minimum, or else to be subjected to a financial penalty, usually based on a certain percentage of the deficiency.

The payment of a penalty might indeed induce a bank to adopt a tight credit policy in cases where profits were considered important; however, central bankers nowadays realize that considerations of profit and loss should be among the least of their pre-occupations. Penalty provisions of this sort are largely carry-overs from the past when central banks had private shareholders whose dividends were contingent upon the earnings of the institution.

#### Composition of required reserves

In practically all countries, the types of assets which central banks may include among their required reserves are prescribed by law. In their earliest form, monetary reserves customarily took the form of gold coin. This was quite natural, since banks of issue were obligated to redeem their notes in gold coin, which could then be used either for domestic circulation or for shipment abroad.

When England returned to the gold standard in 1925, however, it adopted the gold bullion standard, which Ricardo had

advocated over a century earlier. The Bank of England was merely obligated by law to buy and sell gold bars at fixed prices in unlimited quantities above the legal minimum amount of sixteen hundred pounds sterling. Several other countries then followed England in adopting this kind of system, although in some cases, such as that of the Bank of France, the central bank was given an option of redeeming notes either in gold bullion or in gold coin.<sup>1/</sup>

After World War I, a further development was the adoption of the gold exchange standard by a great many countries. The substance of this standard is that central banks held part, or all, of their reserves in the form of demand deposits with central banks, treasuries and commercial banks in foreign countries whose currencies are freely convertible into gold, and that they ensure the gold value of their currency by buying and selling foreign exchange at approximately the gold parity.

It should be pointed out that even before World War I, redemption of notes in actual practice was often effected in foreign exchange and gold bullion, rather than in gold coin, but the central bank was legally obligated to redeem its notes in gold coin if a holder of notes so demanded. Moreover, many central banks actually included foreign exchange among their reserves prior to the formal emergence of the gold exchange standard after World War I, but the number of central banks so doing, and the relative importance

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<sup>1/</sup> Arthur D. Gayer, Monetary Policy and Economic Stabilization, Second Edition, Revised (New York, 1937), p. 15.

of foreign exchange as a part of reserves, greatly increased in the inter-war period. This development had the full blessing of the League of Nations which, in the early twenties, gave serious consideration to the possibility that the supply of gold would not permit a sufficiently large credit superstructure for all countries, under existing legal and institutional arrangements. The adoption of the gold exchange standard has economized the use of gold, notwithstanding the necessity for large gold reserves in the great financial centers whose currencies are held by the smaller central banks.

As of the end of 1951, the central banks in four countries --South Africa, Switzerland, the United Kingdom and the United States-- had to hold their entire required reserve in gold (in the case of the United States, in gold certificates issued by the Treasury), and could not include foreign exchange as part of their required reserves. There were seven other countries which had to hold at least part of their required reserves in the form of gold. These were Cuba, the Dominican Republic, India, Iran, Portugal, Syria, and Venezuela. The monetary reserves of some countries--Bolivia, Brazil, Colombia, El Salvador, Ethiopia, Haiti, Iraq, Ireland, Lebanon, Mexico, and Pakistan--could be held entirely in the form of foreign exchange, although usually there were limitations as to the type and maturity of the foreign exchange.

In many of the countries in which the central bank may include foreign exchange among its required reserves, only an

amount in excess of the bank's foreign exchange liabilities is eligible for this purpose.

Some central banks are permitted to include certain assets among their required reserves in lieu of gold or foreign exchange. A number of central banks can include prime foreign government securities. Silver can be included in the reserves of central banks in several countries, such as Mexico, Ethiopia and Pakistan. The central bank in several countries--among them Colombia, Cuba, the Dominican Republic, and Mexico--may now include as part of their required international reserves either their gold contribution to the International Monetary Fund or their net credit balance with the Fund.<sup>1/</sup> The reason for the adoption of this practice generally was to enable the country to become a member of the Fund without any reduction in its "legal reserves", because any such reduction would diminish the size of the credit superstructure permitted by the existing reserve requirements. Another consideration was to avoid giving the impression to the public that the country's reserve position had deteriorated as a result of joining the Fund.

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<sup>1/</sup> A country's net credit balance with the Fund is defined for this purpose as the difference between its total subscription to the Fund, in local currency as well as in gold, and the Fund's holdings of the country's currency. Until the Fund has engaged in transactions in the currency, the net credit balance will equal the country's gold contribution.

Statutory reserve requirements as a check against inflation

Historically, legislators in most countries, including the United States, have regarded the chief function of central bank reserve requirements to be that of limiting the creation of money by the central bank. By limiting the expansion of central bank liabilities, a ceiling is also placed on the expansion of commercial bank reserves, because the reserves of these institutions in nearly all countries consist of central bank demand obligations, either in the form of currency or of deposits with the central bank. The limitation on the potential magnitude of commercial bank reserves in turn places a ceiling on the volume of deposit liabilities of the banks and thus limits their ability to expand credit. Therefore, at any given moment, and with any given set of central bank and commercial bank reserve requirements, the maximum volume of money which could be produced by expansionary credit policies of both the central bank and the commercial banks is determined by the size of central bank reserves and by the deposit-notes ratio (i.e., the proportion which the public desires to maintain between its holdings of currency and its holdings of bank deposits).

A statutory reserve requirement obviously does not necessarily prevent a country from having an inflation. An expansion in the supply of money and credit, and upward pressure on prices, is possible whenever the central bank has, or acquires, large excess reserves. The legal ceiling on the money supply is thus raised whenever the balance of payments is favorable, but is



lowered whenever the balance of payments is unfavorable and reserves are falling.

If banks customarily expanded their credit operations to the maximum permitted by legal reserve requirements of the fractional type, any inflow of reserves would be followed by a multiple expansion of bank credit, regardless of the economic maladjustments which such an expansion might create, or aggravate. The traditional reserve ratio, therefore, is an unsatisfactory method of preventing inflation. "The check to inflation which a mechanical gold-reserve note-issue ratio imposes may occur either sooner or later than would appear desirable. An arbitrary and mechanical check to inflation may in some circumstances be better than no check; but it would be strange if conscious and deliberate credit control, without necessary reference to the size of the central bank's gold reserve, could not do better still. The saying that 'good banking is made not by good laws but by good bankers' is not less true for having become hackneyed."<sup>1/</sup>

The traditional reserve ratio as an indicator of the adequacy of reserves

The classical type of central bank reserve ratio is sometimes defended on the grounds that it does, after all, provide a useful measure of the adequacy of reserves, and in this manner

<sup>1/</sup> Central and Commercial Banking in South America, Report No. 12 of the Social and Economic Planning Council, Pretoria, May 8, 1948, pp. 22-23.

helps prevent a careless drawing down of reserves to a dangerously low level. While one might contend, as we shall see later on, that the probable net demand for foreign exchange from central banks in underdeveloped countries, and thus to some extent the adequacy of existing reserves, is closely related to movements in the volume of domestic means of payment in the hands of the public, it would seem unlikely that the probable magnitude of such demand or the adequacy of reserves bears any close relationship to the central bank's liabilities alone.<sup>1/</sup> Yet, the amount of such liabilities, rather than the volume of means of payment held by the public, is the reference point of the classical reserve requirement.

The linkage of reserve requirements to the central bank's liabilities, rather than to the money supply, could, at best, provide a satisfactory indicator of the adequacy of reserves only if commercial banks were always eager and able to expand their loans and investments whenever they acquired additional reserves, so that a stable relationship would be maintained between the volume of their reserves and their deposits. This is not the case in practice, especially in underdeveloped countries. The traditional reserve ratio, therefore, is an extremely crude device for measuring the

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<sup>1/</sup> Mr. Hawtrey states that: "The justification for basing the gold reserve on the liabilities of the Central Bank is that it is only through those liabilities that gold can be drawn from the reserve." (The Gold Standard in Theory and Practice, op. cit., p. 50). While this is true, it does not follow that the adequacy of the reserve bears any close relationship to the amount of such liabilities.

adequacy of central bank reserves, if for no other reason than that discussed in this section.

The traditional reserve ratio as a guide to appropriate central bank credit policy

Under the classical theory of the gold standard, movements in central bank reserves, and in the reserve ratio, were supposed to serve as a barometer to guide central bankers in the determination of appropriate domestic credit policy. When the ratio rose substantially, credit expansion was regarded as appropriate, and when it fell too fast or too far, deflationary credit policies were in order. The process was not wholly mechanistic, however, because, even under the classical theory, central bankers were to exercise some judgment in reading the barometer. For one thing, they were supposed to examine the causes of the influx of gold and to consider the probabilities of the movement continuing, and its domestic effects, if no central bank action were to be taken. Nevertheless, the "normal determinant of decision" was the reserve position of the central bank.

It was possible to have a supreme "determinant of decision" under the gold standard because central bank policy had a single and ultimate norm of reference--the interconvertibility of the domestic currency and gold. The experiences of the nineteen-twenties and thirties, however, have demonstrated that measures designed to assure convertibility are not necessarily suited to the broader

objectives of economic policy, and at times even operate in conflict with more desirable aims.<sup>1/</sup>

Today, the ultimate norm of reference in most countries is steady and well-balanced economic growth. This is a much broader objective, and the degree of achievement in attaining it is much less measurable in quantitative terms. With the change in orientation of central bank policy, fluctuations in the reserve position of central banks have become a less satisfactory mechanical guide to appropriate monetary policy. Central bank action to offset the effects of gold movements on the domestic economy is considered to be appropriate in a much greater number of circumstances than was the case when primary importance was attached to the "state of exchanges," rather than to the level and direction of domestic economic activity. In short, the value of the traditional central bank reserve ratio as a guide to monetary policy formulation has been greatly weakened by the virtual abandonment of so much of the theoretical system of which it was a part.

The preservation of the traditional reserve ratio for purposes of inspiring public confidence in the value of the currency

One of the reasons frequently advanced for preserving the traditional gold, or gold and foreign exchange, reserve requirements in countries where their effect has not been unduly restrictive

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1/ See Woodlief Thomas, Monetary Controls, an article in Banking Studies, Board of Governors of the Federal Reserve System (Washington, 1941), p. 335 et seq.

in the past is that they serve to assure the public that the currency is adequately "backed". In the absence of this assurance, it is asserted, the public would become alarmed about the value of the currency.

This argument is a relic of the days when banks of issue were required to convert their notes into gold coin upon demand of the holders of the notes. Gold coin was regarded as the basic domestic means of payment, and banknotes were merely a convenient "warehouse receipt" of a perfectly negotiable character. Under these circumstances, if the "warehouse" (i.e., the bank of issue) did not hold the gold that it purported to hold, the public would become alarmed. This was especially true, of course, in the case of banknotes that were not legal tender.

Nowadays, these arguments do not have much validity in most countries. Very few people know what the "backing" against their currency is, and even fewer seem to care. The public is much more concerned about the purchasing power of the currency, and about freedom to spend the currency for such purposes as it desires, than it is about the amount of reserves which the law requires the central bank to hold.

The invention of new types of reserve ratios to measure the adequacy of reserves

Few economists nowadays would maintain that the ceiling on central bank credit expansion should be determined by statutory

reserve requirements, or that movements of gold and foreign exchange reserves should be the principal determinant of central bank policy, or that any part of reserves should not be available to maintain the flow of really essential imports in times of exchange scarcity. One might have expected, therefore, that faith in mechanical reserve requirements and reserve ratios would have utterly vanished. Man does not free himself from old fetishes so easily. Statutory reserve requirements have been retained in many countries because of the fear that their abandonment might constitute too sharp a break with the past and might give rise to public uneasiness, and thus engender capital flight. Nevertheless, in many cases the requirements have been substantially altered and liberalized, as has already been mentioned.<sup>1/</sup>

Recent central bank reforms in several of the Latin American countries have replaced old-style reserve ratios with new types of ratios designed to serve as a general guide to the adequacy of the bank's reserves and, therefore, as an indicator of the need for remedial action by the central bank. For the most

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<sup>1/</sup> As Hawtrey observes: "Experience in many countries has shown in 1914 and subsequently that it is only too easy to pass legislation to suspend or amend a gold standard law if the monetary authorities (Government and Central Bank) so choose. If there is any obstacle in the way of a change, it is to be found not in the statute book but in the minds of the authorities or in public opinion." The Gold Standard in Theory and Practice, op. cit., p. 169.

part, they do not place an absolute limit on central bank credit expansion nor do they sterilize part of the international reserve. These attempts to create a meaningful type of reserve ratio have generated widespread interest among students of central banking and for this reason warrant an examination of their value.

In the Paraguayan and Guatemalan central bank legislation of 1944 and 1945, respectively, the inadequacy of the traditional reserve requirement was recognized and an attempt was made to adopt a more meaningful relationship consisting of the ratio of the central bank's net reserves to its average sales of exchange during the preceding three years. This novel reserve ratio was suggested by Dr. Robert Triffin, the principal architect of the Paraguayan and Guatemalan legislation.<sup>1/</sup>

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<sup>1/</sup> The manner in which net reserves are computed in the Paraguayan and Guatemalan laws is quite different from the method of computation used in most other countries, and in itself represents an interesting innovation.

The usual legal prescription for computing the net reserves of a central bank is to deduct the full amount of the bank's gold and foreign exchange liabilities from its gold and foreign exchange assets. One of the defects of this method is that it fails to recognize that a long-term foreign exchange liability should have less influence on current central bank policy than a liability of shorter maturity, because in the case of a long-term obligation the bank has time in which to take steps to increase its gross holdings of gold and foreign exchange. Long-term obligations, therefore, should have less weight in the determination of the adequacy of the bank's reserve position. Dr. Triffin's novel method endeavors to correct this defect by deducting foreign exchange liabilities on a graduated basis according to their maturity. Thus, Article 59 of the Bank of Paraguay Act provides that net reserves shall be derived by deducting from gross reserves the following:

- a) The full amount of any gold or foreign exchange liabilities of the Bank falling due within 30 days;

Under the provisions of Article 85 of the Bank of Paraguay Act, net reserves are considered to have fallen to a dangerously low level whenever the reserve ratio has dropped to 20 per cent. On such occasions, the Monetary Board of the Bank is required to "use all the powers at its disposal and to advise the Council of Economic and Financial Coordination about other measures or policies necessary in order to re-establish the competitive position of the national producers in the domestic and foreign markets and to prevent depletion of the (reserve) fund to dangerously low levels."

The reserve ratio is also intended to play an important role in the administration of the exchange control system adopted in 1945. In the exchange control legislation, however, a reserve ratio of 35 per cent appears to be regarded as indicating a critical level of reserves, because when reserves reached this level certain

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- b) Seventy-five per cent of any gold or foreign exchange liabilities of the Bank falling due within a year but after 30 days;
  - c) Fifty per cent of any gold or foreign exchange liabilities of the Bank falling due within 3 years but after one year;
  - d) Twenty-five per cent of any gold or foreign exchange liabilities of the Bank falling due after 3 years, and those of indefinite maturity.

The above provisions shall apply in the same manner to any gold or foreign exchange liabilities of other parties for which the Bank has given its guarantee.

The legislation of Guatemala and the Dominican Republic contain similar provisions.



measures restricting the availability of exchange are to be applied, and when the reserves have been restored to a position above this level, and have remained there for a specified period of time, the restrictions are to be removed.

In the Guatemalan legislation, a dangerously low level is considered to have been reached whenever the reserve ratio, computed in the manner mentioned above, has fallen to 40 per cent. Whenever the reserve ratio falls below 40 per cent, an "emergency system of international transfers" can be put into effect by decree of the president of the country, upon the request of the Bank. Moreover, the system may also be put into effect whenever the ratio of the net holdings of any single currency to the average sales of the same currency during the three preceding years falls below 40 per cent, provided that the scarce currency can not be procured by the Bank through conversion of other currencies which it holds. The details of the "emergency system of international transfers" are fully specified in the Second Part of the Guatemalan Monetary Law. The system has never been imposed, but is being held in reserve.

It should be emphasized that the legislative provisions which establish the critical level of the reserve ratio do not prevent the central bank in Guatemala and Paraguay from drawing down reserves still further. Moreover, they do not compel the central bank to contract credit and in no way do they hinder an expansionary credit policy to offset the income-reducing effects of an unfavorable

balance of payments, with one single exception in the Guatemalan case. This exception is a provision, in Article 107, which prohibits the Bank from purchasing government or other securities whenever the reserve ratio falls below 25 per cent. Thus, while a reserve ratio of 40 per cent is considered to be an indication that the reserves are dangerously low, open-market purchases may continue to point where reserves have fallen to 25 per cent. The domestic credit operations of the Bank of Guatemala are therefore not entirely free from restraints imposed by the reserve ratio. No similar restriction, however, is placed on other types of credit operations by the Bank.

It has been noted that the Paraguayan and Guatemalan reserve ratios do not "tie up" the bank's reserves nor, with one important exception, do they impose a restrictive domestic credit policy. What, then, is the purpose of these reserve ratios? Their principal purpose, according to Dr. Triffin, is to constitute "warning signals of special gravity which forcibly call the attention of the Bank to possible dangers in the.....external monetary situation."<sup>1/</sup> They focus the attention of the monetary authorities on the extent to which reserves alone could maintain the level of imports and outward remittances of the recent past. Furthermore, this yardstick of the adequacy of reserves is wholly objective and is capable of quantitative expression, which, in a sense, are desirable features, especially in countries in which the available statistical

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<sup>1/</sup> Robert Triffin, Monetary and Banking Reform in Paraguay, issued by the Board of Governors of the Federal Reserve System (Washington, 1946), p. 82.

data are meager and where the number of well-trained economists is few. Dr. Triffin cautions, however, that movements in the reserve ratio cannot "be considered a substitute for continuous watching of all relevant economic indices".

Despite its ingeniousness, a reserve ratio which relates reserves to past sales of exchange has severe limitations which greatly weaken its value as a measure of the adequacy of the central bank's reserve position. The validity of this ratio in each of the following three sets of circumstances should be considered;

1. when the balance of payments is expected to remain substantially in equilibrium over the next year or more;
2. when a large deficit is expected;
3. when a large surplus is anticipated.

Clearly, the adequacy of the level of the central bank's reserves at any given moment, and the consequent appropriateness of its policies, depends on what the future holds in store. What would be an adequate reserve under (1) or (3) above would not be adequate under (2). Yet a relationship based on past sales of exchange attaches no significance to the differences as between the sets of circumstances listed above. As in the case of human ailments, preventive action is better than remedial action. By focusing their attention on a reserve ratio which is geared to a sort of normal level of sales of exchange during the relatively recent past, the monetary authorities may fail to notice symptoms of approaching crises soon enough. A reserve ratio of the Paraguayan and Guatemalan type

can serve a useful purpose if it is treated as one of a number of "economic indices" which should be taken into consideration by the research and policy-making officials of central banks. Giving a formal status in a central bank law to this particular ratio, and to certain levels of the ratio, is an entirely different matter, however, and one may question whether such a procedure, on balance, is likely to help or to hinder the adoption of appropriate monetary and exchange policies.

The Guatemalan and Paraguayan legislation recognize that, if reserves are falling rapidly, action should be taken before a dangerously low level has actually been reached. In Guatemala, the "emergency system of international transfers", as it is called, may be put into effect not only when the reserve ratio falls below 40 per cent but also when there is a persistent decline in net reserves at a rate greater than 25 per cent annually which is not attributable to seasonal or transitory factors. Similarly, exchange restrictions may be applied to "scarce currencies" whenever the Bank's net holdings of a currency have fallen by more than 25 per cent of their previous level within a period of twelve months, provided that the holdings of the currency can not be replenished by conversion of other currency holdings of the Bank.

The Paraguayan legislation does not prescribe any specific rate of decline in net reserves as calling for special attention, but, in Article 85, as has already been noted, the Bank is required to "use all the powers at its disposal and to advise the Council of

Economic and Financial Coordination about other measures or policies necessary in order to re-establish the competitive position of the national producers in the domestic and foreign markets and to prevent depletion of the (reserve) fund to dangerously low levels" not only whenever the reserve ratio falls below 20 per cent but also whenever there is "a persistent loss of reserves not attributable to exceptional and temporary factors". In practice, the latter guide is likely to be more useful than the former because it focuses on current, rather than past, developments. It should be noted, however, that this warning signal involves subjective elements and cannot be given quantitative precision of expression.

Another novel type of reserve ratio is contained in central bank legislation enacted by Ecuador in 1948. The net reserves of the Central Bank (calculated in the customary manner of deducting 100 per cent of gold and foreign exchange obligations from gross reserves) are related to the volume of money held by the public (currency and checking deposits). If the ratio of net reserves to the money supply falls below 40 per cent, the Central Bank must submit a detailed report to the President and to the National Economic Council on the causes of the decline, the defensive measures already adopted, and the additional measures which the Bank considers desirable.

In most industrially undeveloped countries, any substantial increase in the money supply is usually followed by a considerably increased demand for foreign exchange for the purpose of importing goods or exporting capital, with a consequent drain on the international

reserves of the banking system. One of the principal reasons for the sensitive response of imports to expansion in the money supply is the limited variety of domestically-produced goods on which the public can spend any additions to its holdings of money. In some of the underdeveloped countries, frequent depreciations of the currency have created a preference for keeping idle funds abroad rather than at home. An important contributing element, but one which is perhaps more effect than cause, is the absence of low-risk, highly liquid securities in which funds not immediately needed for other purposes can be invested. For all of the reasons mentioned above, the demand for foreign exchange is highly sensitive to changes in the money supply. Thus, in most of the underdeveloped countries, prospective demands for foreign exchange can, to some extent, be gauged by changes in the amount of money in circulation; and consequently, changes in the ratio of international reserves to the total money supply may provide the public and the central bank with a useful though crude measure of the adequacy of reserves.<sup>1/</sup>

Under a system like that adopted in Ecuador, which relates central bank reserves to the public's holdings of currency and checking

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<sup>1/</sup> The observation may be made that this reserve ratio would be more accurate if the numerator (i.e., the amount of net reserves) included the net reserves of the other banks, in addition to those of the central bank, on the grounds that the foreign exchange holdings of these banks are equally available to finance imports and capital exports. In Ecuador, however, where this type of ratio was introduced, the banks are required to turn over all foreign exchange acquisitions to the Central Bank. Thus, in effect, the international reserves of the Central Bank comprise those of the banking system as a whole.

deposits, a credit expansion by the commercial banks would cause the central bank's reserve ratio to fall as the deposit liabilities of the other banks increased. The monetary authorities would thus be warned of a prospective increase in demand for foreign exchange.

Although this yardstick of the adequacy of reserves is an improvement over the traditional reserve ratio, its usefulness is severely limited by the fact that it does not adequately reflect certain important factors which influence demand for foreign exchange, such as expectations concerning price movements at home and abroad, and changes in liquidity preferences, to name only two hard-to-measure elements which bear little functional relationship to changes in the money supply. Like all of the reserve ratios discussed above, factors tending to affect the supply of foreign exchange are neglected.

Another attempt to devise more meaningful reserve relationships is to be found in the 1947 central bank legislation of the Dominican Republic. The law defines the "prudential minimum" international reserve of the banking system to be an amount equal to "the sum of 60 per cent of the increase in the money supply over its lowest level during the preceding six years, plus 30 per cent of the average annual imports of the preceding thirty-six months" (Article 68). This complex system endeavors to combine into a single formula the merits of the Guatemalan ratio (reserves to sales of exchange) and the Ecuadoran ratio described above (reserves to money supply). The Dominican system has several additional embellishments which merit description. In the first place, "reserves" are defined as consisting not only of the net reserves of the central bank (calculated

by the Paraguayan and Guatemalan method) but also of the "excess of the foreign currency assets of the (other) banks over their obligations of the same sort" (Article 68). Thus, the reserves of the commercial banks are included in the reserve calculation. Secondly, imports, rather than total sales of exchange are employed in the construction of the ratio. As a result, capital exports and other invisible outflows of exchange are excluded from the determination of the "prudential minimum", presumably on the grounds that such remittances can be suspended or controlled during a drought of exchange receipts but that the flow of imports must be substantially maintained. Thirdly, the increase in the money supply, rather than the level thereof, is considered as the pertinent factor.

Whenever reserves fall below the "prudential minimum", or whenever they have declined by more than 25 per cent within a twelve-month period, the bank must cease expanding its loans and investments, except in cases of great emergency, and must use its powers to prevent an excessive drain of reserves. The Monetary Board must also report to the President on the measures adopted and must suggest whatever other measures of a fiscal or economic nature it considers necessary (Article 68). Thus, unlike the Paraguayan, Guatemalan, and Ecuadoran legislation, the Dominican law stipulates that central bank credit expansion should cease whenever the international reserves of the banking system fall below the "prudential minimum" prescribed in the law, although a loophole is provided for any "great emergency". In the legislation of Paraguay, Guatemala, and Ecuador, as we have already



noted, domestic credit policy is not tied to the international reserve position;<sup>1/</sup> in fact, the authors of the legislation of these three countries in their various writings have tended to stress their view that central bank credit policy should be guided primarily by analysis of domestic developments, rather than by changes in the international reserve.<sup>2/</sup>

While the Dominican method of determining the adequacy of the international reserve is a tribute to the ingeniousness of its author, Dr. Henry Wallich, it nevertheless does not escape some of the defects of the Guatemalan and Ecuadoran reserve ratios discussed earlier.<sup>3/</sup>

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1/ With the exception, already noted, of the restriction on the purchase of securities by the Bank of Guatemala.

2/ For example, Dr. Triffin (op.cit., p. 79) states that the central bank, in non-industrialized export economies, must "prescind its action as far as possible from the movement of its reserves and neutralize the internal effects of fluctuations in the balance of payments. This must be done through an adequate monetary and credit policy based primarily upon the internal needs of the economy."

3/ The Dominican Central Bank Law does not stop with a definition of the "prudential minimum" international reserve of the banking system. It also adopts the traditional type of reserve requirement. The Central Bank is required to hold net reserves (of its own, not including those of the other banks) equal to at least 50 per cent of its note issue and deposit liabilities. Whenever the reserve is drawn below the stipulated minimum, the Bank is not prevented from expanding its credit operations, as it is when the reserves of the banking system fall below the "prudential minimum", but it is required to pay a penalty of one-half per cent of the deficiency monthly to the Public Treasury. Apparently, these provisions were adopted for their salutary psychological effect on the officials of the bank and on the public as a whole. Moreover, the absence of such provisions might have led to lack of confidence in the thorough-going monetary reform which was being undertaken. Previously, the United States dollar was legal tender in the Dominican Republic and was the only paper currency in circulation. The Monetary and Central Bank Reform of 1947 created a central bank with sole power over currency issue and provided for the eventual complete replacement of the dollar by the Dominican peso as the circulating medium. The gold content of the peso is the same as that of the dollar.

Since the adequacy of central bank reserves depends on the magnitude of prospective deficits in the balance of payments, one may well ask why the reserve ratio is not related directly to the anticipated deficits which the reserves will have to cover. An endeavor to do this was made in the Ecuadoran Central Bank legislation of 1948.<sup>1/</sup> Whenever reserves fall below 300 per cent of any anticipated deficit in the balance of payments for the current year, the Central Bank is required to submit a detailed report to the President and to the National Economic Council on the causes of the decline, the defensive measures already adopted, and the additional measures which the Bank considers desirable. It is also required to consult the International Monetary Fund. This ratio is really quite similar to an inverted form of the Guatemalan ratio discussed earlier, which consists of the rate of decline in the volume of net reserves (i.e., the ratio of the loss of net reserves to the volume of net reserves). The principal conceptual difference between this Guatemalan ratio and the Ecuadoran one is that the former is based on the actual deficit in the balance of payments whereas the latter is based on the estimated prospective deficit.

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<sup>1/</sup> The drafters of the legislation did not believe that any one reserve ratio could serve as a sufficiently reliable guide to the adequacy of the Central Bank's reserves. Hence, three distinct ratios were incorporated in the law. The first ratio is that of net reserve to sales of exchange during the past twelve months (thus, except for the time period, and the method of treating liabilities, it is identical with the Paraguayan and Guatemalan ratios). The second ratio is that of net reserves to the money supply, which has been discussed above. The third ratio is the one about to be described in the text.

Despite the theoretical soundness of determining the adequacy of central bank reserves on the basis of the magnitude of prospective deficits in the balance of payments, a number of problems present themselves in devising a practicable ratio on this basis. First is the subjective element involved in any estimate of future balances of payments and the consequent probable degree of error in such estimates. This difficulty can be exaggerated, however. Errors of prognostication would undoubtedly be the cause of inappropriate central bank policy decisions on many occasions; nevertheless, such occasions would probably be fewer and less serious than if reliance were placed on a purely mechanical standard which can take into consideration only some of the pertinent elements and must ignore many others of equal importance. Furthermore, regardless of the type of reserve requirement established by law, the policies which the monetary authorities adopt in any given situation will depend, consciously or unconsciously, on what they expect to happen in the future. More specifically, the foreign exchange policies, and to a considerable extent the domestic monetary policies, of a central bank must inevitably be influenced by anticipated movements in the balance of payments. Accordingly, if a central bank is to have a reserve ratio at all, one which relates reserves directly to the balance of payments has considerable logic in its favor.

Another argument in support of such a ratio is that if reserves were related to estimated deficits, the monetary authorities would be more likely to recognize the importance of preparing detailed,

competent balance-of-payments budgets and to use the conclusions of such studies in the shaping of their policies. In fact, in this writer's mind, this is the principal merit of this kind of reserve ratio

One of the major theoretical problems involved in the use of a balance-of-payments reserve ratio is the length of the period for which the balance of payments is to be estimated, and the subsidiary problem as to the relative weight to be attached to more distant deficits as contrasted with immediate ones. In practice, the degree of error in balance-of-payments estimates increases so rapidly as one gazes further and further into the future that the errors for periods beyond one year are likely to be so large as to preclude the use of such estimates in the calculation of a reserve ratio. This is not to say that the monetary authorities should not endeavor to determine whether factors expected to produce a deficit in the coming year are likely to continue beyond that period if counteraction is not taken. Obviously the authorities would be negligent if they failed to make such an analysis. This is quite different from making an exact quantitative computation, however.

The size of the "critical minimum" reserve would have to be determined on the basis of past experiences with respect to the frequency and duration of balance-of-payments deficits and on the degree of precision with which they are susceptible to prediction. In countries where the instruments of monetary and exchange control in the hands of the authorities are effective, the reserve ratio could safely be much lower than in contrary cases, because an anticipated deficit could be

reduced or perhaps even avoided by the adoption of prompt measures. Indeed, the chief value of this sort of reserve ratio is precisely that it requires the monetary authorities to look forward rather than backwards and focuses their attention on a potentially dangerous situation which may be avoidable if the proper policies are pursued. Nevertheless, notwithstanding this feature, this type of reserve ratio has very definite limitations as a mechanical guide to the adequacy of reserves.

Some concluding comments on central bank reserve ratios of all types

The question may now be raised as to whether reserve ratios of any type yet devised, or likely to be devised, can serve a sufficiently useful purpose in any country to justify their inclusion in central banking legislation. Would it not be better to dispense with such ratios entirely, insofar as statutory provisions are concerned?

This is a subject on which there are many different shades of opinion. It is only fair to state that some experts in the field of money and banking would disagree with a good deal of what has been said up to now and what will be said in these concluding paragraphs. The author wishes to emphasize, therefore, that the following remarks, like those which have preceded them, are merely his personal views on a subject which has interested him for several years.

The argument is sometimes advanced that a reserve requirement, or a formal "warning signal" does, after all, strengthen the position of a central bank in resisting unreasonable demands of the government for credit. If the central bank insists that a granting of the government's request would lead to a decline in the international reserve

ratio to below the "safe" minimum specified in the Central Bank Act, the government may be deterred from pressing the bank too hard, so the argument goes. The validity of this defense is highly questionable nowadays, one would think. Governments have become more sophisticated and are not as awed by such rules as they were formerly. Governments have in practice insisted on expanding the money supply even when this has forced a reduction or suspension of the reserve requirements.

If the central bank were to explain to the government the consequences of unsound fiscal policies on the level of prices, on the allocation of resources into channels of consumption, investment and exportation, and on the competitive position of domestic producers in the home market and abroad, the results might be far more effective than those which would follow from resort to the fetishism of the "minimum statutory reserve". History has demonstrated that governments will seldom abandon inflationary policies because of such artificial restraints as legal reserve requirements or statutory standards of the adequacy of reserves. What is likely to happen is that a battle will be waged between the central bank and the Ministry of Finance over an artificial issue rather than over the real issue, which is the effect of the proposed government expenditures on investment, consumption, and foreign trade. Moreover, if the central bank endeavors to use the reserve requirements as a principal line of defense rather than clearly stating the real issue and placing the ultimate responsibility squarely on the shoulders of the government, hostility between the government and the central bank is likely to reach a point

which will considerably diminish the government's willingness to accept constructive advice from the central bank in the future.

There are times when credit expansion is fully justifiable even though it leads to a temporary decline in reserves to a level near or below the legal minimum. If the public has been led to believe that a "reserve deficiency" is a genuine cause for alarm, the use of reserves beyond a certain point close to the legal minimum may provoke a flight of capital. The greater the degree of emphasis which the central bank has placed on the sanctity of the legal reserve ratio at times when it has been confronted by undesirable requests for accommodation, the more difficult it is to prevent immobilization of reserves at other times when their use would be perfectly reasonable. Accordingly, reliance on statutory reserve provisions as a psychological weapon has little to commend itself.

It is the view of this author that the inclusion of reserve ratios of any type in central banking legislation is more likely, on balance, to impede than to aid the formulation and implementation of appropriate central banking policies. He concurs with an observation which E. A. Goldenweiser has made on the general subject of automatic devices for monetary policy:

"... most over-all policies have a rather better chance of functioning satisfactorily if they are based on the best available judgment applied to existing and known current conditions. After all, what the advocates of automatic devices propose is the substitution of their own a priori judgment--unencumbered by responsibility and in advance of the event--for the judgment of responsible policy

makers confronted by the event, presumably in possession of all known facts about it, and willing and able to take appropriate action. Looked at in this way, the proposals lose much of their allurements; they almost fall in the class with attempts to achieve perpetual motion or to discover the philosopher's stone. Energy and ingenuity are better spent in devising means for securing and implementing better judgment in policy makers than in inventing ways to make it unnecessary." 1/

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1/ E. A. Goldenweiser, American Monetary Policy (New York, 1951), p. 77.



Table I - GOLD AND FOREIGN EXCHANGE RESERVE REQUIREMENTS OF CENTRAL BANKS\*

Country	Liabilities against which gold or foreign exchange reserves are required	Reserve requirements (Per cent)		Status of reserve requirements and qualifying provisions
		In gold	In gold and/or foreign exchange	
Argentina	Notes and other demand liabilities	20	25	Suspended since October 1949. (In the 1949 Banking Act, the Central Bank became a dependency of the Minister of Finance). Only net foreign exchange holdings may be included, and not more than one-tenth of required reserves may consist of inconvertible exchange. Deposits held by member banks for account of Central Bank are not included as liabilities in computing Central Bank's reserve requirements.
Australia	—	(1)	(1)	
Austria	—	(1)	(1)	
Belgium	Notes and demand liabilities	30	40	Suspended by Government in Exile on May 1, 1944; suspension confirmed by Regent in decree of January 24, 1945.
Bolivia	Notes and demand deposits of Issue Department	—	50	In effect. Required reserves may consist of gold and of deposits abroad freely convertible into gold or other currencies. Reserve requirement may be lowered upon authorization of the Finance Minister to 25 per cent when the value of exports falls to certain specified levels in relation to earlier periods.
Brazil	Notes	—	25	In effect. The power of note issue is vested in the Treasury and must be guaranteed by Government holdings of gold and foreign exchange equal to 25 per cent of the note issue. At present the Government's gold and net foreign exchange holdings held in custody account by the Bank of Brazil serve as the reserve against note issue.
Canada	—	(1)	(1)	
Ceylon	—	(1)	(1)	
Chile	Notes in excess of fiduciary issues, and deposits	—	50	Suspended since February 15, 1941. Reserves may consist of gold and net deposits payable in gold in New York or London.
Colombia	Notes and Demand deposits	—	25	In effect. By Law No. 756 of April 5, 1951, reserve requirement against notes was reduced from 30 to 25 per cent, but the reserve requirement against demand deposits was increased from 12-1/2 to 15 per cent. Required reserves may consist of gold (including gold contribution to the International Monetary Fund) and deposits abroad.

Country	Liabilities against which gold or foreign exchange reserves are required	Reserve requirements (Per cent)	In gold	In gold and/or foreign exchange
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Status of reserve requirements  
and qualifying provisions

Costa Rica	---	(1)	(1)	(1)	In effect. Required reserves may consist of gold and foreign exchange freely convertible into gold. In addition, reserves may include the country's net credit balance with the International Monetary Fund and obligations of the Currency Stabilization Fund secured 100 per cent in gold or foreign exchange. Gold must represent not less than 2/3 of the required reserve.
Cuba	Notes and deposits	---	25	25	Suspended for consecutive one-year periods since 1940. Gold held abroad is limited to 5 per cent of note issue. Foreign exchange held as reserve must be net and in form of non-interest-bearing demand deposits in central banks.
Denmark	Notes	20	25	25	In effect. Gold deposited at home or abroad must form at least 25 per cent of the reserves. In addition to gold and net foreign exchange, reserves may include foreign government securities and net credit balance with the International Monetary Fund. Net reserves are computed by deducting foreign exchange obligations of Bank on a graduated basis according to their maturity. The "prudential minimum" international reserve of the banking system (Central Bank plus commercial banks) is defined by law to be an amount equal to the sum of 60 per cent of the increase in the money supply over its lowest level during the preceding six years plus 30 per cent of average annual imports of the preceding thirty-six months. Whenever reserves fall below the "prudential minimum", or whenever they have declined by more than 25 per cent within a twelve-month period, the bank must cease expanding its loans and investments, except in cases of great emergency, and must use its powers to prevent an excessive drain of reserves.
Dominican Republic	Notes and other demand liabilities	12-1/2	50	50	Although no specified minimum reserve requirement exists, the Ecuadoran legislation provides for three distinct reserve ratios designed to serve as a general guide to the adequacy of reserves. The first ratio is that of net reserves to sales of exchange during the past 12 months. The second ratio is that of net reserves to the money supply (currency and checking deposits). In both instances a "critical" level of reserves is considered to have been reached whenever the ratio of net reserves to sales of exchange or to money supply falls below 40 per cent. The third ratio relates reserves to the magnitude of prospective deficits in the balance of payments whenever reserves fall below 300 per cent of any anticipated deficit in the balance of payments for the current year a critical level has been reached. Whenever reserves are at a "critical" level by any one of these three criteria, the Bank must prepare a report to the Government, recommending appropriate action, and must also consult the International Monetary Fund.
Ecuador	---	(1)	(1)	(1)	The Law of April 5, 1951 converting the National Bank into a central bank provides for a 100 per cent note cover in gold, foreign securities, foreign exchange convertible into gold and Egyptian Government securities against any increase in note issue after April 5, 1951. The composition of these reserves will be fixed by the Minister of Finance in agreement with the Bank and the Council of Ministers. Under the law, the requirement could be fulfilled exclusively by Egyptian Government securities.
Egypt	---	(1)	(1)	(1)	

Status of reserve requirements  
and qualifying provisions

Country	Liabilities against which gold or for- eign exchange re- serves are required	Reserve requirements (Per cent)		Status of reserve requirements and qualifying provisions
		In gold	In gold and/or foreign exchange	
El Salvador	Notes and other demand liabilities	--	25	In effect. Reserves may consist of unnumbered gold and net foreign exchange. If reserves fall below 30 per cent, Bank's discount and loan rates must be raised by 1/2 per cent for each percentage point by which reserves fall below 30 per cent.
Ethiopia	Notes	--	30	In effect. In addition to gold and foreign exchange, reserves may include silver and also prime foreign securities readily convertible into foreign exchange.
Finland	--	(1)	(1)	
France	Notes and other demand liabilities	35	--	Suspended since September 1, 1939.
Germany	--	(1)	(1)	
Greece	Notes and other demand liabilities, minus holdings of national silver coin up to 150,000,000 drachmas.	--	40	Suspended since April 25, 1932. Required reserves may consist of gold and net foreign exchange, and certain gold bonds of the Greek Government up to 650 million drachmas.
Guatemala	--	(1)	(1)	Although no specified minimum reserve requirement exists, the legislation establishes two special types of reserve ratio to serve as an index of the adequacy of reserves. Specifically, a critical level of reserves is considered to have been reached whenever the ratio of net reserves to average annual sales of exchange during the three preceding years has fallen to 40 per cent or whenever there is a persistent decline in net reserves at a rate greater than 25 per cent annual which is not attributable to seasonal or transitory factors. Net reserves are computed by deducting foreign exchange obligations of Bank on a graduated basis according to their maturity. Whenever the reserve situation is critical by either of these two criteria, the Government, at the request of the Bank, may put into force a special system of exchange controls which is held in reserve for such occasions. So far, this system has not been used.
Haiti	Notes up to 20 million gourdes	--	33-1/3	In effect. United States dollars are only foreign exchange which may be included in required reserves.
	Notes in excess of 20 million gourdes		100	
Honduras	--	(1)	(1)	
Iceland	Notes	28-1/8	37-1/2	Suspended.

Status of reserve requirements  
and qualifying provisions

Country	Liabilities against which gold or foreign exchange reserves are required	Reserve requirements		Status of reserve requirements and qualifying provisions
		In gold	(Per cent) In gold and/or foreign exchange	
India	Notes	—	40	In effect. A minimum gold reserve of 400 million rupees must be held, and at least 65 per cent of the total gold reserves must be kept at home. Foreign exchange is limited to claims payable in the currencies of foreign countries which are members of the International Monetary Fund and may include foreign government securities maturing within five years.
Iran	Notes	60	100	Partly in effect. Notes up to 3.5 billion rials must be secured 60 per cent by gold and crown jewels. Notes in excess of this amount must be secured at least 60 per cent in gold. The balance must be secured by either gold or foreign exchange freely convertible into gold. Since August 1951, the Bank has been authorized temporarily to use for other purposes the foreign exchange which it held in partial fulfillment of the reserve requirement.
Iraq	Notes	—	70	In effect since July 1949.
Ireland (Eire)	Notes	—	100	In effect. Reserves may consist of gold, British currency, sterling deposits in the United Kingdom and British Government securities.
Israel	Notes	—	50	Suspended by amendment of June 19, 1949 which authorizes use of Government Land Bonds as reserves in lieu of foreign exchange.
Italy	Notes and other demand liabilities	—	40	Suspended since July 22, 1935.
Japan	—	(1)	(1)	
Korea	—	(1)	(1)	
Mexico	Notes and other demand liabilities	—	25	In effect. Net gold and foreign exchange and net credit balance with International Monetary Fund must represent at least 80 per cent of required reserves; remainder may be silver.
Lebanon	Notes	—	50	In effect since May 25, 1949. A subsequent decree provides that the gold portion be gradually increased so that by the end of 1952 it must be equivalent to 30 per cent of the note circulation.
Morocco	Notes	11-1/9	33-1/3	Suspended de facto since 1941.
Netherlands	—	(1)	(1)	
New Zealand	—	(1)	(1)	
Nicaragua	—	(1)	(1)	
Norway	Notes in excess of 425,000,000 kroner	100	—	Suspended since 1940.

Country	Liabilities against which gold or foreign exchange reserves are required	Reserve requirements (Per cent)		Status of reserve requirements and qualifying provisions
		In gold	In gold and/or foreign exchange	
Pakistan	Notes	--	30	In effect. Required reserves may consist of gold coin or bullion, foreign exchange, silver bullion and foreign government securities maturing within five years. At least 85 per cent of the gold and silver must be held at home.
Paraguay	--	(1)	(1)	Although no specified minimum reserve requirement exists, the legislation establishes a special type of reserve ratio as an index of the adequacy of reserves. A critical level of reserves is considered to have been reached whenever the ratio of net reserves to average annual sales of exchange during the three preceding years has fallen to 20 per cent. The Bank is then required to take unspecified remedial action. Whenever the ratio is 35 per cent or lower, the Bank is authorized to impose certain extraordinary restrictions on the sale of exchange under the existing exchange control system. Net reserves are computed by deducting foreign exchange obligations of the Bank on a graduated basis according to their maturity.
Peru	Notes and other demand liabilities	--	50	Not in effect. National silver currency may be included up to one-fifth of reserve. Foreign exchange liabilities to banks abroad are treated as deposits in computing reserve requirements.
Philippines	--	(1)	(1)	
Portugal	Notes and other demand liabilities	25	50	In effect. Reserves may consist of unencumbered gold and net foreign exchange.
South Africa	Notes and other demand liabilities	25	--	In effect. One-half of reserve must be held at home.
Spain	--	(1)	(1)	
Sweden	--	(1)	(1)	There is no gold or foreign exchange reserve requirement but the Riksdag establishes a ceiling on the note issuing authority of the Bank. The ceiling has been raised from time to time.
Switzerland	Notes	40	--	In effect.
Syria	Notes	30	--	In effect.
Thailand	--	(1)	(1)	
Turkey	--	(1)	(1)	
U.S.S.R.	--	(2)	(2)	
United Kingdom	Notes in excess of £1,450,000,000	100	--	In effect. The legislation authorizes the Bank of England to issue a fixed amount of notes not backed by reserves--the so-called "fiduciary issue"--and requires the Bank to hold reserves in

Country	Liabilities against which gold or foreign exchange reserves are required	Reserve requirements (Per cent)		Status of reserve requirements and qualifying provisions
		In gold	In gold and/or foreign exchange	

United States	Notes and deposits	25	--	In effect. Required reserves must be held in gold certificates issued by the Treasury.
Uruguay	--	(1)	(1)	Note issue is limited to sum of paid-up capital of Bank, its gold stock, holdings of silver up to 12 million pesos, and non-Government rediscount paper. The note-cover could consist exclusively of domestic assets.
Venezuela	Notes and other demand liabilities	45	50	In effect. Gold in vaults may not represent less than 50 per cent of reserves; exchange holdings not more than 10 per cent. Balance may be in gold held abroad.

\* In countries not having a true central bank, the gold and foreign exchange reserve requirements of institutions having responsibility for note issue are shown. Certain countries for which information is lacking or whose banking systems are in process of transition are not included.

1/ No minimum reserve requirement in gold or foreign exchange.  
2/ In the U.S.S.R., central bank reserve requirements have no role. The banking systems of the European satellites of the U.S.S.R. are in process of transition to the Soviet type of banking system and for this reason are not included in this table.