The Need for Monetary Reserves

This article will address itself to the question whether it is possible to find any objective criteria for the need of monetary reserves, either for individual countries or for the world at large.

Although questions of terminology are uninteresting to some readers, I find it worth while to explain first why I speak of the "need for monetary reserves" and not, as so many others, of the "demand for international liquidity".

Liquidity Is More Than Reserves

It is not easy to have a clear idea of what is meant by international liquidity or liquidity of the international payments system. Most people seem to mean by it the liquidity of all national monetary authorities taken together, although this leaves the important question of the distribution of a given total among the individual countries out of consideration.

By liquidity of a monetary authority one means its capacity to make payments to other countries if its foreign receipts were to drop or stop. For such payments, that is, to cover a deficit in foreign payments, it can use its own reserves or outside finance. The latter consists of borrowing facilities (including "drawing rights") and facilities to liquidate assets other than monetary reserves.

Measurements of outside-financing facilities are not quite meaningful. Both the liquidity of assets (other than the perfectly liquid assets counted as monetary reserve) and the availability of credit for any one country depend on the simultaneous demand for liquid funds by others. For example, while every one of many central banks may have potential borrowing power of a certain amount if it *alone* asks for credit, it would not make sense to add these amounts as a measure of *aggregate* borrowing facilities: they would in fact not be available to all at the same time. This is different only with regard to unconditional drawing rights. They are available no matter how many countries wish to draw on the International Monetary Fund (I.M.F.) at the same time. It has, therefore,

become accepted practice to add such unconditional rights to the gross reserves of the countries.

That most statistical tables of international liquidity report *gross* reserves, rather than net reserves, is fully consistent with the principles of the gold-exchange standard. Calculating the total of *net* reserves raises hard questions, for it is not clear just what kinds of foreign liabilities should be deducted from the total reserve assets of a country. There are 1) official liabilities to official foreign creditors (such as debts of the central bank to other central banks, or Treasury securities held by foreign monetary authorities); 2) private liabilities to official foreign creditors (such as deposit liabilities of commercial banks to foreign monetary authorities; 3) official liabilities to private foreign creditors (such as Treasury notes held by foreign banks); and 4) private liabilities to private foreign creditors (such as deposit liabilities of commercial banks to foreign private banks). Should only the first kind of liabilities be dedeucted from the gross reserves of a country, or the first two, or the first and the third, or the first three, or all four? It may be worth pointing out that, by the second method of computation (that is, deducting all current liabilities to official creditors) the net reserves of the United Kingdom are minus $4,700 million and those of the United States are minus $650 million.

The practice of looking at gross reserves, rather than net reserves, if global figures are wanted, corresponds also to the practice used in statistics of the total money supply in a national economy. When one talks about the total money supply, or stock of money, in any country, one does not deduct from anybody's cash balances his current liabilities to anybody, official or private. The total stock of money is equal to the sum of the cash holdings of all individual and corporate persons in the economy.

One may, however, point to another analogy in national statistics, that of commercial-bank reserves. Some banking specialists prefer to make two distinctions: one between required and excess reserves, and another between borrowed and free reserves. The first distinction is quite sound, because excess reserves are a basis for measurements of the unused lending capacity of the banking system. The second distinction, however, relies on theories which I do not regard as sound, and it happens that the notion of *free* reserves of the commercial banks in a national economy is in many respects similar to the concept of net reserves in the international economy.

All these statistics — of the total money supply and aggregate commercial-bank reserves in a country, and of total official reserves in the free world — disregard the distribution of the totals among cash holders or reserve holders. This is a serious limitation. Since the propensities to spend, lend, and invest differ among the holders of cash balances and among the holders of reserves, the same total may mean very different rates of spending, lending, and investing, depending on its distribution. A redistribution from more liquid to less liquid holders of cash or of reserves would quickly increase aggregate spending and, hence, the velocity of circulation of the money supply or of the total of reserves. No one, to my knowledge, has shown how to present statistics giving totals with some index of their distribution. But for certain simplified and accelerated trains of reasoning one may neglect the problem of distribution and confine oneself to totals.

It has become fashionable to speak condescendingly, if not contemptuously, of the quantity of money and of the total of international reserves. A group of monetary theorists have decreed that liquidity in the national economy comprises more than money (and even more than "money plus quasi-money"), and that liquidity in the international economy comprises more than official reserves. This is correct, but not very helpful if we have no statistical data measuring the "supplementary liquidity". We lack such data both for national and for international liquidity.

On the level of international financial statistics we have one set of data which we can add to those of total reserves: the unconditional drawing rights provided by the I.M.F. Any other borrowing facilities and liquidating facilities have to be left aside. Under these circumstances we decide to remain old-fashioned and to stick with those parts of liquidity that are definite and measurable, that is, official gross reserves plus unconditional drawing rights.

Need Is Not the Same As Demand

It may be a little tedious if I point here to the popular confusion among three words: need, desire, and demand. I have done it before, but find it important enough to repeat (1).

(1) Fritz Machlup, *International Payments, Debts, and Gold* (New York: Scribner's, 1964) or *International Monetary Economics* (London: Allen and Unwin, 1966), Chapter 13.

Demand implies an offer of something in exchange for the object demanded; hence, it involves an exchange ratio or price; it states the quantities of the object that are demanded at various prices.

Desire is a psychological concept indicating a feeling, usually connected with an anticipation or imagination of its satisfaction; it implies neither a willingness to offer anything in exchange for the object desired nor a specification of any consequences of its nonfulfillment.

Need implies that certain, usually undesirable, consequences will arise if the needed object is not obtained in due time. In case of a personal need, the object may also be desired; this is not always so, for example, if the person does not know his need; if a person has a need and desire for an object and has possessions he could give up, he will also demand the object. But need does not always refer to persons, and may therefore be unrelated to demand or desire. It may be an objective statement of the consequences to be expected if what is "needed" does not actually occur. That a plant needs water and sunshine means that it will wilt without them; a sailboat needs wind if it is to move without any other force; a child needs vitamins in order to stay healthy and avoid rickets. A growing economy needs an increase in the stock of money if a decline in the level of wage rates and prices or a decline in the rate of employment are to be avoided.

The last example is of an objectively stated need of an economy: it specifies the consequences of a failure to provide an increase in money supply when the labor force increases. It is in precisely this sense that one may speak of the need for additions to total reserves of the monetary authorities in the countries that form the international economy (in the non-communist world).

Just what these consequences are, why they would occur, and on what grounds they are regarded as "bad" and "to be avoided", these are questions which this paper will attempt to answer.

Alternative Quantitative Measures

We shall not propose our answers before examining some of the answers that have been advanced by others. Strictly speaking, most of them have not been explicit. For example, when certain groups of experts offered a quantitative measure of "world liquidity"

by compiling statistics of official reserves and of world trade and then computing the ratios of reserves to trade for a long series of years, they did not really say that a particular ratio of reserves to trade was "needed". They did not indicate what would happen if it fell below any particular level, nor why anything should happen in this case, nor why it ought to be avoided.

Some of these thoughts, however, are implied. It would make no sense to compute these ratios if one did not assume that they mattered. In other words, those who directed or executed the research ascertaining these ratios must have had a hypothesis or theory in mind. The researchers did not, after all, look into the ratios of reserves to total ton-miles of freight shipments, to the total amount of rainfall in the country, or to the total number of windows in the central-bank building. When they selected foreign trade as a relevant denominator they must have seen a connection between foreign reserves and foreign trade. The theory of this connection will have to be formulated and examined.

Ratios of reserves to several other magnitudes have sometimes been considered. Some have been discussed in the literature, others suggest themselves as improvements of those discussed. In each case the ratios may be regarded either as relevant for individual countries (as terms in "behavior equations" indicating the decisions of the authorities) or as relevant for a group of countries representing a large part of world trade (as terms in some "aggregative equations" in a causally interrelated system).

We shall look into the relations between official reserves and 1) imports, 2) seasonal and cyclical variations in foreign trade, 3) imports and capital outflows, 4) past deficits in the balance of payments, 5) domestic money supply and domestic money plus quasi-money, and 6) current domestic or total liabilities of the central bank or current foreign liabilities of the entire banking system.

To the extent that data are available, we shall present them for the 14 "industrialized countries" listed in *International Financial Statistics* (*I.F.S.*), published monthly by the I.M.F. The 14 countries are those commonly called the Group of Ten, plus Australia, Austria, Ireland, and Switzerland. Each statistical presentation will be accompanied by a critical discussion of the underlying theory. Where no adequate statistical data are available, we shall confine ourselves to brief theoretical observations.

Reserves in Relation to Imports

The theory of the relevance of the ratio of foreign reserves to imports rests chiefly on the analogy with the theory of the demand for cash balances on the part of the individual household. The money transactions of the household which determine its "transactions demand" for cash balances are its income and what it purchases with it (hence, its real income). These purchases are the "imports" of the household. By analogy, the imports of the nation are supposed to determine its "demand" for foreign balances to pay for them. The two conceptual jumps from demand to need and from household to nation have often been thoughtlessly accepted.

If a household is said to hold enough cash to pay for, say, four months' purchases, the ratio of its average cash balance to annual purchases is one-third, or 33 1/3 per cent. There is nothing wrong in expressing the ratios of a nation's foreign reserves to its annual imports in the same way: a ratio of 50 per cent pays for six months imports, 33 1/3 per cent for four months, 25 per cent for three months, 12 1/2 per cent for 6 weeks. To describe the size of the foreign reserve in this way is one thing; it is another, however, to explain it or to attribute to it any particular consequences.

In the Appendix, Table A-I presents the relevant statistical series for 1949 to 1965 for the 14 industrial countries (to the extent that they are given in *I.F.S.*). It shows the size of official reserves at the end of each year. These may be accepted in lieu of the unavailable averages for each year. (I have compared some end-of-year figures with the averages of the end-of-quarter figures in years for which the latter were available; I found the differences insignificant, which indicates that the substitution of end-of-year figures is not too unreasonable. I might have taken averages of the reserves at the beginning and the end of each year, but have not considered this exercise worth its cost.) The table shows, secondly, the annual imports for each year. Both the reserves and the imports are given in US dollars. The third column gives the ratio of reserves to imports.

A selection of a few of the data of Table A-I and computations made with the data for recent years will facilitate comparisons. Table 1 shows for each of the 14 countries first the highest ratio, in any year between 1949 and 1965, of its reserves to imports, then

the lowest ratio in the same period, and finally the average ratio of reserves to imports during the five-year period 1961-1965.

TABLE 1

RATIOS OF RESERVES TO IMPORTS IN 14 INDUSTRIAL COUNTRIES: Highest and Lowest Ratios from 1949 to 1965 and Mean Ratios for 1961-1965

	Highest Ratio		Lowest Ratio		Mean Ratio	
	Year	%	Year	%	Years	%
Australia	*1953*	92.6	*1960*	33.8	*1961-65*	55.8
Austria	*1963*	73.4	*1949*	15.5	»	66.6
Belgium-Luxembourg	*1949*	54.2	*1957*	33.3	»	38.3
Canada	*1950*	59.0	*1957*	31.1	»	37.8
France	*1965*	61.3	*1957*	10.5	»	57.0
Germany [a]	*1958*	77.6	*1950*	7.0	»	55.4
Ireland	*1950*	87.7	*1965*	39.4	»	45.3
Italy [b]	*1959*	90.7	*1952*	29.8	»	58.7
Japan [c]	*1952*	54.3	*1957*	19.3	»	29.4
The Netherlands	*1953*	51.9	*1951*	21.7	»	35.2
Sweden	*1953*	35.3	*1960*	18.2	»	24.1
Switzerland	*1949*	191.8	*1964*	86.5	»	93.2
United Kingdom	*1950*	46.8	*1964*	15.0	»	22.1
United States	*1949*	345.0	*1965*	66.6	»	90.6

[a] Data for imports in 1949 not available.
[b] Data for reserves in 1949 not available.
[c] Data for reserves in 1949, 1950, and 1951 not available.

The highest ratio of reserves to imports, in all 14 countries during the 17 years under observation, was that of the United States in 1949 — that is, before its long series of deficits began. The ratio was 345 per cent, which is enough to pay for almost 3 1/2 years of imports. The lowest ratio shown in the table is that of Germany in 1950; it was 7 per cent, which would have paid for only 26 days of imports. The second-lowest ratio is that for France in 1957, which was 10.5 per cent, or imports for 37 days.

Looking at the averages for 1961-1965, we see that Switzerland leads in the size of reserves relative to imports, with a ratio of 93.2 per cent, followed by the United States with a ratio of 90.6 per cent. The lowest ratio is that for the United Kingdom, 22.1 per cent, and next to it Sweden with 24.1 per cent. From Table A-I one can

see a further decline in the ratio maintained by the United Kingdom: in 1965 it was down to 18.6 per cent, or imports for 68 days.

England was not alone in the decline of its ratio of reserves to imports. Indeed, 12 of the 14 countries included in the survey "suffered" such a decline from 1961 to 1965, Austria and France being the only exceptions. This is shown in Table 2, which gives the ratios of reserves to imports for 1957, 1961 and 1965. The year 1957 is included in order to add another base year beside 1961. While in twelve countries the ratios were lower in 1965 than 1961, these ratios were above those of 1957 in eight countries. Consistent declines from 1957 to 1961 and to 1965 were registered only by Germany and the United States, which for Germany was entirely, and for the United States partly, due to large increases in imports.

TABLE 2

RATIOS OF RESERVES TO IMPORTS IN 14 INDUSTRIAL COUNTRIES:
for Selected Years, 1957, 1961, and 1965

	1957 %	1961 %	1965 %
Australia	68.9	56.3	42.0
Austria	46.4	56.9	62.4
Belgium-Luxembourg	33.3	42.9	34.8
Canada	31.1	36.7	34.7
France	10.5	56.9	61.3
Germany	68.9	65.4	42.5
Ireland	57.4	46.9	39.4
Italy	36.9	72.7	60.1
Japan	19.3	28.7	26.3
The Netherlands	24.6	38.5	32.4
Sweden	20.7	25.1	22.2
Switzerland	96.6	101.9	87.8
United Kingdom	21.0	27.0	18.6
United States	169.9	116.7	66.6

The computation of averages for all 14 countries together involves the problem of weighting. The different sizes of the countries obviously call for weighting, but the weights can be either by size of reserves or by size of imports. (The latter measure is identical

with the ratio of aggregate reserves to aggregate imports.) Moreover, since the reserve-currency countries present special problems, one may prefer to see separately the averages for the twelve countries exclusive of the United States and the United Kingdom. The results of these four computations for the five-year period 1961-1965 are shown in Table 3, which for the sake of simplicity omits the details of computing the weights. That the figures are higher for the 14 than for only 12 countries is due to the high ratio and large weights of the United States. That the ratios are higher if weighted by imports than if weighted by reserves is due to the fact that some countries with large shares in aggregate reserves have relatively low ratios of reserves to imports.

TABLE 3

AVERAGE RATIOS OF RESERVES TO IMPORTS, 1961-1965,
for 12 and 14 Countries, Weighted by Size of Reserves and by Size of Imports

Average Ratio of Reserves to Imports	for 14 countries	for 12 countries
Weighted by size of reserves	53.6%	48.5%
Weighted by size of imports	62.4%	53.7%

Is there any real significance in the ratios? If there is, I do not know any theory that would show and explain it. We might have taken different periods and would have obtained different average ratios, but I could not seriously propose any other numerical data with which the ratios or their changes might be meaningfully correlated or causally associated.

Looking again at Tables 1 and 2, especially at the ratios for individual countries in various years, we wonder whether one can detect any reasons why some countries should "need" reserves of 50 and more per cent of their imports, while others can do with 30 to 35 per cent, and again others with less than 25 per cent. We know no such reasons. One can perhaps explain why ratios of less than 20 per cent are regarded as "dangerously low", but the reasons are more likely related to the possibility of *variations* in receipts and expenditures than to the *length of time* imports could be paid for if all receipts were stopped suddenly.

There have been some "amateur theories" linking reserves with imports, or rather with total foreign trade, by means of the conception of a need to "finance" trade. This is a naïve fallacy, for it confuses money, commercial-bank reserves, central-bank reserves, and the demand for credit. A trader (importer, exporter) who wants "finance" wants credit because his working capital is not adequate to tide him over the intervals between due dates of his payments and receipts. This has nothing to do with official reserves of either any individual country or all countries taken together.

Another theory links the size of imports with the probability of deficits in the balance of payments and the function of official reserves to finance such deficits. This theory will be discussed in another section dealing with the magnitudes of past deficits and the probabilities of future deficits. To associate the size of probable deficits with the volume of imports is to make several untenable assumptions. The most notable ones are 1) that significant changes in the net demand for foreign exchange depend on imports only and not at all on exports, capital movements, and unilateral payments; and 2) that the size of probable deficits would vary directly with the total value of imports.

We shall not go into details, but emphasize only one point. The assumption that clearing balances are likely to increase in direct proportion with total transactions is contrary to all experience. It has been shown that firms can do with relatively smaller cash balances when their total transactions increase. Assuming, though not admitting, that total international transactions are perfectly correlated with imports — so that one could safely disregard all transactions other than payments for imports — one may not disregard the fact that the magnitudes of probable deficits will rise absolutely but fall relatively with increasing imports. On these grounds one could expect declining ratios of "needed" or "wanted" reserves to total imports.

With some imagination one may conceive of a reason for holding, nevertheless, reserves in an undiminished ratio to imports: one might hold that the increase in world trade is a result of liberalized commercial policies and that exports, therefore, are more vulnerable to relapses into illiberal attitudes, which would justify reckoning with a greater risk of deficits. The fall in the need for reserves for "transactions purposes" would be offset by a rise in the desire for reserves to satisfy "precautionary" considerations.

All this, I submit, is far from reasonable. As I see it, there is neither theoretical nor statistical support for attaching any real significance to the ratio of reserves to imports.

Reserves in Relation to Variations of the Trade Balance

In the previous section we mentioned that one might find a more plausible relation between the need for official reserves and *variations*, seasonal or cyclical, in the balance of trade. For example, if imports are evenly distributed over the year whereas exports are chiefly of a crop commodity and are bunched in the autumn, there will be trade deficits in three quarters of the year and a surplus in one. The ratio of reserves to foreign trade might in this case — if only in specific circumstances — be higher than if both exports and imports were evenly distributed over the year. Likewise if exports and imports are of very different sensitiveness to business fluctuations, one may expect cyclical variations in the trade balance, which could result in periodic accumulations and decumulations of reserves and a higher ratio of average reserves to trade than if exports and imports varied concurrently and equally.

However, movements of private capital could easily counteract any effects which such variations in the trade balance would have upon official operations in foreign exchange. Indeed, in the absence of governmental restrictions, hedging and speculation would operate to eliminate the expected succession of excess demand and excess supply in the market for foreign exchange. The net effects on official reserves would be nil.

In any case, in large industrial countries there is no indication of significant variations of this kind. They may play a role in developing countries with foreign-exchange controls, but precisely there, with the chronic and latent excess demand for foreign exchange, large accumulations of reserves are rare.

If there were any detectable effects of variations on the ratio of reserves to foreign trade, they would probably refer to comparisons among different countries rather than to the ratios of aggregates in the world at large. The whole theory, however, has not looked sufficiently promising to invite statistical tests. If any one is diligent enough to try, he will, I anticipate, find no confirmation of the theory.

Reserves in Relation to Imports and Capital Outflows

The theory that the need for foreign reserves is determined by the amounts paid for imports was rejected partly because it singled out one particular category of transactions and neglected all others. Just as the transactions of a household include payments for securities besides payments for consumer goods, the foreign transactions of a nation include capital outflow besides imports and commodities. Why not take all out-payments of a country into account?

That capital outflows can be of paramount significance in the payments position of a country has been well known in any number of instances of capital flight. But apart from "unusual circumstances", the last 16 years of payments deficits of the United States testify to the importance of capital movements. Practically all these deficits were due to net outflows of capital and unilateral payments abroad in excess of net proceeds from export surpluses. Thus, if reserves were needed to finance deficits in the balance of payments, it must have been the capital outflows and transfer payments that played the determining role in the deterioration of the reserve position throughout these years.

Capital transactions are probably larger than payments for merchandise if they are counted on a gross rather than net basis. Total foreign transactions in the New York money market may be several hundred times as high as the change in net positions of foreign and domestic banks from the beginning to the end of the year. Of course, it is doubtful that large cash balances or official reserves are "needed" to support these transactions. Still, if one holds the theory that reserves are needed in some proportion to transactions, it is untenable to confine oneself to payments for imports and disregard all capital transactions.

Statistical tests of this extension of the theory are impossible because we have no data on international capital transactions, at least not in the two or three countries in which such transactions are likely to be a multiple of imports. I refer to the United States, Switzerland, and perhaps Germany. The reports collected for statistical purposes in the United States are all on the basis of net positions at a few dates per year, not on day-to-day transactions. One cannot infer the volume of transactions from changes in net positions at dates as far apart as a month or even a quarter of a year.

We need not be particularly disturbed by the absence of statistical tests of a theory as weak as the one discussed. Imagine we had all the data required for the computation of ratios of reserves to the sum of imports and gross outflows on capital account. The results of such computations would probably show us ratios varying both from country to country and for each country from year to year. We would still lack any quantitative measure of the "need" for reserves in any meaningful sense.

Reserves in Relation to Past Deficits

A much more plausible theory is derived from the "most rational" assumption about the function of official reserves. This rational assumption — which, however, may be neither realistic nor relevant — takes it for granted that reserves have only one purpose: to be ready in a contingency. There is no other fully rational use.

The contingency in question is a deficit in the balance of payments. If reserves are held so that a country may be able to finance a payments deficit and not be compelled to take unpopular measures — such, as devaluation, deflation, or direct controls — it follows that the reserves have to be in some proportion to the size and duration of a potential deficit.

Here, then, is a theory of the need for reserves that satisfies the requirements specified earlier in this paper. It states the consequences to be expected from a lack or inadequacy of reserves, to wit, devaluation, deflation, or direct controls. The theory can explain how these consequences arise if reserves are lacking, and why they are regarded as "bad" and to be avoided if possible. And it may also help obtain an idea about the magnitude of the possible loss of reserves for which the authorities of a country think they ought to be prepared.

Contingencies are usually estimated on the basis of experience. In order to make a realistic estimate of a loss of reserves that may occur in the future, it is a reasonable procedure to take a look at the past. For certain kinds of contingency, to be sure, such a procedure would be unreasonable: I cannot judge from my largest damage or injury in a fire or accident in the past for what damages or injuries in the future I ought to prepare; still less can I conclude from the fact that I have never died before that I may safely dis-

regard the probability of my death in the future. For contingencies of this sort we must pool large numbers of people and calculate the actuarial probabilities. On the other hand, for such things as seasonal fluctuations, cyclical swings, and even irregular contingencies in the economic life of a nation, it is quite appropriate to look into its past experience for some indication of what one ought to be prepared for in the future.

I propose to examine the reserve-loss experience of our 14 industrial countries. For this purpose I have prepared statistical data for the three largest reserve losses which each of these countries has sustained between 1949 and 1965. These losses are then compared with the official reserves at three points of time, (a) at the peak before the deficit began, (b) at the trough reached when the deficit ended, and (c) at the end of 1965. Quarterly data are used and the duration of the deficit is defined as the interval from a peak in reserve holdings to the nearest trough that is not followed by another trough within one year. For example, if a country loses reserves for nine quarters in a row, then gains reserves for half a year (two quarters) but subsequently continues to lose reserves for another year (four quarters), reaching another low (which remains the low point for more than a year), the period of the deficit is measured to the second low point, that is, 15 quarters in all, and the total loss is measured by the difference between the reserve holdings at the beginning and at the end of the entire period extending over 15 quarters.

These data are presented in the Appendix in Table A-II. More detailed descriptions are supplied in the footnotes to the table. A short digest of the relation between each country's reserves at the end of 1965 to its largest reserve loss suffered since 1949 is furnished here in Table 4 for the convenience of the reader. The countries are arranged, not as before in alphabetic order, but in ascending order of the ratios. These ratios, incidentally, are not contained in Table A-II explicitly but only in the form of their reciprocals. It seems more appropriate there to show the proportion of the reserve losses to the reserves; after all, to say that a nation during a certain period lost one-half of its reserves sounds more plausible than to say that its reserves had been twice the loss suffered. In Table 4, however, which shows only the reserve holdings at the end of 1965, it is unobjectionable to state the ratios of reserves to the largest losses

sustained. This way of expressing the relationship allows us to be consistent with our Tables 1, 2, and 3, and also with several more tables to follow.

TABLE 4

RATIOS OF RESERVES HELD IN 1965 BY 14 INDUSTRIAL COUNTRIES TO THEIR LARGEST CUMULATIVE LOSS OF RESERVES BETWEEN 1949 AND 1965

United Kingdom	142 per cent
Australia	165 »
United States	255 »
Japan	417 »
Ireland	427 »
Germany	452 »
The Netherlands	473 »
France	477 »
Italy	506 »
Canada	660 »
Belgium-Luxembourg	922 »
Switzerland	981 »
Sweden	1262 »
Austria	1441 »

It is interesting to note that the two reserve-currency countries are among the three lowest reserve holders of the 14 industrial countries. The reserves held by the United Kingdom at the end of 1965 were only 142 per cent of the largest reserves loss that the country had sustained. The reserves held by the United States at the end of 1965 were 255 per cent of its largest reserve loss, but this will surely turn out to be a serious overstatement since the loss period had not ended in 1965 and reserves have continued to fall. Thus, the reserve-currency countries are poorly prepared for future deficits and, if their current official liabilities are taken into account — leaving at least the United Kingdom with negative net reserves — they can hardly be said to be prepared at all.

One may observe how many countries are in a middle category of preparedness for future deficits. Six of the 14 countries were holding reserves between 417 and 506 per cent of their largest past deficits. In other words, the reserves they held in December 1965 would finance deficits four or five times as large as the largest they had ever suffered. Their margin of safety is so wide that one may

assume that the authorities in charge have never appraised their position from this point of view.

This is even more so with regard to the countries with the highest ratios. Can anybody seriously contend that central banks hold reserves only for the purpose of meeting future deficits if these reserves are between 900 and 1,500 per cent of the largest deficits they have experienced? It would be ridiculous to entertain this thought. If Belgium and Switzerland are able to finance deficits nine or ten times as large as the largest in their experience, this is a leeway that cannot be consciously intended. This conclusion is well-nigh unavoidable with regard to Sweden and Austria, holding reserves 1,262 and 1,441 per cent of their largest past deficits. No central banker in his right mind would find it justifiable to carry such exorbitant over-insurance against the risk of deficits. He must have other reasons for carrying reserves in amounts he can never expect to " need " or use for their supposedly true purpose.

Reserves in Relation to Domestic Money Supply

There are other theories which may possibly explain why large reserves are held and are considered necessary. The oldest of all such theories relates reserves to the quantity of money; indeed, the phrase " reserve ratio " originally meant precisely the ratio of reserves to money, though " money " in this case meant in the first place money issued by the central bank.

In the sense of ratio of central-bank reserves to central-bank money, the reserve ratio was an outgrowth of an old banking tradition. For a long time, however, the difference between deposit liabilities and note issue was considered so crucial that in many countries the gold reserve was related to bank notes only. Where the maintenance of a minimum reserve ratio was made a legal requirement, reserves were, of course, needed — and some of the consequences of nonfulfillment of the requirement were spelled out in statutory law. As the volume of central-bank money issued increased, more reserves were needed to meet the requirement, and the managers of the bank had to gear their credit policies to the growth of reserves.

Some professors of central-banking theory, in the past more than in our time, were convinced of the economic rationale of a

" gold backing " for domestic money, particularly for central-bank money. But regardless of the particular theory held — whether a certain gold backing was deemed necessary for the maintenance of the value of money, whether a reserve in a certain ratio to the money circulation was held necessary to meet the demand for foreign remittances that was likely to rise as the quantity of money was increased, or whether certain proportions kept in foreign liquid assets were regarded as needed to maintain a sound structure of the balance sheet — a " need " for increased reserves somehow in proportion to increased amounts of central-bank money has been taken for granted by most practitioners of central-bank management. One may regard all these theories and rules as primitive, naïve, obsolete, or what not, but nevertheless as fully effective in determining the monetary policies of many countries. This qualified acceptance of the need for reserves as actually guiding the central-bankers in their policies and as explaining the magnitudes of their official reserves must be withdrawn, however, if one sees the enormous variations in the reserve ratios from country to country. No theory indicates a need for reserves of over 90 per cent of central-bank money; yet such reserve ratios have existed in a few countries during the last 17 years.

Perhaps the limitation to central-bank money is inappropriate; most practitioners maybe have recognized, with the monetary theorists, that money issued by private financial institutions, especially by commercial banks, ought to be taken into account. They may well argue that the need for foreign reserves grows with the domestic supply of money. They could point to several theories in support of such an argument; for example, they might hold that effective demand and money incomes would rise roughly with the quantity of money in circulation, that — even with constant average propensities to import (and to invest abroad) — the volume of foreign trade (and other foreign transactions) is certain to increase, and that larger foreign reserves would be needed to finance occasional deficits in foreign payments. Let us see what the statistical data can tell us about the ratio of official reserves to the domestic money supply.

Views differ as to how inclusive the concept of money ought to be understood. Some insist that demand deposits in commercial banks are money, but time deposits are not. Others prefer to distinguish different kinds of time deposits and to include in the stock of money " certificates of deposits " and other highly liquid time deposits in commercial banks, but to exclude thrift deposits or " pass-

book savings accounts". Institutions are different in different countries, and in some of them these distinctions cannot be made. It has become customary to speak of "near money" or "quasi-money", but there is no agreement on exactly what should be included in this concept in particular countries. Are balances on current account in a postal-savings system to be regarded as money, as quasi-money, or as neither? We shall not try to provide our own answers to such questions, but simply adopt the decisions made by the statisticians of the I.M.F. for their table published in *I.F.S.* They report for most (though not all) countries two figures, one for the money supply, another for quasi-money.

In the Appendix, Table A-III, the figures for official reserves, domestic money supply, and money plus quasi-money are presented for our 14 countries (for as many years as are available from *I.F.S.*) and reserve ratios are calculated. We have thus obtained a ratio of reserves to money and a ratio of reserves to money plus quasi-money. In view of some doubtful classifications, the comparability of the ratios may be somewhat impaired, but not sufficiently to make comparisons worthless. Where classifications have not changed in the course of the years, we can at least rely on the intertemporal comparability of the figures for the same country.

Again we present a digest for the convenience of the reader. Table 5 presents the highest and lowest ratios of official reserves to money supply and to money plus quasi-money that prevailed in our 14 countries between 1949 — or the first year for which statistical data are available — and 1965.

The table conveys a picture of almost incredible diversity in time and place. Looking only at the ratio of reserves to money, we find that the lowest of the lowest ratios was 3.8 per cent (France in 1957) and the highest of the highest ratios was 114.0 per cent (Ireland in 1950). The highest of the lowest ratios was 57.2 per cent (Ireland in 1965) and the lowest of the highest was 12.8 per cent (United Kingdom in 1960). The greatest change over time in the same country occured in Germany, with a low of 10.0 per cent (in 1951) and a high of 62.3 per cent (in 1960). Consistently low ratios prevailed in the United Kingdom, with a low of 7.0 per cent (in 1964) and a high of 12.8 per cent (in 1960). France too had rather low ratios: between 1949 and 1960 there were nine years with ratios below 9 per cent (and six years with ratios of 7 per cent or less), and the highest ratio in that period was 11.6 per cent. The

TABLE 5

RATIOS OF RESERVES TO QUANTITY OF MONEY AND OF MONEY PLUS QUASI-MONEY IN 14 INDUSTRIAL COUNTRIES: Highest and Lowest Ratios between 1949 and 1965, and Mean Ratios for 1961-1965

	Ratio of Reserves to Money Supply						Ratio of Reserves to Money plus Quasi-Money					
	Highest Ratio		Lowest Ratio		Mean Ratio		Highest Ratio		Lowest Ratio		Mean Ratio	
	Year	%	Year	%	Years	%	Year	%	Year	%	Years	%
Australia	1950	50.4	1960	22.4	1961-65	37.9	1950	27.8	1960	10.8	1961-65	15.3
Austria [a]	1953	73.4	1955	41.0	»	67.8	1953	52.3	1960	24.9	»	28.7
Belgium-Luxembourg [b]	1961	38.2	1950	25.2	»	36.0	1958	32.3	1950	23.2	»	29.3
Canada	1950	47.9	1960	32.2	»	36.2	1950	23.9	1960	14.8	»	17.5
France	1965	17.6	1957	3.8	»	16.6	1965	15.8	1957	3.6	»	15.0
Germany	1960	62.3	1951	10.0	»	47.5	1957	30.3	1951	7.0	»	19.7
Ireland	1950	114.0	1965	57.2	»	61.8	1950	40.8	1965	22.3	»	23.6
Italy [a]	1959	29.3	1953	12.6	»	21.6	1959	16.8	1953	8.6	»	12.3
Japan [a]	1956	17.9	1965	7.4	»	9.5	1953	8.2	1964	2.4	»	3.1
The Netherlands [b]	1960	62.6	1951	30.1	»	53.9	1953	48.0	1951	25.3	»	38.5
Sweden	1953	32.4	1959	21.0	»	27.6	1951	9.9	1959	5.3	»	7.3
Switzerland	1949	65.6	1964	47.6	»	49.8	1949	31.6	1965	17.8	»	19.8
United Kingdom [c]	1960	12.8	1964	7.0	»	9.4	—	—	—	—	—	—
United States	1949	23.7	1965	9.1	»	10.8	1949	18.0	1965	5.0	»	6.5

[a] Earliest data for 1953. [b] Earliest data for 1950. [c] Earliest data for 1951.

large increase in reserves after 1960 did not show up in especially high reserve ratios: the high was reached in 1965 with only 17.6 per cent. Consistently high ratios prevailed in Austria, with a low of 41.0 per cent and a high of 73.4 per cent, and in Switzerland with a low of 47.6 per cent and a high of 65.6 per cent.

The arithmetic averages of the reserve ratios in the five years 1961-1965 show again substantial differences among the 14 countries. United Kingdom, Japan, and the United States had the lowest average ratios with 9.4, 9.5, and 10.8 per cent, respectively. Austria had the highest ratio, 67.8 per cent, followed by Ireland with 61.8 per cent and the Netherlands with 53.9 per cent. Then came Switzerland with 49.8 per cent and Germany with 47.5 per cent.

The ratios of reserves to money inclusive of quasi-money are, of course, lower. The differences between the two ratios are large in countries where time deposits play a large role but are not considered " money proper ". Ireland leads in this respect: the average reserve ratios for 1961-1965 were 61.8 per cent for money and 23.6 per cent for money plus quasi-money. Other countries in which the former ratio is more than twice the latter are Australia, Austria, Canada, Germany, Japan, Sweden, and Switzerland. The difference is smallest in France; it is nil in the United Kingdom, where the category of quasi-money does not exist (at least not in *I.F.S.*).

Just for the purpose of helping us to judge which ratios may be regarded as high and which as low, I computed weighted averages of the ratios of reserves to money for the whole group of 14 industrial countries and also for the twelve countries excluding the two reserve-currency countries. For the period 1961-1965, the ratios of aggregate reserves to aggregate money stocks were 26.9 per cent for the 14 countries and 35.5 per cent for the twelve countries.

The enormous differences among countries compel rejection of any theory that would assert a needed or most desired ratio of foreign reserves to the quantity of domestic money, unless the theory included some parameter that would fit the ratio to particular circumstances. I am not aware of any such theory, but could imagine one. For example the needed or most desirable amount of foreign reserves might held to be a function of a country's marginal propensity to import (goods, services, and perhaps also securities) besides the stock of domestic money. This might be explained by referring to some intervening variables, especially changes in income; if the

import propensity is high, a relatively small increase in the quantity of money might lead to a substantial increase in the demand for foreign exchange, for which the monetary authorities wish to be prepared.

I do not think that this theory holds much promise; at least I doubt that it describes the kind of reasoning that the managers of monetary policy in any of the countries in question seriously engage in. They might, however, be more impressed with their own balance sheets, and I shall turn to this possibility.

Reserves in Relation to Current Liabilities

It is in part a return to this notion, because we have previously mentioned that reserves might be considered as " needed " in relation to the amount of central-bank money outstanding. Central-bank money is largely the same as the current domestic liabilities of the central bank. Hence it is, in fact, a concern with a property of the balance sheet if liquid foreign assets (chiefly gold) are viewed in their " proper " relationship to current domestic liabilities.

The theory that it may be found desirable to maintain a certain ratio of liquid foreign assets (gold) to current domestic liabilities could be based only on one consideration: the probability that a certain portion of these liabilities may at any time be presented for conversion into foreign currency (gold). It is out of the question that the portion can ever come close to 100 per cent or even close to 50 per cent of the domestic liabilities, because the owners of these liabilities need them in their domestic business. The bank notes are needed for day-to-day transactions between households and the businesses catering to them, and deposit liabilities of the central bank are needed by commercial banks to meet legal or customary reserve requirements. At times, however, some of the holders of commercial-bank deposits may find that they have to make increasing remittances to foreign firms to pay for increased imports of goods, services, and securities from abroad, and, in the process, the commercial banks have to use some of their central-bank deposits to acquire foreign exchange (gold) from the central bank. If all commercial banks were always loaned-up, that is, without any excess reserves, and if the central bank were determined never to help them with loans, rediscounts, or open-market purchases, authorities

would be quite safe with a very small ratio of foreign reserves to current domestic liabilities. The greater the excess reserves of commercial banks and the greater the political responsibility accepted by the central bank for averting liquidity troubles on the part of commercial banks and industry, the larger have to be the foreign reserves in relation to the domestic liabilities of the central bank.

This is perhaps the most plausible of all theories thus far considered. For it not only explains a "need" for foreign reserves but also why this need is related to the size of current domestic liabilities and why the needed ratios may be very different from country to country. While one country may feel that it can do with a 10 per cent ratio, another may feel safe only with 30 per cent, another with 40 per cent. Ratios larger than this, however, can hardly be explained by this theory. What it does explain, on the other hand, is why countries will want to have their foreign reserves increase every year. Since in a growing economy the current domestic liabilities of the central bank have got to increase if declining wage and price levels are to be prevented, maintenance of the "safe" reserve ratio requires a steady increase in foreign reserves, approximately by the annual rate of economic growth.

We have thus far talked about the relation of reserves to current *domestic* liabilities only. Where all official reserves of all monetary authorities are gold, and no other "foreign assets" are held by any monetary authority, none of them could have foreign liabilities. Under the gold-exchange standard, however, where many countries hold foreign exchange among their reserve assets, the countries whose currencies are so held must have foreign liabilities. Do these countries or central banks "need" an extra reserve against their foreign liabilities? Is the probability of payment being demanded the same, or is it smaller or greater than in the case of domestic liabilities? No economic theory can be developed to answer these questions completely, because demands for conversion into gold are largely political decisions by the official claimants. Only to a small part is conversion explained by economic factors, namely, when countries that hold large portions of their foreign reserves in the form of foreign exchange develop payments deficits vis-à-vis countries that hold chiefly gold. The recipient central banks, in order to maintain their customary ratios between gold and foreign exchange, would convert their surplus holdings of exchange into gold. The probabilities of such occurrences are not easy to express in the form of numerical coefficients.

It is quite likely that the same countries have had at different times different attitudes concerning the need of foreign reserves against their foreign liabilities. In periods when foreign central banks were eager to build up their foreign-exchange reserves, the reserve-currency countries were probably quite unconcerned about demands for conversion into gold. Later, when the holders of currency reserves became apprehensive about further additions to their holdings, the issuers of these currencies became quite conscious of their inadequate preparedness to convert them into gold. In any case their holdings of gold and convertible foreign currencies will have to constitute reserves against *all* their current liabilities, foreign as well as domestic.

In order to see what ratios the major central banks have maintained over the years, I prepared again comprehensive statistics, based on the data published by *I.F.S.* Unfortunately, comparability is doubtful, probably because of different reporting practices in different countries. For the two reserve-currency countries, the United Kingdom and the United States, the data are really not usable for meaningful comparisons, particularly because of the "split personality" of their monetary authorities. The foreign reserves are held partly by the central bank, partly by agencies of the Treasury department; likewise the foreign liabilities are owed partly by the central bank, partly by the Treasury. These data will therefore be omitted and the tabulation confined to the twelve other countries. This has the additional advantage that we need not seriously concern ourselves with differences between total and domestic liabilities, since the foreign liabilities of these twelve central banks are negligible. Their total liabilities are virtually the same as their domestic liabilities.

Table 6 presents a digest, similar to those given in Tables 1, 4, and 5, of highest, lowest, and average ratios. The highest of the highest ratios of official reserves to total liabilities of the central banks of the 12 industrial, non-reserve-currency countries in the period from 1949 (or the earliest for which data are available) to 1964 is that of Switzerland with 103.1 per cent (in 1949). Next are the Netherlands with 98.9 per cent (in 1964), Canada with 88.3 per cent (in 1950), and Austria with 87.2 per cent (in 1953). The lowest of the lowest ratios is that of France with 7.1 per cent (in 1957).

Next come Germany with 10.6 per cent (in 1951) and Japan with 22.3 per cent (in 1957).

The lowest of the highest ratios is that of France with 43.1 per cent (in 1964). And the highest of the lowest ratios is that of Switzerland with 87.4 per cent (in 1964). The average ratios for the four-year period 1961-1964 range from 39.5 per cent (France) to 94.7 per cent (The Netherlands).

TABLE 6

RATIOS OF RESERVES TO LIABILITIES OF THE CENTRAL BANKS OF 12 INDUSTRIAL COUNTRIES

Highest and Lowest Ratios between 1949 and 1964, and Mean Ratios for 1961-1964

	Highest Ratio		Lowest Ratio		Mean Ratio	
	Year	%	Year	%	Years	%
Australia	*1949*	79.0	*1960*	37.5	*1961-64*	62.3
Austria [a]	*1953*	87.2	*1955*	46.9	»	73.7
Belgium-Luxembourg [b]	*1964*	64.5	*1950*	43.1	»	62.4
Canada	*1950*	88.3	*1949*	62.3	»	78.7
France	*1964*	43.1	*1957*	7.1	»	39.5
Germany [c]	*1960*	71.7	*1951*	10.6	»	63.0
Ireland [f]	—	—	—	—	—	—
Italy [d]	*1961*	72.0	*1956*	35.1	»	59.3
Japan [e]	*1952*	52.0	*1957*	22.3	»	26.3
The Netherlands [b]	*1964*	98.8	*1951*	34.0	»	94.7
Sweden	*1964*	47.1	*1949*	27.7	»	42.1
Switzerland	*1949*	103.1	*1964*	87.4	»	91.3

[a] Earliest data for 1953. [b] Earliest data for 1950. [c] Earliest data for 1951.
[d] Earliest data for 1955. [f] No data for liabilities.

As with all the previous reserve ratios, it is not possible to explain the differences in the ratios from year to year or from country to country by anything that could reasonably be called a " need for reserves ". If the Netherlands almost tripled their ratio of reserves to liabilities between 1951 to 1964, if France raised her ratios sixfold from 1957 to 1964, and if Germany's ratio in 1960 was seven times as high as in 1951, these enormous increases were the result of neither any need nor any desire for these high ratios. Indeed, at least two of these countries attempted to combat the inflow of

reserves in that they appreciated their currencies in 1962, lowering thereby both the value of the reserves accumulated and the competitiveness of their industries in foreign trade.

Inconsistent Ratios

Some countries hold *large* reserves no matter how the relative size is measured, and others hold *low* reserves on all counts. In some instances, however, the picture is confusing, showing both high and low reserve ratios depending on the magnitudes with which the size of reserves is compared. Thus, a country may at the same time have a high reserve ratio in some respects and a low reserve ratio in other respects.

Take Sweden, with her low ratio of foreign reserves to imports — 22 per cent in 1965 — and high ratio of reserves to the largest deficit in the past — 1,262 per cent. Take France, with her low ratio of reserves to domestic money — 17,6 per cent in 1965 — and a high ratio to imports — 61.3 per cent. Such indices of reserve-holding practices appear inconsistent only if they are regarded as indications of particular preferences on the part of the national monetary authorities. I shall argue that they are not. Certain " structural relations ", such as those between domestic money supply, central-bank liabilities, and imports, are very different from country to country, and the men in charge may not even have made the comparisons to judge what proportions of reserves are desirable. I seriously doubt that the size of reserves is among the major targets or goals of economic policy, except where reserves are so *dangerously low* that a false step may bring the roof down or where reserves, though respectably high, show a *decline*.

An Analogy: My Wife's Wardrobe

Not long ago, when I had concluded that reserves were not needed for any of the purposes emphasized by either theorists or practitioners, I asked myself what really might be behind the commotion about their supposed inadequacy. I hit upon an analogy which I found helpful and, since it has been given wide currency in circles of specialists, I take the liberty of quoting my own statement.

" What then are foreign reserves needed for? They are not ' needed ' at all, strictly speaking. But monetary authorities make a fuss if they do not have all that they think they ought to have. Let me explain this by comparing the typical central banker with my wife, though this might be too flattering for most central bankers. How many dresses does my wife need? One, seven, 31, or 365? You may think that one dress is all she really needs — and even this is only because of our ' culture pattern '. I assure you, however, that she thinks she needs more. Whether she wants 25 or 52 depends on her upbringing and on the Joneses with whom she wishes to keep up. Perhaps she wants to maintain a fixed ratio of dresses to the family income. If that ratio declines, she will fuss and fret, and if I were to keep her from getting additional clothes, she would impose restrictions and controls affecting my home life and our external relations with friends and acquaintances. I conclude that the right amount of clothes owned by my wife is that which keeps her from fussing and fretting and spares me the danger of unpleasant restrictions. Before I leave this analogy between women and central bankers, let me point out that ' rights ' to borrow dresses from friends or from rental agencies would not take care of the matter in the least. Most women want to own their dresses, not to borrow them. I wish that my friends at the *I.M.F.* would take full cognizance of the psychological difference between owning and borrowing.

" Central bankers look not at their clothes closets but at their balance sheets, and they like to see among their assets foreign reserves far in excess of what they would need to cover their nudities; they would like to maintain certain ratios of foreign reserves to total liabilities. The ratio may be merely a matter of tradition or of fashion or, if you will, of religious doctrine. There is no point quarreling with such normative matters. The point is that most central bankers start fussing when the reserve ratio declines. Their liabilities have got to increase year after year, because notes and deposits, the domestic money supply, must increase if deflation is to be avoided. With labor force and productive facilities increasing continuously, and money wages refusing to go down, central bankers have to provide the additional money to avoid continuous deflation and increasing unemployment. Being used to certain traditional reserve ratios, they want their foreign reserves to increase roughly in proportion with their total liabilities. Not that they need it in

any sense other than my wife needs more clothes. But if the central banks lose foreign reserves, and even if they find their reserve ratios declining, there will be demands for policies conducive to the inflow of reserves. I conclude that the ' need ' for reserves is determined by the ambitions of the monetary authorities. I submit we ought to see to it that they get foreign reserves in amounts sufficient to be happy and satisfied; in amounts, that is, that will keep them from urging or condoning policies restricting imports or capital movements " (2).

This idea has become known as " the Mrs. Machlup's Wardrobe Theory of Monetary Reserves ". I am not satisfied, however, with its first formulation and wish to propose an amendment.

A Revision: My Wife's Need for New Clothes

In the first formulation I mixed relevant with irrelevant points. Irrelevant is the emphasis upon the central bankers' ambition " to maintain certain ratios of foreign reserves to total liabilities ". Relevant is " that most central bankers start fussing when the reserve ratio declines ". Maintaining a certain reserve ratio would imply resistance to an increase as well as to a decrease. But it is only the political reaction to a *decrease* that matters.

The analogy of my wife's wardrobe was also not quite correctly phrased in that it stressed the number of dresses hanging in her clothes closets instead of the annual addition to her wardrobe. She does not really care so much whether she has 25 or 52 dresses, if only she gets a few new dresses each year. This ambition is the correct analogue of the central banker's ambition. He is not so much concerned whether his reserve ratio (to his liabilities or to the total money supply) is 47 or 74 per cent, if only his reserves increase, however modestly, and do not decrease.

With these amendments, my theory is probably correct. The " behavior equations " of my marital authority and our monetary authorities are sufficiently similar to make the analogy valid.

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(2) Fritz Machlup, " International Monetary Systems and the Free Market Economy ", in *International Payments Problems: A Symposium* (Washington: American Enterprise Institute for Public Policy Research, 1966).

Not Need But Willingness to Accept

My theory, explaining only a need for additional reserves, cannot explain the sizes of reserves actually held. Since I have rejected all theories based on a need or desire for particular magnitudes of reserves, either for individual countries or for a group of countries, the question why the reserves are as high as they are is still open.

The search for an answer is not difficult if one is prepared to discard the idea that reserves are held for a purpose. The simplest explanation for the holding of " exorbitant " reserves is that all alternatives are considered undesirable. For, in order to reduce large foreign reserves, a country would have to pursue policies which it may want to avoid: appreciation of the currency, price and income inflation, or abolition of restrictions on imports. Currency appreciation is unpopular because it injures export industries (less able to compete in foreign markets) and industries competing with imports (becoming available at reduced prices); in addition, it reduces the values of gold and foreign assets held by the central bank (causing it a sometimes embarrassing capital loss). Domestic inflation is unpopular because of inequitable effects on income distribution and because of induced inefficiencies in the allocation of resources. The abolition of import restrictions is resisted by protected industries, their stockholders, workers and representatives in the legislature. If all policies designed to reduce foreign reserves and to avert further accumulations are " politically impossible ", the accumulation of reserves is allowed to continue, without much thought being given to the irrational allocation of national economic resources which is involved in accumulating assets that are not expected to be used, let alone needed.

In our discussion of the ratio of reserves to liabilities, we mentioned the huge increases in the reserve ratios of the Netherlands, France, and Germany, and of the attempts of two of these countries to combat the inflow of reserves by appreciating their currencies. In order to avoid the increase in the ratios of reserves to liabilities, they would have had to appreciate their currencies more drastically (not by only 5 per cent) or they would have had to create additional liabilities by expanding domestic credit much more than they did. Had they really wanted to keep the ratio of reserves to liabilities unchanged, the monetary authorities would have had to match the

increase in foreign assets by the same percentage increase in domestic assets. Such an expansion of credit would have produced a rather serious inflation of incomes and prices. Unwilling to permit higher rates of inflation — they were already embarrassed by the rates they did permit — they put some restraint on the increase in domestic credit. In consequence, the ratio of foreign reserves to liabilities increased beyond anything the central banks wanted or could have needed for any purpose.

It should be clear by now that the volume of reserves, and their ratios to all sorts of magnitudes, are not determined by what the monetary authorities *want* to hold but rather by what they are offered and are *willing to accept* or, more correctly, unwilling to " fight off ". If we allow ourselves to use the terms " supply and demand " in this context, we may say that the demand for reserves is infinitely elastic and the amount taken and held is therefore determined by supply alone. The infinite elasticity of demand is implied in the resolution to maintain fixed exchange rates; a refusal to buy any amount of foreign exchange that may be offered to the authorities would result in a fall in the prices of foreign currencies, that is, in an appreciation of the currency of the country unwilling to accept more reserves. Rather than allow appreciation, most monetary authorities permit their reserves to increase to any level that is dictated by the supply of foreign exchange.

The Need for Additional Reserves

Let us repeat: it cannot be reasonably said of any particular amount of reserves, either in a particular country or in a group of countries, that it is needed or adequate, but it can be said convincingly that an *increase* in reserves will be needed or adequate to prevent restrictions on foreign trade and payments. Emphasis on the *size* of reserves is mistaken, emphasis on *additions* to reserves is justified.

The justification does not rest on biological or physical necessities, nor even on economic necessities; it is based on prevailing political attitudes. It is well known that in countries suffering losses in foreign reserves the authorities will sooner or later adopt policies to stop further outflows and that, of the alternative policies, they

are likely to choose restrictions on international trade and capital movements. Such restrictions are harmful to the performance of the economies of all countries affected. One way to avoid the restrictions is to avoid the causes (or pretexts) for their imposition, that is, deficits in the balances of international payments. The easiest way to avoid or reduce deficits is to provide for annual additions in official reserves. Hence, additional reserves are needed if restrictive policies are to be avoided.

The effect of the creation of new reserves upon the net surpluses in the balances of payments of all countries together is sometimes not fully understood. It may be explained most easily by comparing two situations, one in which the annual production of gold by South Africa is absorbed by private demand, the other where it is acquired by monetary authorities. Assume, for the sake of simplicity, that there are only ten countries besides South Africa. Assume further that South Africa uses all proceeds from exporting gold to purchase imports of goods, and the other ten countries purchase the gold in exchange for their exports to South Africa. If the gold is purchased by private parties, for industrial uses and for hoards, the trade balances of the ten countries taken together (as well as that of South Africa) will be completely balanced. Each of the ten countries may have a surplus or a deficit, but the sum of surpluses and deficits will be equal. (Incidentally, if some of the imports of non-monetary gold were not recorded, the statistical balances would show a global export surplus offset by a negative balance on errors and omissions.) Alternatively, if the gold is purchased, not by private parties but, instead, by central banks of some of the ten countries, their composite balance of payments will show a net surplus. This net surplus of exports over imports will be offset by a net increase in monetary reserves. Some of the ten countries may be in surplus, some in deficit, but the sum of the surpluses will exceed the sum of the deficits exactly by the increase in monetary gold.

It is conceivable that either the number of countries in deficit will be the same or that the deficits of some countries will be the same in both situations; but the most likely result of the increase in monetary reserves will be that some countries will have smaller deficits and others will have surpluses instead of deficits. With smaller deficits and fewer countries in deficit, the pressures for restrictive policies will be reduced.

If additional reserves are created, not through additions to the monetary gold stock, but through the creation and free distribution of fiduciary reserves, the effects are similar in that the sum of surpluses in payments balances will exceed the sum of deficits. Although this may look like an accounting trick, the balance-of-payments accountant would enter the deposit of his country's currency into the dormant account of the international reserve agency as an inflow of long-term capital (since it would not constitute a current liability) whereas the aquisition of the current claim against that agency would be shown below the line as an increase in the official reserve. Thus, the creation of a new reserve asset in the form designed by recent proposals would, like an increase in earned reserves, reduce the number of deficit countries and the sum of their combined deficits — assuming, however, that the statisticians make the proper distinction between dormant and active accounts.

How much of an increase in aggregate monetary reserves will be needed to reduce the size of the deficits and the number of deficit countries sufficiently to avert restrictions on trade and capital movements will depend on the distribution of the deficits and on the political propensities of various countries to impose restrictions. These propensities — to wit, how large and persistent a loss of reserve in a particular country will present a sufficient reason or pretext for the adoption of certain restrictive measures — are shaped by the beliefs of the men in charge of policy-making; and these beliefs, in turn, are derived from rational theories, irrational myths, and traditional principles or prejudices. Some countries may patiently put up with higher interest rates, some with effective wage stops, and some even with unemployment, when confronted with a deficit in their balance of payments. Other countries, however, may quickly, on the slightest provocation, turn to restrictions and controls on imports and payments. (For those with a taste for definitions, I may try to define the marginal propensity to restrict imports as the value of imports kept out by means of restrictions and direct controls in relation to a given loss of reserves suffered through a payments deficit.) Since one cannot foretell either which countries will suffer deficits of certain magnitudes or the propensities of the politicians in power, the determination of the "adequate" increase in total reserves can be only a matter of blunt, but still necessary, judgment.

Three Effects of Increases in Reserves

The increase in the monetary reserves of a country may have several effects which, though they are closely related, ought to be distinguished for the sake of clarity. We have just discussed the effect on the balance of payments and, as a probable reaction, on the countries' policies regarding foreign trade and capital movements.

A second effect is on the money supply. If reserves are earned through export surpluses or capital imports (other than borrowings by the monetary authorities), the purchase of the received foreign exchange by the central bank is financed by newly created domestic money. In the absence of offsetting policies, monetary circulation increases.

A third effect is on the reserve position and the resulting credit policy of the central bank. The improvement in the reserve position may make the monetary authorities bolder in their policies; they are likely to keep interest rates lower, to expand their portfolio of domestic loans and other assets, and to allow commercial banks to be more expansionary on their part.

There are certain differences to be noted between various forms of the increase in reserves. The first effect — on balances of payments and policies regarding foreign trade and capital movements — can be expected with greatest certainty from increases in monetary gold stocks, and with a degree of probability also from a distribution of gratis reserves (" reserve units ") by an international agency. The expansion of liabilities by reserve-currency countries in case of deficits in their foreign payments leads to an increase in gross reserves, not net reserves. However, as long as the reserve-currency countries are not worried about the deterioration of their position, the net effect on commercial policies is also liberalizing. The use of borrowing facilities extended by the I.M.F. may lead to an increase in earned reserves of the countries to whom the deficit countries pay the currencies drawn, but the net effects are not certain. If the accommodation extended to deficit countries is upon condition that they abstain from restrictive policies, then again the process is liberalizing.

The second effect — the direct effect on the money supply — is certain to arise in the case of increases in monetary gold stocks and currency reserves. This effect would not arise from the distribution of gratis reserves (" units ") by an international agency. This should be clear, since the central bank would not purchase these reserve units from domestic suppliers but would acquire them with its deposit into the dormant account of the agency, that is, with its non-circulating, non-current liability. The fact that this (rather revolutionary) form of creation of new reserves does not immediately increase the money supplies of the recipient countries commends it to those who, though seeking the first effect, are concerned about inflationary consequences of additions to reserves.

The third effect — on reserve positions and credit policies of the central banks — is probably associated with all forms of reserve creation. In can, of course, be counteracted by deliberate monetary policies if credit expansion is not wanted at the time.

Application to Present-Day Discussions

Our study, up to this point, has stayed within the confines of research and analysis, without explicit application to present-day problems and negotiations. Yet it should not be difficult to see the implications of our findings for the current discussions among official and academic experts trying to solve the problems of our time.

The most important findings, in terms of current controversies, are these:

1. There is no " need " for any particular sum of monetary reserves in the world.

2. There is no sense, therefore, in which it can be said that the world total of monetary reserves is inadequate.

3. Indeed, if the world total of reserves had not reached 70,000 million dollars but, say only 50,000 million dollars, there would still be no " shortage ".

4. Needed, however, is an annual increase in monetary reserves if policies restricting foreign trade and capital movements are to be averted.

5. The annual increase of total reserves should be of such a magnitude that the number of countries in deficit and the amounts

of their deficits are small enough to remove pressures toward restrictions on trade and capital movements.

6. Unless the large private absorptions of gold come to an end, the necessary annual increases in total reserves can be provided only by an international agency issuing new reserve assets.

7. Inflationary effects of the creation of new reserves can be counteracted by appropriate policies.

Princeton FRITZ MACHLUP

STATISTICAL APPENDIX

TABLE A-I

OFFICIAL RESERVES, IMPORTS, AND RATIOS OF RESERVES TO IMPORTS FOR 14 INDUSTRIAL COUNTRIES, 1949-1965

(In millions of U.S. dollars)

Country	1949			1950			1951		
	Res.	Imp.	Res./Imp. %	Res.	Imp.	Res./Imp. %	Res.	Imp.	Res./Imp. %
Australia	1,123	1,590	70.6	1,492	1,620	92.1	1,134	2,420	46.9
Austria	92	592	15.5	91	477	19.1	106	653	16.2
Belgium-Luxemb.	978	1,803	54.2	849	1,942	43.7	1.110	2,535	43.8
Canada	1,197	2,884	41.5	1,845	3,128	59.0	1.901	4,106	46.3
France	580	3,291	17.6	791	3,030	26.1	616	4,457	13.8
Germany	196	n.a.	n.a.	190	2,697	7.0	455	3,491	13.0
Ireland	342	481	71.1	391	446	87.7	331	573	57.8
Italy	n.a.	1,545	n.a.	602	1,488	40.5	774	2,167	35.7
Japan	n.a.	905	n.a.	n.a.	974	n.a.	n.a.	1,995	n.a.
Netherlands	434	1,844	23.5	548	2,056	26.7	554	2,553	21.7
Sweden	269	1,171	23.0	289	1,182	24.5	520	1,776	29.3
Switzerland	1,692	882	191.8	1,579	1,056	149.5	1,645	1,375	119.6
United Kingdom	1,752	8,522	20.6	3,443	7,358	46.8	2,374	10,955	21.7
United States	26,024	7,544	345.0	24,265	9,631	251.9	24,299	11,922	203.8

TABLE A-I *cont'd*

Country	1952			1953			1954		
	Res.	Imp.	Res./Imp. %	Res.	Imp.	Res./Imp. %	Res.	Imp.	Res./Imp. %
Australia	1,032	1,979	52.1	1,362	1,470	92.6	1,133	1,870	60.6
Austria	152	652	23.3	325	546	59.5	425	653	65.1
Belgium-Luxemb.	1,133	2,444	46.4	1,144	2,413	47.4	1,098	2,535	43.3
Canada	1,938	4,370	44.3	1,902	4,697	40.5	2,029	4,433	45.8
France	686	4,326	15.9	829	3,942	21.0	1,264	4,221	29.9
Germany	960	3,814	25.2	1,773	3,771	47.0	2,579	4,571	56.4
Ireland	317	482	65.8	335	511	65.6	364	504	72.2
Italy	696	2,336	29.8	768	2,420	31.7	927	2,439	38.0
Japan	1,101	2,028	54.3	892	2,410	37.0	930	2,399	38.8
Netherlands	944	2,224	42.4	1,232	2,376	51.9	1,278	2,858	44.7
Sweden	504	1,730	29.1	558	1,579	35.3	543	1,776	30.6
Switzerland	1,667	1,208	138.0	1,768	1,176	150.3	1,837	1,300	141.3
United Kingdom	1,958	9,802	20.0	2,670	9,314	28.7	3,034	9,405	32.3
United States	24,714	11,707	211.1	23,458	11,846	198.0	22,978	11,140	206.3

TABLE A-I *cont'd*

Country	1955			1956			1957		
	Res.	Imp.	Res./ Imp. %	Res.	Imp.	Res./ Imp. %	Res.	Imp.	Res./ Imp. %
Australia	844	2,160	39.1	961	1,964	48.9	1,329	1,945	68.9
Austria	374	887	42.2	419	974	43.0	523	1,128	46.4
Belgium-Luxemb. .	1,203	2,830	42.5	1,219	3,288	37.1	1,148	3,444	33.3
Canada	1,985	5,020	39.5	2,035	6,110	33.3	1,926	6,188	31.1
France	1,975	4,739	41.7	1,311	5,558	23.6	645	6,175	10.5
Germany	3,018	5,793	52.1	4,202	6,617	63.5	5,197	7,542	68.9
Ireland	331	582	56.9	283	512	55.3	296	516	57.4
Italy	1,167	2,711	43.0	1,236	3,174	38.9	1,354	3,674	36.9
Japan	1,076	2,471	43.6	1,270	3,230	39.3	828	4,284	19.3
Netherlands . . .	1,292	3,209	40.3	1,107	3,725	29.7	1,009	4,106	24.6
Sweden	522	1,997	26.1	535	2,209	24.2	501	2,428	20.7
Switzerland . . .	1,847	1,489	124.0	1,882	1,766	106.6	1,898	1,964	96.6
United Kingdom .	2,392	10,809	22.1	2,276	10,812	21.1	2,374	11,322	21.0
United States . .	22,797	12,489	182.5	23,666	13,987	169.2	24,832	14,620	169.9

TABLE A-I *cont'd*

Country	1958			1959			1960		
	Res.	Imp.	Res./ Imp. %	Res.	Imp.	Res./ Imp. %	Res.	Imp.	Res./ Imp. %
Australia	1,128	2,039	55.3	1,273	2,125	59.9	915	2,704	33.8
Austria	678	1,074	63.1	697	1,145	60.9	716	1,416	50.6
Belgium-Luxemb. .	1,553	3,129	49.6	1,306	3,442	37.9	1,506	3,969	37.9
Canada	2,038	5,638	36.1	2,029	6,242	32.5	1,989	6,150	32.3
France	1,050	5,609	18.7	1,736	5,088	34.1	2,272	6,281	36.2
Germany	5,879	7,576	77.6	4,790	8,482	56.5	7,032	10,107	69.6
Ireland	305	557	54.8	325	595	54.6	324	633	51.2
Italy	2,184	3,216	67.9	3,056	3,369	90.7	3,251	4,725	68.8
Japan	1,062	3,033	35.0	1,447	3,599	40.2	1,949	4,491	43.4
Netherlands . . .	1,539	3,625	42.5	1,442	3,940	36.6	1,863	4,531	41.1
Sweden	516	2,368	21.8	478	2,414	19.8	528	2,901	18.2
Switzerland . . .	2,063	1,706	120.9	2,063	1,923	107.3	2,324	2,243	103.6
United Kingdom .	3,105	10,493	29.6	2,801	11,153	25.1	3,719	12,714	29.3
United States . .	22,540	14,619	154.2	21,504	17,008	126.4	19,359	16,506	117.3

TABLE A-I *cont'd*

Country	1961			1962			1963		
	Res.	Imp.	Res./ Imp. %	Res.	Imp.	Res./ Imp. %	Res.	Imp.	Res./ Imp. %
Australia	1,348	2,394	56.3	1,387	2,551	54.4	1,880	2,776	67.7
Austria	845	1,485	56.9	1,081	1,552	69.7	1,229	1,675	73.4
Belgium-Luxemb. .	1,813	4,223	42.9	1,753	4,569	38.4	1,940	5,112	38.0
Canada	2,276	6,196	36.7	2,547	6,367	40.0	2,603	6,618	39.3
France	3,799	6,679	56.9	4,049	7,517	53.9	4,908	8,727	56.2
Germany	7,163	10,948	65.4	6,956	12,289	56.6	7,650	13,022	58.8
Ireland	343	732	46.9	359	766	46.9	406	858	47.3
Italy	3,799	5,223	72.7	3,818	6,075	62.9	3,406	7,590	44.9
Japan	1,666	5,811	28.7	2,022	5,637	35.9	2,058	6,737	30.6
Netherlands . . .	1,958	5,089	38.5	1,946	5,347	36.4	2,101	5,966	35.2
Sweden	736	2,929	25.1	801	3,123	25.7	758	3,393	22.3
Switzerland . . .	2,759	2,707	101.9	2,872	3,020	95.1	3,078	3,253	94.6
United Kingdom .	3,318	12,308	27.0	3,308	12,563	26.3	3,147	13,476	23.4
United States . .	18,753	16,071	116.7	17,220	17,764	96.9	16,843	18,590	90.6

TABLE A-I *cont'd*

Country	1964			1965		
	Res.	Imp.	Res./ Imp. %	Res.	Imp.	Res./ Imp. %
Australia	1,947	3,313	58.8	1,575	3,753	42.0
Austria	1,317	1,863	70.7	1,311	2,100	62.4
Belgium-Luxemb. .	2,192	5,901	37.2	2,304	6,326	34.8
Canada	2,881	7,556	38.1	3,027	8,715	34.7
France	5,724	10,070	56.8	6,343	10,341	61.3
Germany	7,882	14,618	53.9	7,429	17,482	42.5
Ireland	446	974	45.8	410	1,041	39.4
Italy	3,823	7,321	52.9	4,415	7,347	60.1
Japan	2,019	7,948	25.4	2,152	8,170	26.3
Netherlands . . .	2,349	7,055	33.3	2,416	7,463	32.4
Sweden	964	3,855	25.0	972	4,378	22.2
Switzerland . . .	3,123	3,610	86.5	3,247	3,697	87.8
United Kingdom .	2,316	15,438	15.0	3,004	16,138	18.6
United States . .	16,672	20,251	82.3	15,450	23,189	66.6

Notes: Reserves as well as imports are in millions of dollars. Reserves are as of the end of each year. Imports are at c.i.f. values. The letters n.a. mean « not available ».

Sources: Data for 1949 to 1964 are from *International Financial Statistics*, 1965-66 Supplement. Data for 1965 are from the May 1966 issue.

TABLE A-II

THREE LARGEST LOSSES OF OFFICIAL RESERVES AND RATIOS OF LOSSES TO RESERVES IN 14 INDUSTRIAL COUNTRIES BETWEEN 1949 (3rd QUARTER) AND DEC 1965

Country	Order of Loss	Period from	Period to	Reserves in millions of U.S. $ at peak	at trough	lost	Dec. 1965	Percentage of Loss to Reserves at peak	at trough	Dec. 1965
Australia	Largest loss	2nd Qu. 51	3rd Qu. 52	1,747	793	954	1,575	52.9	112.4	60.6
	2nd largest loss	1st » 54	1st » 56	1,375	751	624		45.4	83.2	39.6
	3rd » »	4th » 59	4th » 60	1,273	916	357		28.0	39.0	22.7
Austria	Largest loss	3rd Qu. 54	1st Qu. 56	453	362	91	1,311	20.1	25.1	6.9
	2nd largest loss	3rd » 59	1st » 61	754	675	79		10.5	11.7	6.0
	3rd » »	4th » 64	1st » 65	1,317	1,261	56		4.3	4.4	4.3
Belgium-Luxembourg	Largest loss	4th Qu. 58	3rd Qu. 60	1,553	1,303	250	2,304	16.1	19.2	10.9
	2nd largest loss	3rd » 49	4th » 50	1,033	849	184		17.8	21.7	8.0
	3rd » »	2nd » 52	2nd » 53	1,232	1,078	154		12.5	14.3	6.7
Canada	Largest loss	4th Qu. 61	2nd Qu. 62	2,276	1,817	459	3,027	20.2	25.3	15.2
	2nd largest loss	3rd » 50	3rd » 51	1,890	1,730	160		8.5	9.2	5.3
	3rd » »	4th » 52	2nd » 53	1,946	1,839	107		5.5	5.8	3.5
France	Largest loss	4th Qu. 55	4th Qu. 57	1,975	645	1,330	6,343	67.3	206.2	21.0
	2nd largest loss	3rd » 59	4th » 59	1,857	1,736	121		6.5	7.0	1.9
	3rd » »	1st » 53	3rd » 53	806	777	29		3.6	3.7	0.5
Germany	Largest loss	4th Qu. 58	3rd Qu. 59	5,879	4,234	1,645	7,429	28.0	38.9	22.1
	2nd largest loss	1st » 61	1st » 62	7,420	6,642	778		10.5	11.7	10.5
	3rd » »	4th » 64	4th » 65	7,882	7,429	453		5.8	6.1	6.1
Ireland	Largest loss	4th Qu. 50	2nd Qu. 52	246	150	96	410	24.6	32.5	23.4
	2nd largest loss	4th « 54	3rd » 56	364	274	90		24.7	32.8	22.0
	3rd » »	1st » 65	2nd » 65	451	400	51		11.3	12.8	12.4
Italy	Largest loss	4th Qu. 62	1st Qu. 64	3,818	2,946	872	4,415	22.8	29.6	19.8
	2nd largest loss	3rd » 50	1st » 51	648	490	158		24.4	32.2	3.6
	3rd » »	4th » 51	2nd » 53	775	627	148		10.7	22.6	3.4
Japan	Largest loss	4th Qu. 56	3rd Qu. 57	1,279	754	526	2,152	58.5	62.6	24.0
	2nd largest loss	1st » 61	4th » 61	2,122	1,666	456		21.5	27.4	21.2
	3rd » »	2nd » 52	2nd » 53	1,242	980	262		21.1	26.7	12.2
Netherlands	Largest loss	1st Qu. 56	3rd Qu. 57	1,320	898	422	2,416	32.0	47.0	17.5
	2nd largest loss	4th » 58	2nd » 59	1,539	1,419	120		7.8	8.5	5.0
	3rd » »	2nd » 62	4th » 62	2,023	1,946	77		3.8	4.0	3.2
Sweden	Largest loss	3rd Qu. 59	1st Qu. 60	533	456	77	972	14.4	16.9	7.9
	2nd largest loss	3rd » 54	2nd » 55	561	492	69		12.3	14.0	7.1
	3rd » »	2nd » 52	1st » 53	533	485	48		9.0	9.9	4.9
Switzerland	Largest loss	4th Qu. 63	1st Qu. 64	3,078	2,747	331	3,247	10.8	12.1	10.2
	2nd largest loss	4th « 62	1st » 63	2,872	2,637	235		8.2	8.9	7.2
	3rd » »	3rd » 58	1st » 59	2,065	1,877	188		9.1	10.0	5.8
United Kingdom	Largest loss	2nd Qu. 51	2nd Qu. 52	3,906	1,797	2,109	3,004	54.0	117.4	70.2
	2nd largest loss	2nd » 54	3rd » 57	3,289	1,889	1,400		42.6	74.1	46.6
	3rd » »	3rd » 61	4th » 64	3,553	2,316	1,237		34.8	53.4	41.2
United States	Largest loss	4th Qu. 59	4th Qu. 64	21,504	15,450	6,054	15,450	28.1	39.2	39.2
	2nd largest loss	3rd » 49	2nd » 51	26,273	23,389	2,884		11.0	12.4	18.7
	3rd » »	2nd » 52	2nd » 55	25,012	22,783	2,229		8.8	9.7	14.3

Notes: Reserves are official holdings of gold and foreign exchange plus the gold-tranche position at the IMF.

End-of-quarter figures are used for the peaks and troughs in reserve holdings. Losses of reserves are calculated from a peak to the nearest trough that is not followed by a still lower one within a year. Absolute amounts, rather than percentage declines of reserves, are used in ordering the losses by size.

Where a loss period is listed as beginning in the third quarter of 1949 (or with the earliest available figure) it may in fact have begun earlier; where a loss period is listed as ending with the fourth quarter of 1965 it may in fact be continuing beyond that date. (Both these comments apply, among other countries, to the United States).

Sources: All data are taken or derived from *International Financial Statistics*. For 1957 to 1965, end-of-quarter figures are taken partly from the 1965-66 Supplement and partly from the October 1965 and May 1966 issues. For periods before 1957, year-end figures from various issues of the years 1952 to 1958 were used to derive end-of-quarter figures by linear interpolation.

For the following countries comparable series begin only later than the third quarter of 1949: Austria, first quarter of 1954; France and Germany, fourth quarter of 1952; and Japan, third quarter of 1951. The figures for Japan before the third quarter of 1959 were increased by $70 billion to make them comparable with the later series. (I acknowledge the help of Professor Yasukichi Yasuba and Mr. R. J. Sweeney.)

TABLE A-III

OFFICIAL RESERVES, MONEY SUPPLY, AND MONEY-PLUS-QUASI-MONEY, WITH RATIOS OF RESERVES TO MONEY AND MONEY-PLUS-QUASI-MONEY FOR 14 INDUSTRIAL COUNTRIES, 1949-1965

Country	1949				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./M+QM
Australia	467.9 [a]	1,020 [a]	1,954 [a]	45.9	24.0
Austria	n.a.	11.01	n.a.	n.a.	n.a.
Belgium-Luxemb.	48.90	n.a.	n.a.	n.a.	n.a.
Canada	1.32	3.96	8.05	33.4	16.4
France	2.03	27.12	27.5	7.5	7.4
Germany	0.82	n.a.	n.a.	n.a.	n.a.
Ireland	122.3 [b]	118.7 [b]	334.2 [b]	103.0	36.6
Italy	n.a.	n.a.	n.a.	n.a.	n.a.
Japan	n.a.	n.a.	n.a.	n.a.	n.a.
Netherlands	1.65	n.a.	n.a.	n.a.	n.a.
Sweden	1.40	6.40	22.58	21.9	6.2
Switzerland	7.28	11.10	23.02	65.6	31.6
United Kingdom	625.9 [c]	n.a.	n.a.	n.a.	n.a.
United States	26.0	109.9	144.8	23.7	18.0

TABLE A-III *continued*

Country	1950				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./M+QM
Australia	621.7 [a]	1,233 [a]	2,236 [a]	50.4	27.8
Austria	n.a.	12.76	n.a.	n.a.	n.a.
Belgium-Luxemb.	42.45	168.6	183.3	25.2	23.2
Canada	2.03	4.33	8.51	47.9	23.9
France	2.77	31.29	31.89	8.9	8.7
Germany	0.80	n.a.	n.a.	n.a.	n.a.
Ireland	139.6 [b]	122.5 [b]	342.5 [b]	114.0	40.8
Italy	376	n.a.	n.a.	n.a.	n.a.
Japan	n.a.	n.a.	n.a.	n.a.	n.a.
Netherlands	2.80	6.85	7.76	40.9	36.1
Sweden	1.50	6.87	24.03	21.8	6.2
Switzerland	6.79	11.43	23.89	59.4	28.4
United Kingdom	1,230 [c]	n.a.	n.a.	n a.	n.a.
United States	24.3	115.3	150.3	21.1	16.2

[a] Millions of Australian Pounds. [b] Millions of Irish Pounds. [c] Millions of Pounds Sterling.

TABLE A-III *continued*

Country	1951				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./M+QM
Australia	493.0 [a]	1,434 [a]	2,521 [a]	34.4	19.6
Austria	n.a.	16.12	n.a.	n.a.	n.a.
Belgium-Luxemb.	55.5	168.6	186.2	32.9	29.8
Canada	1.90	4.38	8.68	43.4	21.9
France	2.16	36.95	37.75	5.9	5.7
Germany	1.91	19.2	27.3	10.0	7.0
Ireland	118.2 [b]	131.6 [b]	360.2 [b]	89.8	32.8
Italy	483	n.a.	n.a.	n.a.	n.a.
Japan	n.a.	n.a.	n.a.	n.a.	n.a.
Netherlands	2.11	7.02	8.34	30.1	25.3
Sweden	2.7	8.41	27.18	32.1	9.9
Switzerland	7.07	11.92	25.19	59.3	28.1
United Kingdom	848 [c]	8,213 [c]	n.a.	10.3	n.a.
United States	24.3	122.8	159.4	19.8	15.3

TABLE A-III *continued*

Country	1952				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./M+QM
Australia	448.7 [a]	1,382 [a]	2,506 [a]	32.5	17.9
Austria	n.a.	17.14	n.a.	n.a.	n.a.
Belgium-Luxemb.	56.65	174.0	195.6	32.6	29.0
Canada	1.88	4.66	9.26	40.4	20.3
France	2.40	41.88	42.87	5.7	5.6
Germany	4.03	21.3	33.0	18.9	12.2
Ireland	113.2 [b]	137.4 [b]	370.9 [b]	82.4	30.5
Italy	435	n.a.	n.a.	n.a.	n.a.
Japan	398	n.a.	n.a.	n.a.	n.a.
Netherlands	3.59	7.74	9.22	46.4	38.9
Sweden	2.62	8.58	28.12	30.5	9.3
Switzerland	7.17	12.31	26.65	58.3	26.9
United Kingdom	699 [c]	8,401 [c]	n.a.	8.3	n.a.
United States	24.7	129.2	168.7	19.1	14.6

[a] Millions of Australian Pounds. [b] Millions of Irish Pounds. [c] Millions of Pounds Sterling.

TABLE A-III *continued*

Country	1953				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./ M+QM
Australia	592.2 [a]	1,553 [a]	2,759 [a]	38.1	21.5
Austria	14.25	19.52	27.33	73.4	52.3
Belgium-Luxemb.	57.20	180.3	202.5	31.7	28.3
Canada	1.85	4.56	9.32	40.6	19.9
France	2.90	46.58	47.94	6.2	6.1
Germany	7.45	23.4	39.9	31.8	18.7
Ireland	119.6 [b]	145.2 [b]	395.4 [b]	82.4	30.3
Italy	480	3,817	5,596	12.6	8.6
Japan	322	1,937	3,952	16.6	8.2
Netherlands	4.68	8.27	9.75	57.1	48.0
Sweden	2.90	8.94	30.88	32.4	9.4
Switzerland	7.60	12.84	28.71	59.2	26.5
United Kingdom	954 [c]	8,755 [c]	n.a.	10.9	n.a.
United States	23.5	130.8	173.1	18.0	13.6

TABLE A-III *continued*

Country	1954				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./ M+QM
Australia	492.6 [a]	1,593 [a]	2,892 [a]	31.0	17.1
Austria	11.09	24.02	35.39	46.2	31.3
Belgium-Luxemb.	54.90	183.7	207.0	29.9	26.5
Canada	1.97	4.92	10.14	40.0	19.4
France	4.42	52.98	54.65	8.3	8.1
Germany	10.83	26.5	47.5	40.9	22.7
Ireland	130.0 [b]	152.3 [b]	413.1 [b]	85.4	31.5
Italy	579	4,134	6,253	14.0	9.3
Japan	336	2,013	4,556	16.7	7.4
Netherlands	4.86	8.83	10.53	55.0	46.2
Sweden	2.82	9.07	32.68	31.1	8.6
Switzerland	7.90	13.2	30.05	59.9	26.3
United Kingdom	1,083 [c]	9,108 [c]	n.a.	11.9	n.a.
United States	23.0	134.9	180.5	17.1	12.7

[a] Millions of Australian Pounds. [b] Millions of Irish Pounds. [c] Millions of Pounds Sterling.

TABLE A-III *continued*

Country	1955				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./ M+QM
Australia	367.0 [a]	1,630 [a]	2,963 [a]	22.5	12.4
Austria	9.76	23.83	38.07	41.0	25.6
Belgium-Luxemb.	60.15	192.6	218.5	31.2	27.5
Canada	1.97	5.25	10.88	37.5	18.1
France	6.91	59.69	61.69	11.6	11.2
Germany	12.68	29.2	54.5	43.4	23.3
Ireland	118.2 [b]	154.7 [b]	419.4 [b]	76.4	28.2
Italy	729	4,519	7,014	16.1	10.4
Japan	388	2,331	5,395	16.6	7.2
Netherlands	4.91	9.58	11.48	51.7	42.8
Sweden	2.71	9.16	33.75	29.6	8.0
Switzerland	7.94	13.63	31.93	58.3	24.9
United Kingdom	854 [c]	8,838 [c]	n.a.	9.7	n.a.
United States	22.8	138.0	185.0	16.5	12.3

TABLE A-III *continued*

Country	1956				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./ M+QM
Australia	417.8 [a]	1,603 [a]	3,075 [a]	25.6	13.6
Austria	10.94	24.9	41.92	43.9	26.1
Belgium-Luxemb.	60.95	198.2	223.7	30.8	27.3
Canada	1.95	5.18	11.19	37.7	17.4
France	4.59	65.85	68.17	7.0	6.7
Germany	17.65	31.3	61.1	56.4	28.9
Ireland	101.1 [b]	154.7 [b]	421.5 [b]	65.4	24.0
Italy	773	4,883	7,857	15.8	9.8
Japan	458	2,714	6,551	17.9	7.0
Netherlands	4.21	9.23	11.21	45.6	37.6
Sweden	2.78	9.81	35.87	28.3	7.8
Switzerland	8.09	14.61	34.06	55.4	23.8
United Kingdom	813 [c]	8,978 [c]	n.a.	9.1	n.a.
United States	23.7	139.4	188.6	17.0	12.6

[a] Millions of Australian Pounds. [b] Millions of Irish Pounds. [c] Millions of Pounds Sterling.

TABLE A-III *continued*

Country	1957				
	Billions of domestic money			Percentages	
	Res.	Money	M + QM	Res./M	Res./ M + QM
Australia	577.8 [a]	1,710 [a]	3,267 [a]	33.8	17.7
Austria	13.65	26.55	48.44	51.5	28.2
Belgium-Luxemb.	57.40	198.0	224.7	29.0	25.5
Canada	1.91	5.39	11.50	35.5	16.6
France	2.71	71.37	75.35	3.8	3.6
Germany	21.83	35.1	72.1	62.2	30.3
Ireland	105.7 [b]	165.5 [b]	441.4 [b]	63.9	23.8
Italy	846	5,131	8,588	16.5	9.9
Japan	298	2,824	7,591	10.5	3.9
Netherlands	3.83	9.06	11.43	42.3	33.5
Sweden	2.60	10.05	38.67	25.9	6.7
Switzerland	8.16	15.00	36.42	54.4	22.4
United Kingdom	848 [c]	9,266 [c]	n.a.	9.2	n.a.
United States	24.8	138.2	192.9	18.0	12.9

TABLE A-III *continued*

Country	1958				
	Billions of domestic money			Percentages	
	Res.	Money	M + QM	Res./M	Res./ M + QM
Australia	490.4 [a]	1,668 [a]	3,315 [a]	29.4	14.8
Austria	17.63	29.44	57.88	59.9	30.5
Belgium-Luxemb.	77.65	209.5	240.1	37.1	32.3
Canada	1.96	6.08	12.92	32.3	15.2
France	5.15	75.73	80.24	6.8	6.4
Germany	24.69	39.7	83.4	62.2	29.6
Ireland	108.9 [b]	164.7 [b]	450.7 [b]	66.1	24.2
Italy	1,363	5,681	10,017	24.0	13.6
Japan	382	3,185	9,055	12.0	4.2
Netherlands	5.85	10.14	13.00	57.7	45.0
Sweden	2.68	10.20	41.93	26.3	6.4
Switzerland	8.87	16.66	39.95	53.2	22.2
United Kingdom	1,109 [c]	9,593 [c]	n.a.	11.6	n.a.
United States	22.5	143.9	205.6	15.6	10.9

[a] Millions of Australian Pounds. [b] Millions of Irish Pounds. [c] Millions of Pounds Sterling.

TABLE A-III *continued*

Country	1959				
	Billions of domestic money			Percentages	
	Res.	Money	M + QM	Res./M	Res./ M + QM
Australia	553.5 [a]	1,788 [a]	3,574 [a]	31.0	15.5
Austria	18.12	32.4	67.22	55.9	27.0
Belgium-Luxemb.	65.30	216.3	252.7	30.2	25 8
Canada	1.93	5.89	12.79	32.8	15.1
France	8.51	83.92	90.20	10.1	9.4
Germany	20.12	44.4	97.0	45.3	20.7
Ireland	116.1 [b]	170.7 [b]	467.6 [b]	68.0	24.8
Italy	1,898	6,481	11,311	29.3	16.8
Japan	519	3,711	10,947	14.0	4.7
Netherlands	5.48	10.59	14.2	51.7	38.6
Sweden	2.49	11.88	46.98	21.0	5.3
Switzerland	8.87	17.46	42.45	50.8	20.9
United Kingdom	1,000 [c]	10,138 [c]	n.a.	9.9	n.a.
United States	21.5	144.3	208.7	14.9	10.3

TABLE A-III *continued*

Country	1960				
	Billions of domestic money			Percentages	
	Res.	Money	M + QM	Res./M	Res./ M + QM
Australia	397.8 [a]	1,775 [a]	3,700 [a]	22.4	10.8
Austria	18.62	34.12	74.92	54.6	24.9
Belgium-Luxemb.	75.30	220.6	262.7	34.1	28.7
Canada	1.99	6.19	13.41	32.2	14.8
France	11.13	95.79	104.80	11.6	10.6
Germany	29.54	47.4	107.8	62.3	27.4
Ireland	115.7 [b]	182.3 [b]	493.7 [b]	63.5	23.4
Italy	2,019	7,367	12,898	27.4	15.7
Japan	698	4,420	13,357	15.8	5.2
Netherlands	7.08	11.31	15.76	62.6	44.9
Sweden	2.75	12.39	48.75	22.2	5.6
Switzerland	9.99	19.26	47.47	51.9	21.0
United Kingdom	1,328 [c]	10,376 [c]	n.a.	12.8	n.a.
United States	19.4	143.5	213.4	13.5	9.1

[a] Millions of Australian Pounds. [b] Millions of Irish Pounds. [c] Millions of Pounds Sterling.

TABLE A-III *continued*

Country	1961				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./M+QM
Australia	586.1 [a]	1,728 [a]	3,876 [a]	33.9	15.1
Austria	21.97	36.96	83.28	59.5	26.4
Belgium-Luxemb.	90.65	237.4	289.0	38.2	31.4
Canada	2.28	6.96	14.58	32.8	15.6
France	18.62	110.63	122.33	16.8	15.2
Germany	28.65	54.4	121.7	52.7	23.5
Ireland	122.5 [b]	193.6 [b]	526.5 [b]	63.3	23.3
Italy	2,359	8,523	15,011	27.7	15.7
Japan	603	5,258	16,353	11.5	3.7
Netherlands	7.05	12.18	16.75	57.9	42.1
Sweden	3.83	13.57	51.52	28.2	7.4
Switzerland	11.86	22.18	53.92	53.5	22.0
United Kingdom	1,185 [c]	10,705 [c]	n.a.	11.1	n.a.
United States	18.8	148.7	227.6	12.6	8.3

TABLE A-III *continued*

Country	1962				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./M+QM
Australia	603.0 [a]	1,762 [a]	4,183 [a]	34.2	14.4
Austria	28.12	40.76	94.37	69.0	29.8
Belgium-Luxemb.	87.65	254.5	310.4	34.4	28.2
Canada	2.80	7.19	15.12	38.9	18.5
France	19.84	130.70	144.58	15.2	13.7
Germany	27.82	58.0	134.6	48.0	20.7
Ireland	128.2 [b]	209.0 [b]	564.8 [b]	61.3	22.7
Italy	2,371	10,105	17,723	23.5	13.4
Japan	724	6,157	19,517	11.8	3.7
Netherlands	7.01	13.10	18.28	53.5	38.3
Sweden	4.17	14.78	56.46	28.2	7.4
Switzerland	12.35	24.66	60.08	50.1	20.6
United Kingdom	1,181 [c]	11,172 [c]	n.a.	10.6	n.a
United States	17.2	151.6	245.6	11.3	7.0

[a] Millions of Australian Pounds. [b] Millions of Irish Pounds. [c] Millions of Pounds Sterling.

TABLE A-III *continued*

Country	1963				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./M+QM
Australia	817.4 [a]	1,891 [a]	4,621 [a]	43.2	17.7
Austria	31.95	44.28	194.89	72.2	30.5
Belgium-Luxemb.	97.00	279.0	343.1	34.8	28.3
Canada	2.86	7.71	16.15	37.1	17.7
France	24.05	149.76	164.33	16.1	14.6
Germany	30.6	62.2	150.8	49.2	20.3
Ireland	145.0 [b]	230.8 [b]	592.3 [b]	62.8	24.5
Italy	2,119	11,507	20,156	18.4	10.5
Japan	745	8,235	24,479	9.1	3.0
Netherlands	7.56	14.31	20.03	52.9	37.7
Sweden	3.94	16.01	61.00	24.6	6.5
Switzerland	13.24	26.46	66.42	50.0	19.9
United Kingdom	1,124 [c]	11,210 [c]	n.a.	10.0	n.a.
United States	16.8	157.7	264.8	10.7	6.3

TABLE A-III *continued*

Country	1964				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./M+QM
Australia	846.5 [a]	1,995 [a]	5,156 [a]	42.4	16.4
Austria	34.24	47.36	118.39	72.3	28.9
Belgium-Luxemb.	109.60	298.7	368.0	36.7	29.7
Canada	3.17	8.42	17.36	37.7	18.3
France	28.05	161.97	179.15	17.3	15.7
Germany	31.53	67.6	170.1	46.7	18.5
Ireland	159.3 [b]	247.6 [b]	630.7 [b]	64 3	25.3
Italy	2,389	12,415	21,936	19.2	10.9
Japan	723	9,412	28,428	7.7	2.4
Netherlands	8.46	15.46	21.96	54.7	38.5
Sweden	5.01	17.34	66.16	28.9	7.6
Switzerland	13.43	28.18	72.44	47.7	18.5
United Kingdom	827 [c]	11,795 [c]	n.a.	7.0	n.a.
United States	16.7	164.2	283.9	10.2	5.9

[a] Millions of Australian Pounds. [b] Millions of Irish Pounds. [c] Millions of Pounds Sterling.

TABLE A-III *continued*

Country	1965				
	Billions of domestic money			Percentages	
	Res.	Money	M+QM	Res./M	Res./M+QM
Australia	684.8 [d]	3,908 [d]	10,846 [d]	36.0	13.0
Austria	34.09	51.55	123.3	66.1	27.7
Belgium-Luxemb.	115.2	320.0	401.8	36.0	28.7
Canada	3.33	9.62	19.31	34.6	17.2
France	31.08	176.82	197.0	17.6	15.8
Germany	29.72	72.7	192.5	40.9	15.4
Ireland	146.4 [b]	256.1 [b]	655.9 [b]	57.2	22.3
Italy	2,746	14,286	25,296	19.2	10.9
Japan	775	10,455	31,359	7.4	2.5
Netherlands	8.70	17.16	24.30	50.7	35.8
Sweden	5.05	18.02	68.48	28.0	7.4
Switzerland	13.96	29.27	78.26	46.6	17.8
United Kingdom	1,073 [c]	12,704 [c]	n.a.	8.5	n.a.
United States	15.5	171.3	311.1	9.1	5.0

[b] Millions of Irish Pounds. [c] Millions of Pounds Sterling. [d] Millions of Australian Dollars (1965).

Notes: Reserves are as defined in Table A-II, but converted into domestic money at the official rates of the particular time. Where such conversion was not meaningful, the figure was regarded as not available (n.a.).

Money and Money-plus-Quasi-Money are in billions (milliards) of domestic money, except for Australia, Ireland, and the United Kingdom, where they are in millions.

Quasi-money includes:

in Australia: time and savings deposits in "deposit money banks" and in savings banks;
in Austria: time and savings deposits in deposit money banks;
in Belgium-Luxembourg: time and foreign-currency deposits in deposit money banks and "quasi-monetary liabilities" of the central bank;
in Canada: time deposits in deposit money banks;
in France: time deposits in deposit money banks;
in Germany: time deposits in deposit money banks;
in Ireland: time deposits in commercial banks and Post Office and Trustee Savings Bank deposits;
in Italy: time deposits and foreign-currency deposits in banks and savings banks;
in Japan: time deposits in commercial banks and in the Postal Savings System;
in the Netherlands: time, savings, and foreign-currency deposits;
in Sweden: time and savings deposits in commercial banks and savings deposits in savings banks;
in Switzerland: time and savings deposits and "bonds" in "large" banks, and in Cantonal, local, and savings banks;
in United Kingdom: nothing;
in the United States: time deposits in commercial banks.

Sources: for 1949 to 1964, *International Financial Statistics*, 1965-66 Supplement; for 1965, *I.F.S.*, May and June 1966 issues. (I am indebted to Mr. R. J. Sweeney for statistical work.)