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A PRIORI APPROACHES

AFTER CENTURIES of consideration in the literature, the best way to define money remains a live issue today. Contemporary writers who have tried to formulate the definition of money on a priori grounds have generally stressed either the "medium of exchange" function (section 1), or the "asset" function of money (section 2). Both the general approach and these two specific versions of it seem to us to provide an unsatisfactory basis for defining money (section 3). We conclude that the definition of money is an issue to be decided, not on grounds of principle as in the a priori approach, but on grounds of usefulness in organizing our knowledge of economic relationships. There is no hard and fast formula for deciding what total to call "money" (section 4).

1. "Medium of Exchange"

Many writers regard it as nearly self-evident that the role of money is to facilitate transactions and hence that money must be defined as currency plus demand deposits. Still others reach the same conclusion less directly, through a sophisticated theoretical analysis of the monetary system. In fact, this conclusion is not a valid implication of two of the recent analyses considered more fully below. These analyses imply rather that money should be defined as equal to high-powered money (currency outside banks plus bank reserves)—the modern counterpart of the early definition of money as coin plus government issues. Convention is stronger than logic!

Claims to Money Versus Money

Just as earlier writers regarded bank notes as claims to money rather than money itself, and argued that debts could not be discharged finally with bank notes but only with the specie that could be obtained for the bank notes, so many current writers argue that time deposits or savings and loan shares or other assets expressed in nominal terms can be used to discharge debts only by being first converted into currency or demand deposits, and hence cannot themselves be regarded as money.[1]

A minor difficulty with this approach is that the apparently simple criterion of whether an item directly serves as a "medium of exchange" turns out, on close examination, to be an uncertain guide to the classification of assets. At first glance, currency clearly seems to satisfy this criterion. Yet U.S. currency includes ten-thousand dollar notes. These can seldom be used directly as means of payment; they must first be converted into smaller denominations.[2] Should they therefore be excluded from the total termed "money"? How about $5,000 bills; $1,000 bills? How do we decide which denominations are media of exchange, which near-money assets? A holder of a demand deposit may not be able to effect transactions with persons he does not know by direct transferal of his check; he may first have to "cash" a check at his bank or with someone who knows him. On the other hand, banks have often been willing to transfer time deposits from party to party, sometimes even by the close equivalent of checks. Many people in the United States, and even more in other countries, pay a part of their bills by converting currency into postal money orders or their equivalent. Are the money orders to be regarded as the medium of exchange, and currency not? Brokerage balances are employed as a means of payment for a large class of transactions, and used cars for still another.[3]

[1] J. W. Angell, *The Behavior of Money,* New York, 1936, pp. 5–10; P. A. Samuelson, *Economics,* 2nd ed., New York, 1951, p. 308; H. A. Latané, "Income Velocity and Interest Rates—A Pragmatic Approach," *Review of Economics and Statistics,* Nov. 1960, p. 447.

[2] See Mark Twain's, "The £1,000,000 Bank-Note," for the classic illustration of the fact that a large denomination note is not a means of payment for the holder, but a near-money asset on the basis of which he can borrow to discharge debts.

On July 14, 1969, the Federal Reserve System and the Treasury Department announced that they would cease issuing currency in denominations over $100.

[3] An interesting modern counterpart in some countries to the "bills of exchange," the small denominations of which were so widely regarded as media of exchange in the nineteenth century literature, is the postdated check. In countries like Israel and the Republic of China (Taiwan), the postdated personal check is a major short-term credit instrument, which is transferred from person to person, each adding his endorsement and

These problems of classification are, in practice, rather minor; the puzzles cited can properly be regarded as exceptions. There would be little dispute that at the present time in the United States, currency, demand deposits, and travelers' checks are the only major items generally used as media of exchange and that the bulk of these items can be regarded as so usable. The significance of the exceptions is the light that they throw on the ambiguity of a "medium of exchange" as a theoretical concept.

The major difficulty with this approach is that it begs the question of whether the "essential" feature of money is its use as a means of payment. A "money" economy is distinguished from a barter economy by the separation of the act of purchase from the act of sale. An individual who has something to exchange does not need to search out the double coincidence of someone who both wants what he has and offers what he wants in exchange. He need only find someone who wants what he has, sell it for general purchasing power, and then separately find someone else who has what he wants and buy it with general purchasing power. In order for the act of purchase to be separated from the act of sale, there must indeed be something that will be generally accepted in payment—this is the feature emphasized in the "medium of exchange" approach. But also, there must be something that can serve as a temporary abode of purchasing power, in which the seller holds the proceeds in the interim between sale and subsequent purchase or from which the buyer can extract the general purchasing power with which he pays for what he buys. This is the feature that is emphasized in the so-called Cambridge cash-balances approach, and that has received increasing attention in modern monetary theory.[4] Both features are necessary to permit the act of purchase to be separated from the act of sale, but the "something" that is generally accepted in payment need not

so improving the "quality" of the check. After several endorsements, it is widely accepted and is used to make payments. In general, the standard analysis for checking deposits is that the "money" or "medium of circulation" is the individual's deposit credit on the books of the banks, not the check, and that the check is simply an order to transfer the deposit. This is clearly not correct for postdated checks of the kind just described. There may be no corresponding deposit credit at the time the check is written or when it circulates; the deposit credit may arise only on the date when the check is payable.

[4] H. G. Johnson, "Monetary Theory and Policy," *American Economic Review*, June 1962, pp. 344–345, 351–352; Milton Friedman, "The Quantity Theory of Money," *International Encyclopedia of the Social Sciences*.

In the *Treatise on Money* (New York, 1930, Vol. I, p. 13), Keynes defined money in language almost identical with that used above. In his view money was "that by delivery of which debt-contracts and price-contracts are *discharged*, and in the shape of which a store of General Purchasing Power is *held*." (His italics.)

coincide with the "something" that serves as a temporary abode of purchasing power; the latter may include the former and more besides.

For a somewhat fanciful illustration, suppose that silver were used as the medium of exchange for all but "money changing" transactions, yet gold, because of its convenience, remained the major constituent of the temporary abode. Of course, there would have to be some "money changers" who would facilitate the conversion of silver into gold.

To illustrate in a less fanciful way: for many a low-income consumer, time or savings deposits may be the major temporary abode, and currency or money orders the chief means of payment. There is some evidence that savings deposits and currency are closer substitutes for one another among some groups and at some times than either is for demand deposits. It is suggestive that individuals are the main holders of both currency and time deposits and business enterprises the main holders of demand deposits.

Of course, we can regard the term "medium of exchange" as referring to both features we have stressed—general acceptability in payment and use as a temporary abode of purchasing power. But then the term is of little use in deciding on an empirical counterpart to "money." Accordingly, we have interpreted "medium of exchange" narrowly as referring solely to general acceptability in payment.

A few numbers show the empirical importance of recognizing the asset as well as the medium of exchange role of whatever is regarded as money—at least for personal as opposed to business balances. Consider the definition of money currently favored by those who emphasize the medium-of-exchange role: currency plus demand deposits. In the United States in 1966, this total was equal to the value of four months' personal disposable income, about one month's in currency and three months' in demand deposits. Roughly two-thirds of the currency and two-fifths of the demand deposits were held by individuals and the rest by businesses. On the average, therefore, individuals held in currency about three weeks' income, in demand deposits about five weeks', or a total amount equal to two months' disposable income. Is it plausible that anything like this large a sum was held for the narrow medium of exchange function of money alone—that is, for mechanical transactions needs?

When money has been an unattractive asset to hold, as in hyperinflation, the quantity held, expressed in terms of income or in real value, has sometimes fallen to less than 1 per cent of its initial value. This quantity

represents an estimate of the irreducible minimum necessary for transactions purposes. And even in much more moderate inflations, the quantity held has often fallen to one-half or one-third of its level when prices are stable. Applied to the United States, this experience would imply that, for individuals and businesses combined, roughly one to two days' income is the hard core, as it were, of what might be called transactions balances proper, and one to two months' income is the level of balances that can be maintained for extended periods without serious transactions difficulties.[5]

Another bit of evidence that current balances are much larger than can readily be accounted for by mechanical transactions needs is provided by recent attempts to analyze cash balance holdings on inventory lines—in terms of the difference in timing of income receipts and consumption expenditures. These studies yield estimates of the required amount of cash balances that are of about the same order of magnitude as the actual amount held during inflations. The simplest model assumes that income is received in equal amounts at regular intervals but spent continuously and that only cash balances are used to correct for the lack of synchronization between payments and receipts (i.e., that transactions balances are never temporarily held in a liquid interest-yielding asset). This model makes the individual's cash balances equal to half his regular income receipt, which means that, if he is paid weekly, his cash balances equal half a week's income; if he is paid bi-weekly, they equal a week's income, etc. It would be difficult along these lines to explain cash balances equal to about two months' income. Complications introduced into more sophisticated models may either raise or lower the estimated transactions demand derived from the simple model.[6]

[5] See Phillip Cagan, *Proceedings of a Symposium on Inflation: Its Causes, Consequences and Control*, C. K. Kazanjian Economics Foundation, Inc., 1968, pp. 30–48; *idem*, "The Monetary Dynamics of Hyperinflation," *Studies in the Quantity Theory of Money*, M. Friedman, ed., Chicago, 1956, p. 26; also C. D. Campbell and G. C. Tullock, "Hyperinflation in China," *Journal of Political Economy*, June 1954, pp. 236–245.

[6] See J. W. Angell, "Money, Prices, and Production: Some Fundamental Concepts," *Quarterly Journal of Economics*, Nov. 1933, pp. 39–76; W. J. Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach," *Quarterly Journal of Economics*, Nov. 1952, pp. 545–556; James Tobin, "The Interest-Elasticity of Transactions Demand for Cash," *Review of Economics and Statistics*, Aug. 1956, pp. 241–242; R. L. Teigen, "Demand and Supply Functions for Money in the United States: Some Structural Estimates," *Econometrica*, Oct. 1964, pp. 482–485; M. H. Miller and D. Orr, "A Model of the Demand for Money by Firms," *Quarterly Journal of Economics*, Aug. 1966, pp. 413–435; Paul E. Smith, "Probabilistic Demand for Cash Balances and (s,S) Inventory Policies," *Weltwirtschaftliches Archiv*, Band 100, Heft 1, 1968, pp. 72–83.

Still another bit of evidence is the very different ratio of business and personal balances of currency and demand deposits to the transactions effected by each. The asset motive is largely irrelevant for business, hence business holdings per dollar of transactions can be taken as something of an estimate of the amount held for mechanical transactions purposes.

Business holdings of currency and demand deposits are estimated to be roughly equal to personal holdings of these items, or about two months' personal disposable income. Yet business transactions are a substantial multiple of personal transactions—at least triple and perhaps more than triple—because most intermediate transactions are between business enterprises.[7] It follows that at least two-thirds of personal balances of currency and demand deposits alone (i.e., even excluding time deposits) would have to be attributed to asset motives.

The rough estimates underlying this comparison yield business balances of demand deposits that are reasonably consistent in size with the level suggested by the inventory analysis of cash balance needs, but, as noted above, yield personal balances of deposits and currency that are much larger.[8]

[7] For example, in the second quarter of 1968, seasonally adjusted total debits to demand deposits (excluding interbank and U.S. government deposits but including float) in 233 Standard Metropolitan Statistical Areas averaged about $7,700 billion, at an annual rate, and in the 232 areas outside New York City (excluding the large volume of transactions connected with security dealings), about $4,200 billion (*Federal Reserve Bulletin,* Nov. 1968, p. A-15). This last figure must be raised about 20 per cent to say, roughly $5,000 billion, to allow for debits not included in the 232 areas covered by the Federal Reserve estimates. (Dividing bank debits by turnover gives an estimate of average deposits in covered SMSA's for May 1968 of $26 billion for New York City and $99 billion outside New York City. Total seasonally adjusted demand deposits in that month were $144.5 billion, excluding not only interbank and U.S. government deposits, but also float [*ibid.*, p. A-17]. Adding float, which averaged $1.5 billion, yields a demand deposit total of $146 billion. This leaves roughly $20 billion of deposits not covered in the turnover figures, all of which are presumably outside New York City, or just 20 per cent of the deposits in the 232 SMSA's outside New York City.) Even this figure is a substantial underestimate of total transactions, not only because it excludes New York but also because it excludes transactions in currency.

In the second quarter of 1968, personal income in excess of taxes withheld (which involve business, not personal transactions) was about $650 billion, at an annual rate. Personal transactions can roughly be estimated at about double this amount, say, $1,300 billion, consisting of the receipt and then subsequent spending of the income. This is an underestimate since individuals do engage in some intermediate and capital transactions, but it is almost surely much larger as a fraction of total personal transactions than $5,000 billion is of total transactions. Yet taking these figures at face value, business transactions would be $3,700 billion or only a little less than triple personal transactions.

[8] Business demand deposit holdings implied by the preceding estimates (assigning three-fifths of demand deposits to business) would amount to about 8.5 days' transactions effected by check. We have estimated personal balances of currency and demand deposits as roughly two months' personal disposable income and personal transactions

These comments are not intended to deny in any way the importance of a generally accepted "medium" of exchange for the functioning of a money economy. They do not deny that it is in principle possible to define a "medium of exchange" or to identify in practice the assets commonly used as a "medium of exchange." Their purpose is rather to deny that it is self-evident that the term "money" should be restricted to the class of assets so identified. Perhaps that is the most useful definition of "money" for analyzing the behavior of prices and nominal income in a money economy. But to establish that it is requires more than unsupported assertion.

Net Wealth and Neutrality

Recently, several self-consciously formal attempts have been made to settle the proper definition of money by theoretical considerations. Pesek and Saving approach the problem in the course of an examination of the role of wealth in economic theory. They distinguish between "money" as a separate item of net wealth, and "debt," an asset to some and a liability to others. Newlyn, whose approach is adopted and elaborated by Yeager, considers that the key issue is whether a payment is "neutral" in its effect on the asset and interest rate structure. Gramley and Chase discuss the effect of monetary changes on interest rates, thereby implementing the analysis of Newlyn and Yeager.

Net Wealth (Pesek-Saving). Pesek and Saving start with three entirely correct propositions.[9] (1) Commodity money and fiat money are assets to their holders, but in no meaningful sense debts to anyone. Hence they should be included in the consolidated net wealth of the community without any offsetting entries. They are "money" without simultaneously being debt. (2) The charter granted to a commercial bank empowering it to offer deposits convertible into "dominant money" on demand and transferable by check is a valuable privilege if the number of charters is restricted by considerations other than the demand for such charters. This privilege increases the net worth of a bank beyond

as roughly double personal income in excess of withholding. This implies that personal balances of currency and demand deposits amount to a little less than one month's transactions.

The figures for business are expressed in terms of demand deposits only because the residual figure derived in the preceding footnote is based on a total figure covering only transactions effected by debits to demand deposits.

[9] Boris P. Pesek and Thomas R. Saving, *Money, Wealth, and Economic Theory,* New York, 1967, especially pp. 39–254.

any sums invested in setting up the bank. In the special case in which it costs nothing to set up a bank and nothing to run a bank (in particular, if banks are prohibited from paying interest on demand deposits and the prohibition is fully effective), the net worth so created would be precisely equal to the volume of deposits outstanding. An inventory of the wealth of the community will include this net worth as an item of wealth, which can be done, in the special case cited, by including *either* the quantity of deposits *or* the value of the equity in the bank. (3) The services rendered by money do not depend on its "resource content," [10] i.e., on the number of physical units, but on the existence of a stock (plus other variables); "if the quantity of the money resource (the nominal quantity of money) is constant, demand for the service of money will create its own supply at no expenditure of resources but merely through the change in the price of money." [11]

Pesek and Saving argue that these propositions have the following implications: (a) There is a sharp distinction in theory between the activity of banks as "producers" (their term) of deposits transferable by check, which pay no interest, and as financial intermediaries borrowing at one rate of interest and lending at another. (b) Noninterest-bearing deposits transferable by check are, like specie and fiat money, an asset to their holders but a liability to no one, while interest-bearing time deposits are a debt, like a bond. (c) The payment of interest on deposits transferable by check converts them into money-debt, which has the property of losing its moneyness (its capacity to serve as a medium of exchange) as the interest rate paid tends to approach the market interest rate. At the limit, it is entirely debt—in no part money. (d) Hence, theory provides a sharp line of demarcation between "money" and "debt," money consisting of items used as a medium of exchange which are best regarded as assets to their holders but liabilities to no one.

This analysis differs from that of the earlier writers cited primarily by giving greater weight to the net wealth criterion than to the medium of exchange criterion, and by being much more self-consciously formal. While Pesek and Saving have many valid and important things to say on topics other than the definition of money, unfortunately on this issue their analysis seems to us clearly wrong. Like the other writers, they beg a basic question by taking it for granted, albeit by rather subtle

[10] *Ibid.*, p. 170.
[11] *Ibid.*, p. 250.

implication, that the medium of exchange function is the essential function of "money." [12] More important, their conclusions (a to d) are not valid inferences from their propositions 1 to 3.

Consider conclusions a and b, which they believe to be implications of propositions 1 and 2. Suppose that financial intermediation by some institutions that do not have demand liabilities transferable by check, such as insurance companies or savings and loan associations, may be conducted only by chartered enterprises (as is in fact the case) and that the number of charters issued is restricted by considerations other than the demand for such charters. These financial enterprises will, like Pesek's and Saving's "producers" of money, have a net worth in excess of the sums required to establish the enterprise.[13] This net worth will be the capitalized value of the part of the difference between interest received and interest paid that is not required to pay operating expenses. Or to go farther afield, radio and television stations have a net worth in excess of the sums required to establish them, because licenses are limited and granted without charge. The value of these licenses is properly included in the wealth of the community.

In all these cases, the community might be better off if free or freer entry were permitted, even though net wealth as measured might be lower. This is simply an example of a point recognized by Pesek and Saving in a footnote,[14] but thereafter almost completely disregarded. We value items by market price, which corresponds to marginal utility, not average utility; hence, a reduction in scarcity may reduce the total value (in terms of a numeraire or other goods) that we attach to the total quantity. In the extreme, a free good will have an aggregate value of

[12] What they take for granted is that use as a medium of exchange is the sole nonpecuniary service rendered by liquid assets and is the only service to which proposition 3 applies. This is not the case. Liquid assets may also render nonpecuniary services in the form of such satisfactions as pride of possession and a feeling of security, as, for example, in having a reserve for the future. Such nonpecuniary services must obviously be introduced to explain differences in interest rates on assets that they and we alike would regard it as undesirable to call "money." These nonpecuniary services must also be rendered by assets that we do call money. The volume of such services, too, need not depend on the resource content of the assets.

For a fuller discussion of these issues, see Milton Friedman, *The Optimum Quantity of Money and Other Essays*, Chicago, 1969, Chap. 1.

[13] Strictly speaking, two qualifications are necessary: We must suppose that: (1) the granting of a charter cannot be affected by the amount of money spent to persuade the authorities to grant one, otherwise competition will lead to expenditures in this direction equal to the net value of the charter (or we must exclude such sums from consideration); and (2) there exist diseconomies of scale beyond some point, else expansion in the size of the individual enterprise could substitute completely for increase in the number of enterprises.

[14] Pesek and Saving, p. 43, footnote 2.

zero, yet it clearly contributes more to total utility than a lesser amount of it would. This is the classical diamond-water paradox.

Because a bank issuing deposits transferable by check can be regarded as having a net worth equal, in the special case of proposition 2, to the amount of deposits outstanding, it does not follow that these deposits are not a liability of the bank. It simply means that the bank has a valuable charter.[15] And this would also be true for bank notes issued under similar conditions. Fiduciary currency is not the same as fiat currency. Banks are engaged in financial intermediation when they issue promises to pay dominant money bearing no interest that are in excess of the amount of dominant money they hold in their vaults. These promises to pay are properly regarded as debts of the banks.

Assume free entry, and, in the spirit of the Pesek-Saving special assumption, that there is no resource cost involved in setting up or running a bank, but that banks are permitted to pay interest on deposits transferable by check. Competition will then eliminate completely the net worth so far considered. Banks will be driven to pay depositors interest that differs from the interest they earn only because they find it prudent to hold reserves of noninterest-bearing dominant money. Interest paid will differ from interest received by a fraction equal to the ratio of such reserves to total deposits. The deposits may still be available on demand and transferable by check, but since the privilege of issuing deposits is no longer restricted, it will be worth nothing.[16] Pesek and Saving explicitly discuss this case but conclude that if interest payments continue, the result would be that "demand deposits will cease serving as money." [17]

[15] In terms of one of the T accounts (*ibid.*, p. 143, Table 6-1D) Pesek and Saving present, their bank account should be as follows:

Assets		*Liabilities*	
Debt of private sector	1,000	Debt to private sector	1,000
Charter	1,000	Net worth	1,000

Of course, more generally, the two items on each side will not be equal, as they recognize, because of costs.

[16] Pesek and Saving recognize, of course, that in practice there are costs of setting up and running a bank, and that these must be allowed for in a full analysis. However, we agree with them that ignoring these costs is useful in isolating the basic characteristic of money-debt. They discuss the resource costs explicitly and conclude correctly that these convert part of the money-debt into commodity money. The capital facilities required (buildings, machinery, etc.) will enter the bank's balance sheet as assets. These assets will be balanced on the liability side by either debt or net worth (stockholders' equity), which will enter into the net wealth of the community in the same way as the net worth of other enterprises.

[17] *Ibid.*, p. 109.

The source of this remarkable conclusion is the failure of the writers to distinguish, on a rather subtle level, between price and quantity, or alternatively, between marginal and average—a confusion that is greatly fostered by the use of "dollar" (or similar unit) to describe both price and quantity of money. They maintain that "if the interest rate paid on private money-debt is equal to the market rate of interest, then the value of this money-debt as a medium of exchange must have fallen to zero if we are to be in equilibrium on the demand side." [18] This is entirely correct if "value" is interpreted as marginal nonpecuniary services rendered by the money-debt over and above any marginal nonpecuniary services rendered by assets paying the market rate of interest,[19] or, equivalently, as the price in terms of sacrificed interest that must be paid to acquire such services. If deposits transferable by check pay interest equal to the market rate, people will indeed be induced to hold an amount such that, at the margin, an additional dollar will render no additional services in facilitating transactions. The transactions services rendered by demand deposits have become a free good, available without cost to the holders of demand deposits. At this point, Pesek and Saving make an invalid leap, concluding as follows: "As a result, private money-debt has become entirely a bond, and the money supply is once again equal to the supply of dominant money alone so that the price of this dominant money will rise; the general price level will fall." [20] This is a nonsequitur. A zero *price* for the transactions services of demand deposits does not mean that the *quantity* of money in the form of demand deposits is zero. Alternatively, a *zero marginal* yield of transactions services does not mean that the *average* yield is zero.

The actual effect on the general price level will be just the contrary of what Pesek and Saving say it will be. Removal of restrictions on entry and on the payment of interest on deposits transferable by check would make dominant money a less attractive asset, would lead to a smaller real quantity being desired, and hence, to a rise in the general price level for a given nominal amount of dominant money—provided only that the deposits are in fact convertible into dominant money on demand.[21] In a

[18] *Ibid.*, p. 118.

[19] As noted above, in footnote 12, they take the provision of a medium of exchange as the only nonpecuniary service rendered by liquid assets, and in their frame of reference would omit the qualification "over and above . . . interest."

[20] *Ibid.*, p. 118.

[21] This is what Pesek and Saving call the instant repurchase clause. Although they put great stress on this clause elsewhere, they do not refer to it in the context of the

hypothetical world in which there were no costs of setting up and running a bank, and in which deposits transferable by check provided precisely the same services as dominant money, there would be no limit to this process short of a price level of infinity in terms of dominant money. In fact, a limit would be set by the differential usefulness of deposits and dominant money for different purposes, as Pesek and Saving recognize.[22]

Another manifestation of the confusion of price and quantity in the Pesek and Saving analysis occurs in their discussion of money-debt as a joint product. Suppose that a dollar of deposits pays interest. It is entirely valid to view this dollar as they do, as providing the joint products of, say, "moneyness" and "interest-payingness," just as a rented house may provide the joint products of, say, protection against the elements and a view. It is entirely valid to regard the cost of holding a dollar of deposits as equal to the "market interest rate," [23] and to divide this cost into two parts, one paid for "interest-payingness" (equal to the interest received on the deposit), the other paid for "moneyness" (equal to the difference between the market interest rate and the interest received). This is comparable to dividing the rent paid for the house into two parts, one paid for shelter (the rent that would have to be paid for a house

quotations cited above. The reason for the omission is that the writers are under the impression that either permitting the payment of interest or not requiring convertibility is sufficient to destroy the moneyness of money-debt.

They argue that unless the instant repurchase clause is legally enforced, bank money will necessarily depreciate. As proof they cite wildcat banking (*ibid.*, p. 116). It is certainly true that there is an incentive to adulterate the product of banks as there is to adulterate any other product, and it is also true that it may be easier to get away with adulteration of bank money than of many other products, for reasons spelled out elsewhere. (See Milton Friedman, *A Program for Monetary Stability*, New York, 1959, pp. 6–8.) But competitive forces will tend to prevent the adulteration of bank money as they do the adulteration of other products—by destroying the repute of firms engaged in the practice and denying them custom. This will be so even if the operation of these competitive forces on bank money may be less rapid or less uniform than on other products. In the absence of any legal requirement for, or legal enforcement of, an instant repurchase clause (except under general legal penalties for fraud), the market will nonetheless tend to the widespread use of such a clause. At the level of abstraction on which Pesek and Saving reason, therefore, they have no need for a legally imposed instant repurchase clause.

Incidentally, by implication they grossly exaggerate the depreciation of bank money that occurred in the era of wildcat banking. As always, it is the departures from the rule that are headline news. The overwhelming bulk of bank money at the time circulated at par or differed from par only by costs of shipment (comparable to gold points).

[22] *Ibid.*, p. 117.

[23] At the level of abstraction of Pesek and Saving, it is also valid to regard this cost as equal simultaneously to the rate of interest that could be earned on a dollar invested in other assets and the rate that would have to be paid to borrow a dollar in order to hold a dollar as deposits.

identical except for the view) and the other paid for the view (the excess of rent paid over the hypothetical alternative rent).

So far so good. But Pesek and Saving go a step farther. Suppose the interest received on the deposit is 80 per cent of the market interest rate. Then, according to them the dollar of money-debt is 20 cents of money and 80 cents of debt. If the rate received is equal to the market rate, they hold that the money-debt consists of zero cents of money and one dollar of debt. This is like saying, in the case of the house, that if the rent of a house with a view happens to be the same as that of a house without a view, then there is no view! For a house, it is obvious that the two products, shelter and view, do not have a common unit of quantity whose total can be fixed in advance; if there is more of the one, there does not have to be less of the other. Hence it is easy to see the distinction between measures of quantity (how much shelter and how much of a view) and the prices paid for these quantities. It is easy to see that the fraction of the rental price paid for shelter can vary without the quantities varying because the relative price of the two products varies. The price of the view can be zero, so that no part of the rent is attributed to it, yet there can be a view. The view can be a "free" good, yet be a good.

The money-debt case is in principle identical, yet it is far less obvious because the same unit—"dollar"—is used to describe the price paid for the services of the asset (the rent), the price paid for the asset (capital value), the quantity of "debt," and the quantity of "money." A "dollar" of deposits can perfectly well contain a "dollar" of interest-payingness yet simultaneously contain a "dollar" of moneyness, provided only that the rental price of a "dollar" of moneyness is zero. We have seen that the view and shelter are two economic dimensions of the house that cannot be added directly together, though the values attributable to them can be. Likewise the "dollar" of moneyness and the "dollar" of interest-payingness can be two dimensions of the "dollar" of deposits that cannot be added directly together, though the values attributed to them can be. And just as the quantity of view may not be capable of being enjoyed continuously unless combined with the quantity of shelter, as a joint product, yet have a price of zero, so the quantity of "moneyness" may not be capable of being available in this form without being combined with the quantity of "interest-payingness," yet also have a price of zero.

This very fruitful notion of actual assets as joint products is one we

shall return to in section 4, below. For the present, the distinction between the prices paid for the separate services of an asset, and the quantities of the different dimensions of the asset, explains why Pesek's and Saving's conclusion c does not follow from their propositions 1, 2, and 3. It suggests also that if interest-paying deposits transferable by check can have a "dollar" of moneyness, then commercial bank time deposits or mutual savings bank deposits, and so on, can have moneyness as one of their components. That is a question of how we choose to define moneyness, not something to be decided a priori.[24]

The tortured analysis of Pesek and Saving reflects their attempt to keep two balls in the air at once. Money is to be simultaneously a "medium of exchange" and an item of "net wealth" and these two categories are to be wholly coincident. To categorize money as a "medium of exchange," they understandably feel driven to include all demand deposits transferable by check. But if the demand deposits paid interest, they would have to be regarded, at least in part, as a liability of the bank that issued them, and hence could not be regarded wholly as an item of "net wealth." Pesek and Saving are therefore driven to insist that the nonpayment—in fact and not merely in form [25]—of interest on demand deposits transferable by check is a necessary condition for demand deposits to be usable as a medium of exchange.

If Pesek and Saving were to carry their "net worth" criterion to its logical conclusion, regarding use as a medium of exchange as a neces-

[24] On an entirely different level, the implicit assumption that the only nonpecuniary services obtained from assets are those that facilitate transactions leads Pesek and Saving to use a model that does not seem to us fruitful for their or our purposes.

The wide range of "market" interest rates and the common observation that an individual may borrow at a far higher rate than he receives on assets he owns, suggest that it is useful to regard assets as yielding a variety of nonpecuniary services. For example, the "market interest rate" which corresponds to zero nonpecuniary services might be 10 per cent, not the 5 per cent yielded currently by long-term government securities. A long-term government bond would then be regarded as producing a joint product with 5 cents per dollar of such a bond being paid for the nonpecuniary services it yields.

With such a model, even treating a dollar of deposits as decomposable into money and debt with quantities necessarily adding to a dollar, as Pesek and Saving do, would lead them to the conclusion that a dollar of interest-paying deposits transferable by check has much moneyness and so may a dollar of interest-paying time deposits.

Even with their model, they are led to recognize that the nonpecuniary services of facilitating transactions are not homogeneous but can be of different kinds (*ibid.*, p. 117), so that in principle there are different kinds of "moneyness."

[25] Though the payment of explicit interest on demand deposits is currently prohibited by law, it is widely recognized that there are numerous indirect devices by which implicit interest is paid on demand deposits. Benjamin Klein, in an unpublished Ph.D. dissertation at the University of Chicago, has investigated the hypothesis that these devices are sufficiently effective to render the legal prohibition essentially nugatory.

sary but not sufficient condition for an item to be regarded as "money," they would be led to define money as equal to "high-powered money." This would include, for the United States, currency in the hands of the public (though not travelers' checks) [26] and the assets of banks held in the form of vault cash or deposits at Federal Reserve Banks. This total consists now, and has consisted for at least a century, of commodity money plus fiat money (i.e., governmentally issued money which has no "backing" except the "faith and credit" of the sovereign), though at times the fiat money has borne the promise to pay a fixed weight of a commodity (gold or silver) on presentation. Total high-powered money can all properly be regarded as assets of some individuals and liabilities of none.

Proceeding along this line, Pesek and Saving would include the value of bank franchises as an item of net worth along with the value of franchises for life insurance companies, savings and loan associations, and radio and TV stations. But this item of net worth would not be "money" because it is not used as a medium of exchange. This would make their treatment logically consistent—and, incidentally, align them with the early writers who treated only specie plus government note issues as money, excluding both the bank notes that then circulated and bank deposits.

Neutrality (Newlyn and Yeager). W. T. Newlyn, in a book and a subsequent article in the *Economic Journal,*[27] offers an analytical basis for defining money that we find more attractive than Pesek's and Saving's, yet still unsatisfactory. Because it can be considered an a priori approach, we discuss Newlyn's analysis in this section even though Newlyn himself, and Leland Yeager, who builds on Newlyn's analysis, both take the same view as we do, that the definition of money is "an analytic convention, and as such, should be made on the basis of analytic efficiency," rather than something that can be settled on wholly a priori grounds.[28]

[26] The treatment of American Express travelers' checks by Pesek and Saving is illustrative of their ambivalence. Because these seem obviously a medium of exchange, they treat them as money, though as "money-goods" like demand deposits, not "entirely money" like currency (Pesek and Saving, p. 190). Yet, so far as we know, there is no restriction on entry into the business of issuing travelers' checks and no legal prohibition on the payment of interest on them. In practice, of course, American Express charges rather than pays, so that interest is negative, but this does not alter the principle.

[27] *Theory of Money,* New York, 1962, and "The Supply of Money and Its Control," *Economic Journal,* June 1964, pp. 327–346.

[28] Newlyn, *Theory of Money,* p. 6. Newlyn here cites a footnote reference to a passage in *The General Theory of Employment, Interest and Money* (New York, 1936,

Newlyn starts out with the usual textbook statement that "anything is money which functions as a medium of exchange." [29] He then proceeds to distinguish in an original fashion between "the status of assets as determined by law or convention" and the "way in which they actually function." [30] By status, he asserts, only demand deposits at commercial banks in the United Kingdom (called "current accounts") are used as means of payment. Time deposits (called "deposit accounts") must be converted into demand deposits or currency to serve as a medium of exchange. He designates as *quasi-money* by status "those assets which, although indistinguishable from money as assets, do not function generally as a medium of exchange." [31]

However, "the significant [functional] characteristic of a means of payment is that ownership of it by an individual automatically increases or decreases as a result of any difference between the individual's payments and receipts, without altering its aggregate and without having any effect in the market for loans." By this criterion, he says, the total of deposits in the United Kingdom, demand and time, must be classified as money because "the banks in the United Kingdom do not make any significant distinction between the two types of deposits, with the result that time deposits can be drawn upon to make a payment without either altering the total of deposits or having any effect in the market for loans." [32]

In his subsequent article, Newlyn discusses these distinctions at greater length, and states the definition to which he is led somewhat more formally: "We classify as money those assets which can be drawn upon by their owners so as to produce an increase in aggregate expenditure without causing either a decrease in their aggregate or an increase in demand relative to supply in the market for loans. *Mutatis mutandis* for a decrease in expenditure." [33] He describes the second characteristic—not affecting the loan market—as "neutrality."

p. 167, note 1), in which Keynes states that no question of principle is involved in distinguishing "money" from "nonmoney assets." The line separating them may be drawn "at whatever point is most convenient for handling a particular problem."

[29] *Theory of Money*, p. 2.

[30] *Ibid.*, pp. 8–9.

[31] *Ibid.*, p. 6.

[32] *Ibid.*, p. 9.

[33] "The Supply of Money and Its Control," p. 339.

In order for this definition to have the empirical content Newlyn associates with it, some qualifying phrase like "on any of a wide variety of goods and services" must be understood to follow "aggregate expenditure." Otherwise, used cars traded in towards the purchase of other cars would satisfy these conditions fully—the total of used cars is unchanged, only the ownership shifts, and there is no necessary effect on the loan

Newlyn cites currency as the most obvious case of an asset satisfying his functional criterion: "currency . . . changes hands physically in making a payment, and this involves no repercussion in the economy whatever." [34] As noted, he asserts that this is true also of total commercial bank deposits. He adds, "it is satisfied by no other asset." [35]

To illustrate why it is not satisfied by other assets, Newlyn considers a "withdrawal of deposits from institutions such as building societies" (the U.K. counterpart of U.S. savings and loan associations). Such a withdrawal "will be effected by cheques drawn by these institutions on their banks in favor of their depositors. The latter will draw on the proceeds of these cheques to make payment to their creditors. As a result of these transactions bank deposits will have been redistributed, but will be unaltered in total; on the other hand quasi-money will have been reduced so that the total of quasi-money and deposits will also have been reduced. This combination of assets does not therefore satisfy the requirement that its total should be unaffected by a payment made in any of its components. Moreover, the building societies or finance houses will need to replenish their bank balances. This they may do by curtailing their lending or by selling securities; in either case the effect will be to add to the demand pressure in the market for loans." [36]

Unfortunately for this extremely appealing approach, the distinction Newlyn draws between building society deposits and other quasi-money, on the one hand, and deposits and currency, on the other, is not a logical implication of his functional criterion for money. Rather the distinction is a reflection of different unstated assumptions for payments effected by drawing on the different categories of assets. For currency and for deposits, Newlyn implicitly assumes that the recipient wishes to hold the sum transferred in the same kind of asset as that on which the payer drew: that if the payment was made by drawing on currency, the recipient wishes to hold currency; if made by drawing on deposits, the recipient wishes to hold deposits. Make the same assumption for savings and loan deposits, and they too will satisfy Newlyn's criterion. Let the purchaser

market. The same would be true for other durable goods for which it is customary to trade in used items of the same kind.

This is intended not as a criticism, only as an amplification. Newlyn would describe such transactions, we suspect, as a residuum of barter, and would note that he is implicitly referring to a "money" economy in which such transactions can be neglected.

[34] *Ibid.*, p. 335.

[35] *Ibid.*, p. 339.

[36] *Theory of Money*, p. 9.

transfer to the seller the building society's check on a commercial bank and the seller redeposit the check in a building society and both the total of quasi-money and deposits and the loan market will be unaffected.

On the other hand, suppose that the purchaser pays the seller by a check drawn on his own demand deposit at a commercial bank, but that the seller chooses to hold the proceeds in currency and so "cashes" rather than "deposits" the check. The transaction is then nonneutral in precisely the same sense as the withdrawal from the building society. The bank on which the check is drawn, and banks as a whole, to use Newlyn's words, "will need to replenish their [reserve] balances. This they may do by curtailing their lending or by selling securities; in either case the effect will be to add to the demand pressure in the market for loans." Whether the total of currency and deposits under these circumstances will be different than otherwise depends on the point at which the analysis is stopped. If it is stopped before banks have started adjusting to their depleted reserves, the total will be the same. If, as seems more consistent with Newlyn's approach, it is stopped only after the full repercussions on the financial sector of the particular payment, then this total will be less.

Leland Yeager, in his expansion of Newlyn's analysis, recognizes this problem. Indeed, on these grounds he excludes from his definition of money for the United States both time deposits at commercial banks and travelers' checks, the former because—in contrast with the United Kingdom—reserve requirements are different for time and demand deposits, and hence banks do not regard the two classes as the same; and the latter because the issuer of travelers' checks does not hold 100 per cent cash reserves.[37]

He notes that "when demand deposits are cashed in for currency, the drain on reserves limits banks' assets and deposits." But he regards this qualification as "minor" because "if the authorities that create 'high-powered dollars' and the banks, taken together, want to expand the money supply, they can do so. . . . By providing enough reserves to support them, the monetary authorities can maintain any desired amount of demand deposits in existence." [38] He therefore defines money for the United States as currency and demand deposits.

But this lets the cat out of the bag. Clearly, the monetary authorities

[37] "Essential Properties of the Medium of Exchange," *Kyklos*, 1968, No. 1, p. 57.
[38] *Ibid.*, p. 50, note 8.

and the banks, acting together, can as readily "maintain any desired amount" of total commercial bank deposits "in existence" as of demand deposits alone. If they wish to, they can render "neutral" the conversion of savings and loan shares into currency or demand deposits by absorbing the assets that are the counterpart of the savings and loan liability and creating the currency desired or the reserves required to support the demand deposits desired. Once we permit this escape valve, the "neutrality" criterion loses both its appeal and its definiteness. Strictly speaking, only high-powered money has the characteristic that it "can be drawn upon . . . to produce an increase in aggregate expenditure without . . . a decrease in [the] aggregate of that sort of asset in existence." Similarly, high-powered money is "neutral" in Newlyn's sense, though it requires a somewhat strained interpretation of some ordinary transactions to be able to interpret it as such.

To illustrate, let someone make an expenditure by drawing on a demand deposit. If we are testing Newlyn's criterion on "high-powered money" only, we shall have to interpret this as a joint drawing on two assets: the now quasi-money consisting of (1) the excess of the deposit over its pro rata share of bank-held high-powered money and (2) high-powered money itself. The part of the payment financed by the quasi-money will not be neutral unless the recipient happens to wish to hold it in the same form, which he can do only by redepositing it, along with the high-powered money part, in a bank. For the purchaser to pay in full in high-powered money, he will have to transfer currency. To get the currency by simply drawing down his demand deposit will be a non-neutral transaction (like withdrawing a savings and loan account in Newlyn's example). The only way he could get the cash in a "neutral" way would be by a joint transaction in which he (a) drew down his deposits by an amount such that the high-powered money part was sufficient to make the desired payment, (b) received this part in currency, and (c) used the balance to purchase an asset from the banking system (which could mean repaying a loan). This would provide him with high-powered money without affecting the loan market, since the reserve position of the banking system would not be disturbed by his transactions. If the recipient holds the proceeds in currency, that is clearly "neutral" in Newlyn's sense. If he chooses to hold the proceeds in deposits, that is not simply a money-changing transaction (with high-powered money as the definition of money); it is partly the purchase

of a quasi-money asset (nonhigh-powered part of his deposits) and so should not be neutral. In order for him to convert the whole of his currency receipt into a corresponding high-powered money asset at a bank, he would have to deposit a sum such that the high-powered money part corresponded to the currency deposited and to finance the rest of his deposit by borrowing from, or selling an asset to, a bank.

We therefore conclude that if Newlyn's criterion is consistently adhered to, money must be regarded as that part of the medium of exchange the nominal amount of which is outside the control of the actions of the public.[39] Accordingly, it is the same total of high-powered money that must be regarded as money on Pesek's and Saving's net wealth criterion.

Market Equilibrium (Gramley-Chase). Gramley and Chase, in a highly formal analysis of monetary adjustments in the shortest of short periods (Marshall's market equilibrium contrasted with his short-run and long-run equilibria), discuss the definition of money only incidentally.[40] Yet their analysis qualifies for consideration along with the analyses of Pesek and Saving, Newlyn, and Yeager because, like the

[39] Yeager also argues that "asset preferences work asymmetrically. Because of them, a constant supply of actual money can restrain the expansion of near-moneys. But there is no such restraint the other way around: not even some sort of ceiling on near-moneys could keep the monetary authorities from creating as much money as they wished. In the absence of a ceiling, near-moneys tend to gear themselves to the money supply" (*ibid.*, p. 53). In our view there is no such asymmetry. In the absence of a ceiling, let the monetary authorities choose a given quantity of specified near-moneys as their objective. To attain this objective, they would have to let money "gear itself" to the supply of near-moneys (i.e., they would have to let the quantity of high-powered money be whatever is necessary for the quantity of money to be the amount desired, given the specified quantity of near-moneys), so that "a constant supply" of near-moneys "can restrain the expansion" of money.

Yeager goes on, "To dramatize the asymmetry, . . . let us suppose that some official ban on the expansion of near-moneys thwarts this gearing. As the quantity of money expanded beyond what people initially wanted to hold, competition for the fixed supply of near-moneys would drive their yields low enough to keep people indifferent at the margin between them and money. But nothing would keep prices or incomes from rising until people desired to hold all the new money" (pp. 53–54). We might also suppose, however, an "official ban on the expansion" of the nominal quantity of money, coupled with an official desire to expand the quantity of near-moneys beyond the level initially consistent with the quantity of money. To achieve this desire the authorities would raise the yields offered on near-moneys to whatever extent is necessary to induce the public to hold additional near-moneys. This would lower the nominal quantity of money desired at prior prices. But nothing would keep prices or nominal incomes from rising to keep people "indifferent at the margin between" money and near-moneys.

The real asymmetry, if there be any, is on the side of supply, which again means that Yeager's analysis leads to high-powered money, not currency plus demand deposits, as the relevant total.

[40] Lyle E. Gramley and Samuel B. Chase, Jr., "Time Deposits in Monetary Analysis," *Federal Reserve Bulletin,* Oct. 1965, pp. 1380–1404.

others, Gramley and Chase believe that far-reaching substantive conclusions about monetary analysis can be derived from rather simple abstract considerations and, like Newlyn and Yeager,[41] they put great stress on whether the decisions of the public can or do affect monetary totals.[42] That "the stock of money" is "an exogenous variable set by central bank policy," they regard as one of the "time-honored doctrines of traditional monetary analysis." They contrast this "more conventional view" with the "new view" that "open market operations alter the stock of money balances if, and only if, they alter the quantity of money *demanded* by the public." [43]

In their model—and also in the "more conventional view"—only high-powered money is a strictly exogenous variable in the sense that the amount outstanding cannot be altered by transactions among the public or between the public and banks other than the central bank (or monetary authority). The "more conventional view" nonetheless—and correctly—treats the quantity of money (defined more broadly than high-powered money) as, for all practical purposes, "an exogenous variable set by central bank policy" because it accepts the empirical hypothesis that a change in high-powered money will produce private reactions that will rapidly alter the quantity of money *demanded* by the public in a predictable way. Far from incorporating a "new view" in any substantive sense, the Gramley-Chase analysis involves the elaborate spelling out of one minor component of the adjustment process envisaged by the "more conventional view"—the component that consists of the *initial* readjustment of portfolios abstracting both from subsequent portfolio readjustments and from any effects of the initial and subsequent readjustments on spending for current services or on the production of capital goods, or on incomes and prices. As in any Marshallian market equilibrium which holds constant quantities (other than a quantity change that has

[41] Yeager, we should note, explicitly criticizes Gramley and Chase ("Essential Properties of the Medium of Exchange," p. 49, note 7).

[42] In this respect they follow James Tobin, "Commercial Banks as Creators of 'Money'" in *Banking and Monetary Studies,* Deane Carson, ed., Homewood, Ill., 1963, pp. 408–419. Tobin presents a lucid exposition of commercial banks as financial intermediaries with which we agree fully and which we find most illuminating. His analysis, like that of Pesek and Saving, Newlyn, Yeager, and as we shall note, Gramley and Chase, demonstrates that emphasis on supply considerations leads to a distinction between high-powered money and other assets but not between any broader total and other assets. Unlike Gramley and Chase, Tobin explicitly eschews drawing any far-reaching conclusions for policy and analysis from his qualitative analysis.

[43] "Time Deposits in Monetary Analysis," p. 1390.

initiated the adjustment), prices (in this case, interest rates) take the brunt of the adjustment, moving much more than the amount required to clear markets in the short run, let alone the long run.

If Gramley and Chase were to let more items out of the pound of *ceteris paribus,* they would find that the adjustments to open market operations would spread in such a way as to reduce the direct impact on interest rates and increase the effect on the quantity of money. Accordingly, they would find less reason to distinguish between the alleged "new view" and the "more conventional view." Even on the level of portfolio adjustment alone, still abstracting from effects on spending, income, and prices, the particular securities initially affected by an open market operation (the securities purchased and sold by the central bank plus, under the Gramley-Chase assumptions, bank assets) are only part of the whole structure of assets.

Let the central bank make an open market purchase of a particular category of securities. To induce holders of the securities to sell, it will have to raise the price (i.e., lower the yield). This will induce some holders to part with securities, accepting money in return. Gramley and Chase stop their analysis at this point—treating the seller of securities as if he were in equilibrium with respect to his asset structure. But this is only the first reaction. The seller of the securities accepted money not as a permanent abode of his wealth to replace the securities sold but—as for all other purchases and sales in a money economy—a temporary abode, pending the opportunity to buy alternative assets. As he attempts to buy other assets, he raises their prices, spreading the effect on interest rates but at the same time moderating the effect on the initial assets considered.

As the prices of existing assets are bid up, it becomes more advantageous to produce rather than to buy such assets, to rent service flows rather than buy existing sources of services. This spreads the effect to spending, income, and prices, further moderating initial interest rate effects.

It is instructive to have the initial component of this adjustment process spelled out in detail, as Gramley and Chase have done. But it is scarcely justifiable, to say the least, to leap as they do from the wholly abstract analysis of this minor component to substantive conclusions about the process as a whole—to express judgments, as it were, about

a man's physiognomy, character, and familial relations on the basis of a microscopic examination of his finger tips.[44]

2. "Liquidity"

We turn now to a view that is at the opposite end of a continuum. The view of "liquidity" as the essential characteristic of money has been stressed in the United States largely as a result of the pioneering work on financial intermediaries by Gurley and Shaw. They argued that the liabilities of nonbank financial intermediaries are close substitutes for currency and commercial bank deposits, that such liabilities may be expected to grow secularly relative to currency and bank deposits and, in the course of cyclical fluctuations, to change in the opposite direction thereby frustrating attempts by monetary authorities to affect the economy by controlling the quantity of currency and bank deposits.[45] This view, put forward tentatively by Gurley and Shaw, was asserted—almost

[44] To illustrate: They state correctly that "central bank actions do not affect the actual money stock except as they lead to a change in desired money balances. The effect of these actions on money income occurs not because the money stock has been altered, but because financial variables through which the central bank alters the desired stock of money also affect the public's decisions to purchase goods and services" (*ibid.*, p. 1403). (Equivalent: The rabbit was killed not because the hunter pressed the trigger but because the bullet hit it.)

From this they conclude, "Whether financial markets ever behaved in such a way as to permit . . . changes in the money stock [to be interpreted as an appropriate indicator of monetary policy conducted through conventional means] is debatable, but there is little doubt that such a simple rule for appraisal of central bank operations is no longer appropriate" (p. 1403).

This may or may not be true, but it cannot be inferred from a theoretical analysis alone, let alone from one that omits what many analysts would consider the most important aspects of the adjustment process. It requires some empirical evidence, none of which is presented or even adverted to by Gramley and Chase.

[45] John G. Gurley and Edward S. Shaw, "Financial Aspects of Economic Development," *American Economic Review*, Sept. 1955, pp. 515–538; "Financial Intermediaries and the Savings-Investment Process," *Journal of Finance*, May 1956, pp. 257–276; "The Growth of Debt and Money in the United States, 1800–1950: A Suggested Interpretation," *Review of Economics and Statistics*, Aug. 1957, pp. 250–262; *Money in a Theory of Finance*, Washington, D.C., 1960.

Gurley and Shaw themselves do not regard their analysis as requiring, or even suggesting, that "money" be defined as the sum of all liquid assets. Rather they view it as contributing to an understanding of the relation between money and other economic magnitudes, however money is defined. In another context, Gurley has experimented with defining money as the weighted sum of different categories of assets. (See *Liquidity and Financial Institutions in the Postwar Period*, Study Paper No. 14, U.S. Congress, Joint Economic Committee, Study of Employment, Growth, and Price Levels, Washington, D.C., 1960, pp. 7–8.) In a discussion of policy, Shaw has defined money as equal to currency plus demand deposits adjusted ("Money Supply and Stable Economic Growth," *United States Monetary Policy*, New York, American Assembly, 1958, pp. 49–71).

without qualification—in the *Report* by the Radcliffe Committee on the Working of the Monetary System: ". . . monetary action works upon total demand by altering the liquidity position of financial institutions and of firms and people desiring to spend on real resources; the supply of money itself is not the critical factor." [46] "We must," wrote Sayers, one of the chief authors of the *Radcliffe Report,* "put, in the place conventionally occupied by 'the supply of money,' " a "wide concept of liquid assets" as "the monetary quantity influencing total effective demand for goods and services." Just as, in the course of the nineteenth century, notes became, as Keynes pointed out, the "small change" of bank money, so "in an important sense, bank deposits have already become the small change of the system. . . . 'Commercial banks' shade into industrial banks, savings banks and building societies, and these into a host of other financial intermediaries; the liabilities of these are close substitutes for each other, so that a clamping down on one group will not create such an abrupt scarcity of liquidity as will have a worthwhile impact on the pressure of total demand." [47]

Sayers and others who take the same view may be right. As noted earlier, there is a priori no reason why a fairly narrowly defined subtotal of liquid assets should have any special importance. With this version, as with the version stressing the strict medium of exchange function, the issue is an empirical one to be settled by an appeal to the facts. Sayers recognizes this, yet neither he nor other proponents of the broad "liquidity" approach have offered more than the most casual empirical observations to support their assertions—in Sayers' case frequently expressed in an unqualified manner as what we "must" do—even when the assertions run counter to the judgment of many economists over a long period.

Several studies have been made in recent years to test various aspects of the Gurley-Shaw and Radcliffe Committee empirical conjectures; in particular, to investigate whether the liabilities of financial intermediaries do in fact behave in such a way as to offset the movements in currency and commercial bank deposits over the cycle; and to estimate the degree of substitutability among various liquid assets. No tested conclusion has

[46] *Radcliffe Report,* Cmnd. 827, 1959, para. 397 (d).

[47] R. S. Sayers, "Monetary Thought and Policy in England," *Economic Journal,* Dec. 1960, pp. 712, 721–724. The reference to Keynes is to *A Treatise on Money,* Vol. I, p. 40. These conclusions are sharply criticized by Newlyn in both *Theory of Money* and "The Supply of Money and Its Control," as well as by Roy Harrod, "Is the Money Supply Important?" *Westminster Bank Review,* Nov. 1959, pp. 3–7.

yet emerged from these studies. It is perhaps fair to say that, taken as a whole, the evidence is adverse to the Gurley-Shaw thesis that the movements in the liabilities of financial intermediaries severely hinder the effectiveness of monetary policies.[48] In regard to substitutability, all of the studies show that various assets are substitutes for one another to some degree, as is to be expected. Estimates of the degree of substitutability differ, but the major difference among authors is less in the numerical size of the elasticities they find, than in the adjectives they use to describe the size. The same numerical elasticity is described by one author as showing that the assets are "close" substitutes, by another that they are "weak" or "distant" substitutes.[49] This ambiguity reflects the absence of any clear purpose in terms of which to judge the size of the elasticity.

Definition of Liquidity

In discussing the medium-of-exchange criterion, we noted that it offered an uncertain guide to the classification of assets into those that serve as a medium of exchange and those that do not. This difficulty is

[48] See Carl F. Christ, "Interest Rates and 'Portfolio Selection' Among Liquid Assets in the U.S.," *Measurement in Economics: Studies in Mathematical Economics and Econometrics,* in Memory of Yehuda Grunfeld, 1963, pp. 201–218; Edgar L. Feige, *The Demand for Liquid Assets: A Temporal Cross-Section Analysis,* Englewood Cliffs, N.J., 1964, pp. 24 ff.; Allan H. Meltzer, "The Demand for Money: The Evidence from the Time Series," *Journal of Political Economy,* June 1963, pp. 227, 230. Meltzer's finding that the growth of financial intermediaries produced primarily a wealth effect and not a substitution effect was challenged by T. J. Courchene and H. T. Shapiro on the grounds that (1) his regression procedure was not a useful method to measure the extent of the substitution effect, with respect to interest rates, between the various monetary variables, and (2) his conclusion was not based on relevant evidence. Additional evidence that they presented, however, supported Meltzer's conclusion ("The Demand for Money: A Note from the Time Series," *Journal of Political Economy,* Oct. 1964, pp. 498–500). Tong Hun Lee reported findings adverse to the Gurley-Shaw thesis in "Income, Wealth, and the Demand for Money: Some Evidence from Cross-Section Data," *Journal of the American Statistical Association,* Sept. 1964, pp. 746–762, and findings favorable to the thesis in "Substitutability of Non-Bank Intermediary Liabilities for Money," *Journal of Finance,* Sept. 1966, pp. 448–452. David Fand concludes that the Gurley-Shaw effect is "an assumption rather than a proposition derived from empirical evidence" ("Some Implications of Money Supply Analysis," *American Economic Review,* May 1967, p. 392).

See also F. P. R. Brechling and R. G. Lipsey, "Trade Credit and Monetary Policy," *Economic Journal,* Dec. 1963, pp. 618–641. They find that trade credit is "at least a very strong potential frustrator of monetary policy." W. H. White disputes this conclusion, arguing that if proper allowance is made for bias in the data cited in support, "trade credit yields a completely negligible offset to monetary policy in all years" ("Trade Credit and Monetary Policy: A Reconciliation," *Economic Journal,* Dec. 1964, p. 944). A rejoinder appeared in the March 1966 issue of the same periodical (pp. 165–167), a mimeographed reply by White in May 1967, and a further mimeographed analysis by Brechling and Lipsey in June 1967. See also Chapter 4, footnote 5.

[49] See Chapter 4, pp. 181–184.

minor for the medium-of-exchange criterion. The corresponding difficulty is major for the "liquidity" criterion.

Attempts to define "liquidity" precisely have failed to produce anything like a consensus. Consequently, the term is usually used without precise definition, different writers stressing different characteristics of assets. Whatever common content there is to the notion of "liquidity" at the present stage of development is multidimensional and does not provide an unambiguous way to classify assets by degree of liquidity, let alone to draw a line between assets that can be termed "nonliquid" and those "liquid" assets whose total value Sayers and others would put in "the place conventionally occupied by 'the supply of money.' " [50]

One dimension often stressed in discussions of "liquidity" is the ability to sell an asset on demand (more precisely, within a specified time interval) for a nominal sum fixed in advance (i.e., to convert the asset into a fixed nominal number of units of "money").[51] By this measure, Series E U.S. government bonds and cash surrender values of life insurance policies are almost perfectly liquid. So also are time deposits and savings and loan shares, given that banks and savings and loan associations in practice honor requests for conversion on demand. These assets would not be liquid by this measure if the banks and associations exercised their legal right to require extended notice before conversion. Marketable U.S. government securities, corporate bonds, commercial paper, and corporate equities are nonliquid (or less liquid than the other items) by this measure.

Another dimension frequently stressed in discussions of liquidity is the degree of perfection of the market in the asset as manifested in the ready salability of the asset at a well-defined market price. This dimension can be measured by the difference between the price at which the asset can be purchased and the price at which it can be sold at any particular time (more precisely, within a specified time interval). In other words, the dimension can be measured by the range between the

[50] See Arthur L. Broida, "Liquidity as a Variable in Monetary Analysis," unpublished Ph.D. dissertation, University of Chicago, 1963; also J. R. Hicks, "Liquidity," *Economic Journal*, Dec. 1962, pp. 787–802, and *Critical Essays in Monetary Theory*, New York, 1967, essays 1–3 on the "Two Triads."

[51] When this approach is taken, it is with the implicit qualification that the nominal sum fixed in advance is equal to or close to the sum paid for the asset or to its "value" calculated in some nonmarket way (e.g., initial amount paid plus accumulated interest). Otherwise, puts and calls, for example, would convert equities into perfectly liquid assets by this definition.

"bid" and "ask" prices, both including any brokerage charges.[52] By this measure, most marketable U.S. securities are highly liquid assets, typically more liquid, for example, than savings and loan shares, the withdrawal of which may involve a loss of accumulated interest amounting to a larger fraction of the sum withdrawn than the bid-and-asked range on, say, Treasury bills of the same amount. Similarly, by this measure, equity stocks or corporate bonds traded on major stock exchanges are clearly highly liquid assets, much more so, for example, than holdings of British or Japanese currency by a U.S. citizen.

This discussion is not intended to be exhaustive.[53] It is intended only to suggest that the use of the term "liquidity" conceals more conceptual problems than it resolves.

Statistical Counterparts Used

Diversity characterizes not only the dimensions of liquidity stressed in conceptual discussions but also the statistical counterparts to liquid assets used in empirical studies.[54] In the United States, surveys of consumer finances, including ownership of liquid assets, have been conducted for the Board of Governors of the Federal Reserve System from 1946 on. Prior to 1957, the surveys treated as liquid assets demand deposits, savings deposits, shares in savings and loan associations and credit unions, U.S. savings bonds, and marketable U.S. government securities. Thereafter, marketable government securities were dropped from the definition of liquid assets (currency holdings have never been obtained).[55] In addition, the Federal Reserve constructed annual estimates

[52] Note that the bid-and-asked range will typically be a function of the period of time allowed to sell the asset. Therefore by this measure asset A may be more liquid than asset B if a day is specified as the time interval, while B may be more liquid than A if a month is specified as the time interval.

[53] Broida's dissertation ("Liquidity as a Variable in Monetary Analysis") indicates what a major undertaking that involves.

[54] In the United Kingdom, the Radcliffe Committee did not agree upon a concept of liquidity, much less develop a statistical measure of it. In a survey of liquid assets of nonfarm families in Canada conducted by the Dominion Bureau of Statistics, liquid assets are defined to include current accounts, savings accounts, other deposits, and all bond holdings, whether obligations of the Government of Canada, other public authorities, or corporations (*Income, Liquid Assets and Indebtedness of Non-Farm Families in Canada, 1955*, Reference Paper No. 80, Dominion Bureau of Statistics, 1958).

[55] See *Federal Reserve Bulletin*, Mar. 1959, p. 251. The same definition of liquid assets was used in the survey of financial characteristics of consumers, conducted for the Board of Governors, in 1962 (*ibid.*, Mar. 1964, p. 290), and in a Survey Research Center study (*Consumer Behavior of Individual Families Over Two and Three Years*, R. F. Kosobud and J. N. Morgan, eds., Monograph 36, Institute for Social Research, University of Michigan, 1964, pp. 76–78).

Data based on the earlier definition of liquid assets, including government securities,

of liquid asset holdings of individuals and businesses, 1939–54, in which liquid assets were defined as currency, demand deposits, time deposits, savings and loan shares, and U.S. government securities.[56] More recently, the Federal Reserve has published estimates of the public's holdings of "selected" liquid assets, restricting the coverage of government securities included to U.S. savings bonds and short-term government securities.[57] It has also published a chart of liquid asset holdings, defined as above, except that U.S. savings bonds are excluded.[58]

SEC quarterly estimates of savings of individuals in the U.S. have been used to derive quarterly estimates of liquid assets.[59] Through 1957, the SEC estimates included a subtotal labeled "total liquid saving," which changed in composition, becoming less inclusive over the period it was shown.[60] The flow-of-funds accounting system has since superseded the SEC individual savings data as the source of quarterly estimates of liquid assets, but users must still decide for themselves which items to include in the total.[61]

were used by Mordechai E. Kreinin, "Analysis of Liquid Asset Ownership," *Review of Economics and Statistics*, Feb. 1961, p. 76, and by Harold W. Guthrie, "Consumer Propensities to Hold Liquid Assets," *Journal of the American Statistical Association*, Sept. 1960. Guthrie commented: "Currency and the cash surrender value of life insurance policies, although liquid in the economic sense, are not included in the surveys for technical reasons" (p. 470).

[56] Klein and Goldberger's econometric model of the U.S. (L. R. Klein and A. S. Goldberger, *An Econometric Model of the United States, 1929–1952*, Amsterdam, 1955) relied on these Federal Reserve liquid asset estimates.

[57] S. H. Axilrod, "Liquidity and Public Policy," *Federal Reserve Bulletin*, Oct. 1961, p. 1168.

[58] D. H. Brill, "Recent Changes in Liquidity," *Federal Reserve Bulletin*, June 1963. The author notes: ". . . any operational definition must be somewhat arbitrary. Given the availability and quality of data, attempts at further refinement in measurement are not likely to add substantially to understanding and insight" (p. 757).

[59] Zellner used SEC bench mark estimates of currency, deposits, savings and loan shares, and U.S. savings bonds to obtain quarterly estimates by cumulating individual quarterly saving or dissaving in these forms, 1947 I–1955 I (Arnold Zellner, "The Short-Run Consumption Function," *Econometrica*, Oct. 1957, p. 559). Griliches *et al.* replaced Zellner's estimates beginning 1952 I and extended them through 1961 II, substituting flow-of-funds data described in the text. With one minor exception (the exclusion of individuals' business liquid assets, which Zellner had included), there is no difference in definition of the estimates in the two segments (Z. Griliches, G. S. Maddala, R. Lucas, and N. Wallace, "Notes on Estimated Quarterly Consumption Functions," *Econometrica*, July 1962, pp. 491–500). Zellner adopted the series as revised by Griliches in subsequent work (A. Zellner, D. S. Huang, and L. C. Chau, "Further Analysis of the Short-Run Consumption Function," *Econometrica*, July 1965, pp. 571–581).

[60] When the subtotal included the change in currency and bank deposits, savings and loan shares, private insurance, securities, mortgage debt, and consumer and other debt, it was used as a measure of change in liquid assets by Morris Cohen, "Liquid Assets and the Consumption Function," *Review of Economics and Statistics*, May 1954, p. 210.

[61] A definition including currency, demand deposits, and fixed-value redeemable claims (savings deposits, savings and loan shares, U.S. savings bonds) is used by D. B. Suits, in "The Determinants of Consumer Expenditure: A Review of Present Knowl-

Data on liquid asset holdings have been obtained from sources other than the regularly reported ones thus far listed, and the definitions used have varied with the user. Liquid asset holdings of a sample of homebuyers were defined as "lender-confirmed bank deposits, stocks, and bonds." [62] Business holdings of liquid assets are frequently defined as cash and marketable securities, or as cash and government obligations.[63]

In short, numerous statistical measures of liquid assets that include a very wide variety of items in various combinations have been used. Indeed, almost the only broad class of assets that has uniformly been excluded is physical capital. And the differences among the various totals used have been far from trivial. The dollar value of a fairly comprehensive total can easily be double that of a fairly restrictive total.[64]

Theoretical Analysis

This diversity in usage reflects in part the absence of an explicit, consistent application of the theoretical approach under discussion. Let us, therefore, tentatively accept the empirical judgments that we believe are implicit in the "liquidity" approach and see whether we can specify more precisely the monetary total that this approach recommends. The key empirical judgments, we believe, are as follows: (1) The critical distinction to holders of wealth is not between *nominal* and *real* assets

edge," in *Impacts of Monetary Policy*, Commission on Money and Credit, Englewood Cliffs, N.J., 1963, pp. 1–57; and D. B. Suits and G. R. Sparks, "Consumption Regressions with Quarterly Data," *The Brookings Quarterly Econometric Model of the United States*. J. S. Duesenberry *et al.* (ed.), Chicago, 1965, pp. 210, 222.

[62] D. B. Rathbun, "Liquid Assets: A Neglected Factor in the Formulation of Housing Finance Policies," *Journal of Finance*, Dec. 1952, p. 547.

[63] Two studies in which the first definition is used are: F. E. Norton, "Some Cross-Sectional Explorations in Investment Behavior," *Southern Economic Journal*, Jan. 1956, p. 332 (the author lists ten different liquidity variables of which liquid assets is one); Yehuda Grunfeld, "The Determinants of Corporate Investment," unpublished Ph.D. dissertation, University of Chicago, 1958. Two examples of the use of the second definition are M. Cohen and M. R. Gainsbrugh, "Capital Appropriations: Durables Spark Recovery," *The Conference Board Business Record*, June 1959, p. 263; E. Kuh and J. R. Meyer, "Investment, Liquidity, and Monetary Policy," in *Impacts of Monetary Policy*, p. 353.

[64] For example, on June 29, 1960, the value of separate categories of financial assets held by the public was as follows (in billions of dollars):

1. Currency	28.3	7. Cash surrender value of life insurance policies (policy reserves)	98.5
2. Demand deposits	107.8	8. Short-term marketable U.S. government securities	42.0
3. Commercial bank time deposits	67.4	9. Other U.S. government securities	59.6
4. Mutual savings bank deposits	35.4	10. State and local securities	52.2
5. Savings and loan shares	58.3	11. Private marketable bonds	161.3
6. U.S. savings bonds	47.5		

The sum of items 1 to 6, which would be a fairly restrictive definition, is $345 billion; the sum of items 1 to 11, a fairly comprehensive total, is $758 billion.

but between short-dated and long-dated assets, whether nominal or real (more fundamentally, assets with "low" and "high" capital risk).[65] (2) There exists a set of relative returns on short-dated assets at which the public is largely indifferent to the composition of its portfolio of such assets and issuers of such securities are largely indifferent to the composition of their liabilities. As a result, relative quantities can fluctuate considerably with little fluctuation in relative yields (a partial liquidity trap). (3) The public desires to hold a fairly constant total amount of such assets relative to its spending,[66] or, alternatively, shifts in the ratio of such assets to all other assets produce changes in the level of interest rates on such assets, both absolutely and relative to the rates on other assets, which have significant effects on spending for current resource services.

This discussion is in terms of "assets" but clearly its logic requires that "debts" be treated as "negative" assets. This has in fact been suggested by some writers.[67] If the total is to include short-dated assets (as assets with little capital risk), it should also include short-dated debts (with equally little capital risk), since an asset that matures at the same date as a debt provides no net purchasing power to the holder of the asset. Similarly, the logic of the approach suggests treating the translations in parentheses in the preceding sentence not as translations but as additional conditions. The empirical judgment is that most short-dated assets and liabilities have little capital risk—because changes in interest rates have little effect on their present value—and hence that a total of short-dated assets and liabilities can be used as an approximation to the total of assets and liabilities subject to little capital risk. But it might be better to use the low capital risk criterion directly, to allow for types of

[65] See Axel Leijonhufvud, *On Keynesian Economics and the Economics of Keynes: A Study in Monetary Theory,* New York, 1968, pp. 146–149, for a persuasive argument that when Keynes distinguished between "money" and "bonds" in *The General Theory,* he intended this distinction rather than the distinction that has been used by later writers between money, interpreted as noninterest-bearing assets, and all other assets of whatever period.

As for real vs. nominal, note that the view under discussion has been supported largely by economists who follow Keynes' practice of treating the price level as rigid and who therefore tend to treat real and nominal magnitudes as synonymous.

[66] This proposition is less clear than the other two. However, it is necessary if any total is to have significance. In particular, it would be strongly denied by those economists who regard a full liquidity trap as empirically important. But they would deny significance to any total short of total wealth and perhaps even to that.

[67] Albert G. Hart, *Money, Debt, and Economic Activity,* New York, 1948, p. 134; and "Uses of National Wealth Estimates and the Structure of Claims," *Studies in Income and Wealth,* Vol. 12, New York, NBER, 1950, pp. 86–87.

risk other than changes in interest rates. For example, short-term personal loans stated in nominal value may have considerable capital risk; inventories are a real asset that may have considerable capital risk, not because of changes in interest rates or in the general price level but because of changes in relative prices. It is on this ground that followers of this approach would exclude most real assets—even the short-dated, a category in which inventories can be classified.

A central notion in this approach is the distinction between "financial intermediaries" and the rest of the public. This distinction plays the same role as the distinction between "banks" and the nonbank public in more conventional definitions of money.[68] Just as, in our measures of "money," we exclude vault cash and interbank deposits, so, in measuring the liquidity total, we must exclude short-dated assets held by financial intermediaries and not subtract their short-dated debts.[69] Unless this is done, the subtraction of short-dated debts would involve the cancellation of the corresponding short-dated assets, since one person's or institution's liability is some other person's or institution's asset. For example, consider trade credit, which is one of the items that has been extensively discussed. Trade credit is a short-term liability of some firms and a short-term asset of others. If neither set of firms is treated as financial intermediaries, the assets and liabilities will cancel. In order to avoid cancellation, one would have to treat the firms owing the liabilities as financial intermediaries, which seems very strained usage indeed.[70] The same considerations apply to short-term commercial paper.

The notion "short-dated" is also rather arbitrary—is it to be taken to mean one day, one week, one month, three months? This could be handled in principle by constructing a series of estimates, $L(m)$, where m is the maturity regarded as separating short-dated from long-dated assets and liabilities.

[68] See Joseph M. Burns, "The Saving-Investment Process in a Theory of Finance," unpublished Ph.D. dissertation, University of Chicago, 1967, for a discussion of the meaning and role of financial intermediation.

[69] To the best of our knowledge, all liquid asset totals actually constructed have neglected this caveat and so have introduced double-counting—e.g., currency and commercial bank deposits have been added to liabilities of savings and loan associations without subtracting currency and commercial bank deposits held by associations.

[70] Of course, theoretically there is no necessity for a dollar of debt to have negative "liquidity" equal in absolute value to the positive "liquidity" of a dollar of assets. This point is essentially the same as the one we have referred to in suggesting the possibility that money might be defined as a weighted aggregate of selected assets. A corresponding variant of the liquidity approach would be to weight assets differently from liabilities.

If we neglect capital risks other than those arising from changing interest rates (i.e., neglect risks from default, changing relative prices, etc.), and let m approach infinity, then $L(m)$ would approach total national wealth, equal, after consolidation, to real wealth plus high-powered money, if individuals are regarded as treating the obligation to pay taxes to finance interest payments on government debt as a liability. If individuals do not regard this obligation as a liability, then net government debt would be added to real wealth and high-powered money.

This limiting process makes it clear that this approach stresses the division of total wealth into two parts—one that asset holders regard as subject to control over short periods and that they try and are able to keep in a fairly consistent relation with their spending, the other that asset holders regard as not subject to control except over longer periods and that they are willing to let vary considerably relative to spending. Rates of interest can vary considerably between the two parts of wealth but, within each part, different rates are fairly fixed in relation to one another. Changes between the two sets of rates of interest are the major channel through which policies altering the total of the liquid assets are believed to affect economic activity.[71]

This approach is an appropriate theoretical counterpart to an analysis of changes in income and expenditures along Keynesian lines. That analysis takes the price level as an institutional datum and therefore minimizes the distinction between nominal and real magnitudes. It takes interest rates as essentially the only market variable that reconciles the structure of assets supplied with the structure demanded.[72]

The usefulness of the approach is, of course, an empirical, not a theoretical, question. On this, there is much assertion but little hard evidence.

[71] See Radcliffe Committee; Sayers; Gramley and Chase; and Tobin, *oper. cit.*

[72] It is instructive that economists who adopt this general view typically write as if the monetary authorities could determine the real and not merely the nominal quantity of high-powered money. For example, William C. Brainard and James Tobin in setting up a financial model to illustrate pitfalls in the building of such models use "the replacement value of . . . physical assets . . . as the numeraire of the system," yet regard "the supply of reserves" as "one of the quantities the central bank directly controls" ("Pitfalls in Financial Model-Building," *American Economic Review*, May 1968, pp. 101–102). If the nominal level of prices is regarded as an endogenous variable, this is clearly wrong. Hence the writers must be assuming this nominal level of prices to be fixed outside their system.

Keynes' "wage unit" serves the same role in his analysis and leads him and his followers also to treat the monetary authorities as directly controlling real and not nominal variables.

3. Conclusion on A Priori Approaches

A key difference between the two theoretical approaches considered in this chapter is that the medium-of-exchange approach stresses conditions of supply and the liquidity approach stresses conditions of demand. With each the aim is to determine a total that can be regarded as both homogeneous and economically significant—according to the first approach, because the public cannot affect the aggregate amount of the total; according to the second approach, because the public is largely indifferent to the internal composition of the total, yet concerned about its size relative to other assets and to the level of spending.

The approach stressing the medium-of-exchange function of money has the virtue of possessing a fairly clear empirical counterpart. Admittedly, there is some ambiguity in the specific assets that serve as literal media of exchange; and the assets that serve this function will differ from time to time and place to place. But for any one time and place the ambiguity is likely to be confined to a narrow range. For the United States at present, most observers would agree that currency, demand deposits, and American Express travelers' checks should for the most part be regarded as media of exchange and that no other substantial items should be.

However, it turns out that when the approach is developed more formally and systematically, its empirical counterpart, while clear, is different from that assigned to it by its proponents. High-powered money, not currency plus demand deposits, is the total that has the autonomy and the "net worth" or "neutrality" quality suggested as relevant criteria.

Even at first sight the "liquidity" approach does not have a reasonably clear empirical counterpart. It is frequently treated as providing at least a reasonably unambiguous way of ordering assets. But even this impression derives primarily from the failure to specify in any precise way the meaning of liquidity. Any attempt to do so demonstrates that there are different dimensions of the general concept that provide very different orderings of assets. Statistical totals used to approximate the concept have varied widely in composition.

This variation partly reflects a failure to apply consistently the central theoretical approach, which calls for considering both assets and

liabilities and stressing the capital risk involved in reducing assets or adding to liabilities to finance current spending.

We consider the prominence that the medium-of-exchange approach assigns to the distinction between nominal and real assets to be valid, but we regard the approach as an unsatisfactory basis for defining money for two reasons: first, as is pointed out in section 4, we have been led to stress conditions of demand rather than of supply in defining "money"; second, we see no compelling reason to regard the literal medium-of-exchange function as the "essential" function of the items we wish to call "money."

We consider the stress that the liquidity approach assigns to conditions of demand to be valid, but we do not accept the basic empirical judgments underlying the versions of it that have been most prominent in the theoretical literature—especially the judgment that the price level is to be regarded as primarily an institutional datum.

We conclude that the definition of money is to be sought for not on grounds of principle but on grounds of usefulness in organizing our knowledge of economic relationships. "Money" is that to which we choose to assign a number by specified operations; it is not something in existence to be discovered, like the American continent; it is a tentative scientific construct to be invented, like "length" or "temperature" or "force" in physics.

4. Relevant Empirical Considerations

We warn the reader that, as so often occurs in scientific work, the section that follows was written after the event, and is an attempt ex post to systematize what we did. We cannot claim that it guided us explicitly in our initial choice.

It is much easier to see why a priori considerations cannot decide the proper empirical counterpart to the concept "money" than it is to state at all comprehensively the considerations that are relevant. These depend in part on the availability of data for a sufficiently long period and for fine enough time units; in part on the developing theory in accordance with which we interpret the empirical data; and in part on the difficulties and problems that have arisen in analyzing experience with

the help of the theory and in improving the theory with the help of experience.

Statistical Considerations

Little of a general nature can be said about the purely statistical considerations, even though they play a major role in determining the definition of money (see Chapter 4). Data are almost always a by-product of reports made for business reasons or to satisfy regulatory agencies. This means that the data almost always refer to the institutions that specialize in the issuance of "money" or claims (governments, banks, other financial institutions), not to the holders of claims. The issuance of money or claims is the main or major activity of the issuers; the holding of such assets is but one of many activities of the holders. Hence the issuers are concentrated and lend themselves to reporting and regulation; the holders are dispersed and their information on holdings of claims is imbedded in reports on their major activities. That is why most sets of monetary statistics are based on reports of issuers, not of holders. A further corollary, relevant to the problem of definition, is that the inevitable element of statistical arbitrariness is minimized for any magnitudes that reflect the condition of an issuing institution as a whole and do not require a separation of major accounts into categories that have or have had no relevance to its business operations or to regulatory agencies. For our purposes, the main example of this is that there is less arbitrariness in estimating the total deposits of commercial banks in excess of their high-powered money holdings than in estimating demand and time deposits separately in excess of the high-powered money holdings relevant to each category of deposits (see Chapter 1, section 4).

Nominal vs. Real; Demand vs. Supply

The key proposition of monetary theory that seems to us relevant to the definition of money is the distinction between the "nominal" and the "real" quantity of money, a distinction which underlies the determination of the "price level." This distinction is of crucial importance because of the associated empirical generalization that the nominal quantity of money is determined primarily by conditions of supply (production conditions for specie, institutional and legal arrangements for fiat money and fiduciary money), while the real quantity of money is determined primarily by conditions of demand (the balances that holders

of money wish to hold—given their circumstances, the level of prices, and the market costs of and returns to holding money).

Our aim is to formulate an empirical definition of money that will facilitate, as far as possible, the separation and analysis of the forces of demand and supply for the country or countries and period or periods being studied. Or to express the same point in a forward-looking context, a definition that will enable us most readily and accurately to predict the consequences for important economic variables of a change in the conditions of demand for or supply of money. The economic variables that we regard as important for this purpose are nominal and real income, prices, and interest rates.

Why We Stress Demand

Our purpose was primarily the analysis of monetary experience in the United States over a long period. Our historical studies convinced us that conditions of supply had changed fairly drastically over the period, so that there was little hope of getting a single fairly simple supply function of nominal money that would hold for the period as a whole.[73] It was not clear that this was true to anywhere near the same extent for conditions of demand. Hence, we were led to put primary emphasis on demand and to seek a definition of money that could be regarded as having as nearly as possible the same meaning to the holders of money balances over the entire period of our study.

Since we began our studies, we have been impressed that this consideration is of much wider relevance. Among different countries, and in any one country over time, conditions of supply of nominal assets of the class generally regarded as money or near-money differ widely. On the other hand, our own work and the work of other scholars suggests that conditions of demand are much less variable and that most of the differences among countries or periods in the real quantities of such nominal assets can be explained by differences in a small number of key variables. These findings have reinforced our belief that it is desirable to emphasize the conditions of demand in defining money.

To express the same point in more specific terms: the desideratum is a monetary total whose real value (measured as the ratio of the total to a price index or as a ratio to a measure of total income or transactions,

[73] The words "fairly simple" are included in this sentence because there is always a stable function for anything, if the number of variables included can be indefinitely large.

i.e., as the inverse of a velocity) bears a relatively stable relation (as between the different time periods or geographical areas under study) to a small number of variables that theoretical considerations lead us to believe affect the real quantity of money demanded—in particular, real wealth or income and the cost of holding money as measured by interest rates and the rate of change in prices. This desideratum recommends the consolidation into a single total of different monetary items, the relative size of which is likely either to be more heavily influenced by conditions of supply than by conditions of demand or to have little effect on the total amount that demanders wish to hold.

Substitution in Demand

The clearest illustration is presented by items that are near-perfect substitutes to holders of money balances. In the United States, for example, holders of money balances have seldom paid any attention to whether the notes in their pockets were U.S. Treasury notes of 1890, or greenbacks, or national bank notes, or Federal Reserve notes, or Federal Reserve Bank notes, or, before the 1960's, silver certificates, or, between 1879 and 1933, gold certificates. These items were near-perfect substitutes to the bulk of holders the bulk of the time—though the necessity to insert some qualifying dates indicates that this statement is very much a matter of time and place and not to be taken for granted without substantive knowledge.[74] Because these items were near-perfect substitutes, holders of money did not react to a shift in the proportions in which they were available. They were willing passively to accept them in whatever proportions they were issued. Knowledge of the proportions does not enable us to predict anything about the behavior of the holders of notes that we cannot predict simply from knowledge of the total. To explain the proportions we must look to conditions of supply, and we can largely end the analysis at that point without having to take into account any repercussions on the side of demand.[75]

[74] Another example: national bank notes did not satisfy legal reserve requirements for national banks, hence were not at all perfect substitutes for "legal tender" to those banks.

[75] Again this is a place-time limited generalization that has its exceptions. For example, the conditions of issuance of U.S. Treasury notes of 1890 were such as to produce fears of indefinite multiplication that might force the nation off the gold standard; hence the conditions of issuance induced expectations that affected the quantity of money demanded.

More generally, the limitations imposed on issuance of notes in the form of reserve requirements, asset backing, quantity limits, etc., attest the power of the possible reflex influence on demand.

The extent of substitutability in demand is much harder to determine on the basis of casual empiricism for monetary items other than currency. It is customary to proceed next to deposits transferable by check (we shall follow current usage and use "demand deposits" as a synonym, though, as explained in Chapter 8, this is not literally correct) and to regard such deposits as clearly the "nearest" thing to currency and the next candidate for inclusion in a total to be called "money."

Initially, we accepted the customary view. As a result, the systematic empirical tests—summarized in Chapter 4—that we made to choose among different monetary totals did not even consider totals that excluded demand deposits but included other categories of deposits. As our research has proceeded, we have become more and more dubious that we did the right thing, and if we were starting anew we might well follow a different course.

The most important single distinction on the side of demand is probably between business and personal holdings of money—even though there exists no sound statistical basis for separate estimates. However, we do know that until the recent development of large negotiable time certificates of deposit, businesses held negligible amounts as time deposits at commercial banks, mutual savings banks, or savings and loan associations; that they held much larger amounts as demand deposits than as currency; and that very probably business balances account for the bulk of demand deposits but for less than half of currency. For business firms, the customary view seems entirely valid: demand deposits are close substitutes in demand for currency as a medium of exchange.

The situation is very different for individuals (ultimate wealthholders). It appears that more individuals have time deposit accounts (at commercial banks or other institutions) than have demand deposit accounts; and clearly individuals hold a far larger total amount as time deposits than as demand deposits.[76] For them, the relationship between

[76] For decades the number of time and savings deposit accounts has persistently exceeded the number of demand deposit accounts (see FDIC, *Annual Report*, 1964, p. 78). For at least five reasons, however, the difference in numbers of accounts is not a reliable indication of the difference in number of individuals owning time but not demand deposits. (1) Each time certificate of deposit is a separate account in the statistics, and holders of certificates may hold several. (2) A husband and wife may have a joint checking account but separate savings accounts. (3) Individuals are more likely to divide their savings than their checking deposits between two or more banks or between two or more accounts in the same bank, each account having different "rights" or "capacities." (4) Businesses have many of the demand accounts; until recently, few of the time accounts. (5) It is common practice for businesses to divide their checking

currency and time deposits may well be closer than between currency and demand deposits. That relationship itself is probably very much like the mixture of substitutability and complementarity that characterizes the relationship between small and large denominations of currency. Currency is the primary immediate medium of exchange, time deposits are probably the primary temporary abode of purchasing power. We hasten to add that the validity of this observation is particularly dependent on time and place. It has little relevance to countries at an early stage of financial development or to countries experiencing substantial inflation that impose a limit on the interest rate that may be paid on time deposits. In the first set of countries, no widely used institutions for time deposits have developed; in the second set, time deposits tend to disappear.

However, for countries like the United States and those in Western Europe, Japan, and a few others, in the mid-twentieth century, demand deposits alone may be a good index of business balances of "money," and currency plus some categories of time deposits may be a good index of the balances of ultimate wealth-holders.

Though we have not ourselves followed this route, these speculations suggest that casual observation may be an uncertain guide to the substitutability of items on the side of demand. For individuals, time deposits may well be closer substitutes for currency than demand deposits are. Any general statement about any category of deposits as a whole, then, requires aggregating in some fashion the different substitution relationships for business firms and individuals.

Substitution in Supply

Near-perfect substitutability of different assets in demand, while a sufficient condition for combining them, is not a necessary condition. We can illustrate with different denominations of notes. A twenty-dollar bill and twenty one-dollar bills are not at all perfect substitutes for one another to the holder of money balances. On the contrary, bills of differ-

accounts between a number of banks. Items 1 to 3 bias the figures in one direction; items 4 and 5 in the other.

There is no way of knowing the net effect of these five items. However, in view of the sizable excess of the number of time accounts, it is plausible that many individuals own time but not checking accounts. It is almost certain that at least technically there are more holders of time than demand accounts because of the large number of minors with savings accounts (often established and maintained by a parent).

We are indebted to Clark Warburton for the foregoing comments.

ent denominations are in considerable measure complementary commodities. Holders of notes are not indifferent to the composition of their balances by denomination. Yet it seems obvious that we can treat the total amount of currency notes as a single magnitude on the side of demand—without paying much attention to its distribution by denomination. The reason is that there is near-perfect elasticity of substitution of different denominations in supply at fixed rates of exchange, and hence holders of money can readily adjust the composition of their currency balances with little or no further side effects.[77] Near-perfect substitution in supply *at fixed rates of exchange* can be a substitute for near-perfect substitution in demand.

Recent experience with coins in the United States is an interesting, if trivial, illustration. For a few years in the 1960's there was a coin "shortage," i.e., the mints were not producing a large enough volume to enable holders of money to have the desired ratio of coins to notes—a ratio that apparently had risen for a number of reasons ranging from the spread of coin-operated vending machines to the "hoarding" of Kennedy half-dollars. The result was that the difference between coins and notes became a meaningful one. Some enterprising individuals collected coins and sold them to business firms with a special need for them at a premium that is said to have ranged up to 5 per cent.[78] At that time, coins and notes were not homogeneous on the side of demand; the total value of the two together in note units was greater, and in coin units less, than the sum of their nominal values because of the market premium on the coins. And the total nominal value demanded was different than it would have been in the absence of the premium.[79] But this is so special a phenomenon that we have little hesitancy in general in combining notes and coins into a single total we call currency, not because they are near-

[77] Again, this does not mean that the denominations available are necessarily irrelevant. A common phenomenon in countries that have experienced much inflation is that the largest denomination available is inconveniently small in terms of real purchasing power, yet the issuers of currency are hesitant to issue larger denominations for fear that this will be interpreted as a harbinger of further inflation by the sensitized population. In these cases, the inconvenience of the denominations available has the effect of reducing the usefulness of currency and so of reducing the real quantity that people wish to hold.

[78] See *The Wall Street Journal,* Apr. 23 and June 8, 1964.

[79] A more important example of the same phenomenon was the premium on gold coin and currency from 1862 to 1879 and, more recently, the premium on silver certificates. The latter may suggest why it is not possible to say whether the effect of a market premium on one type of money is to decrease (as the premium on coin probably did) or to increase (as the premium on silver certificates probably did) the total nominal value demanded.

perfect substitutes in demand—indeed, they have perhaps an even greater element of complementarity than notes of different denomination—but because they have been near-perfect substitutes in supply.

It is interesting to note that complementarity in demand (provided there are fixed rates of exchange and near-perfect substitutability in supply) is a substitute for substitutability in demand. Suppose holders of currency insisted on holding different denominations in rigidly strict proportions, say, four one-dollar bills, one five-dollar bill, and one ten-dollar bill for every twenty-dollar bill. Then, so far as currency alone is concerned, it would not matter whether we treated only one-dollar bills as our monetary total or any other subset of denominations or all denominations. We shall find this point of some importance when we consider deposits.

The relation between currency and deposits on the side of supply is somewhat clearer than on the side of demand. For any given business firm or individual at any given time, there is near-perfect substitutability in supply between currency and those deposits that are readily available to it or him. However, every firm or individual will not have the same kinds of deposits available. Some firms or individuals may be located in a place that is remote from a commercial bank—though for many decades now, few have been. For such firms or individuals deposits at a commercial bank would not be a close substitute in supply for currency. Firms or individuals located in one of the eighteen states with mutual savings banks may regard a mutual savings deposit as a close substitute in supply for currency or for a deposit at a commercial bank. Firms or individuals located in one of the thirty-two states without mutual savings banks clearly will not.[80]

For the United States as a whole for the period we cover, different categories of commercial bank deposits have clearly been near-perfect substitutes in supply for most firms and individuals most of the time. If one category of commercial bank deposits was available, so were other categories. This reinforces the statistical considerations that recommend the treatment of commercial bank deposits as a single total. Further, commercial bank deposits have been close substitutes in supply for currency for most firms and individuals most of the time. In many localities this has been true also of mutual savings deposits and, more

[80] Banking by mail is, of course, a device that strengthens substitutability in supply when depositors are far from a bank.

recently, of savings and loan association shares. It has been true to a lesser extent, however, which is why we have tended to treat commercial bank time deposits as an item distinct from time and savings deposits at other financial institutions.

Though at each point in time, commercial bank demand and time deposits have been near-perfect substitutes for one another in supply, the terms on which they could be substituted have varied because of changes in the advantage to commercial banks of having deposits in the one form or the other. Thus the ratio of demand to time deposits—like, for example, the ratio of national bank notes to silver certificates (though to a lesser extent)—has been much influenced by conditions of supply, probably more so than by conditions of demand. This point is discussed in detail in Chapter 4, and constitutes a major reason why we chose the definition of money we did.

Our further research has impressed on us that this phenomenon has much wider relevance. Governments have a strong proclivity for "regulating" or "tinkering" with the conditions on which deposits are offered. In many a country, currency has retained much the same meaning to holders over time (although of course the cost of holding currency may have changed drastically because, for example, of changes in the rate of change in prices), whereas the meaning of different categories of bank deposits has altered as banks have reacted to government regulations and interventions. The result is that there have been sharp changes in the ratios of different kinds of deposits to one another and to currency, deriving very largely from changing conditions of supply. To put it in the joint product terms introduced earlier in our discussion of the views of Pesek and Saving, the degree of "moneyness" of different categories of deposits has varied frequently and erratically. Accordingly, in studying monetary conditions in some of the above countries, we have found it preferable to return to earlier definitions of "money" as currency (or high-powered money) solely and to omit all deposits. The rationalization is that currency may be a better index from the side of demand of a total that is homogeneous over time than is the sum of currency and deposits, the "moneyness" of which changes frequently.

Conclusion

The empirical considerations that have guided us can be summarized as follows: Statistical considerations recommend avoiding, where pos-

sible, the subdivision of liabilities of individual institutions. Historical considerations recommend stressing homogeneity in demand rather than autonomy in supply. Theoretical considerations recommend combining items that are *either* near-perfect substitutes in demand *or* near-perfect substitutes in supply at fixed rates of exchange even though they may be complementary in demand.

What degree of substitutability in demand or supply is sufficient to justify treating it as "near perfect" cannot be decided by casual empiricism or qualitative considerations. These can guide investigation into alternative possibilities, but the final test is how well any definition works in enabling "us most readily and accurately to predict the consequences for important economic variables of a change in the conditions of demand for or supply of money."