DEPOSIT VELOCITY AND ITS SIGNIFICANCE

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November 1959

FOREWORD

THIS monograph is one of a series published by the Federal Reserve Bank of New York in order to furnish the student of money and banking with information, not readily available elsewhere, concerning monetary policies, institutions, and techniques. The present booklet discusses the behavior of deposit velocity, over the business cycle and over longer periods, with emphasis on the institutional and structural forces determining this behavior. Further discussion of the underlying statistical series and of some related subjects may be found in Mr. Garvy's *Debits and Clearings Statistics and Their Use,* a revised edition of which was published by the Board of Governors of the Federal Reserve System earlier this year.

The flow of funds through the economy reflects the rate of turnover of the money supply as well as the size of the money supply itself. An understanding of the institutional practices and policies which influence the turnover of money is essential to an informed interpretation of the changing credit situation and to an understanding of the monetary framework in which credit policy operates. We are hopeful that this booklet will contribute to such understanding.

ALFRED HAYES
President

New York City
November 1959

ACKNOWLEDGMENTS

It is quite impossible for the author to name all those within and outside the Federal Reserve System to whom he owes a debt of gratitude for supplying factual information and for commenting on the earlier draft of the manuscript. Mrs. Marian R. Deitsch and Miss Katherine McKinstry assisted the author in many ways in this study, while Miss Louise Freeman checked the manuscript; and Miss Abigail M. Cantwell prepared it for publication and saw it through the press. The charts are due to the craftsmanship of Mr. Howard H. Hendrickson.

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I. Introduction

Money performs several distinct functions; its two main functions are to serve as a means of payment and as a store of value or, to use a more modern concept, as a liquidity reserve. Various types of "near moneys" and money substitutes compete in performing certain, but not all, functions of money. Some payments can be settled without using either "folding" or "checkbook" money. Similarly, liquid reserves can shift back and forth, with only relatively minor differences in terms of ready usability, between demand deposits and money market assets.

There are many ways of looking at the role of money in the contemporary economy of the United States. One of the most important facets of economic analysis is the rate of spending from money balances. Experience shows that a varying volume of money spending may be supported by a constant stock of money and, conversely, experience also teaches us that the money supply may change significantly while the rate of spending remains almost unchanged. Thus, total money spending in relation to money balances—technically, "transactions velocity"—is an important element in assessing changes in the credit situation and in business conditions. Money is usually defined to include currency in the hands of the public and demand deposits, except interbank and United States Government deposits. In practice, since records on the volume of currency payments do not exist, current analysis of transactions velocity is by necessity confined to payments made with demand deposits which, however, account for the overwhelming bulk of all payments made.

It has frequently been pointed out in discussions within and outside the Federal Reserve System that changes in the rate of deposit turnover may be as significant for monetary policy as the quantity of money itself. Indeed, an increase of one in the annual rate of turnover of demand deposits is currently equivalent to a deposit expansion of $3½ billion, or close to 3 per cent—as large as what is sometimes regarded as the "normal" annual rate of growth of demand deposits. Therefore, study of changes in the transactions velocity of demand deposits is an important aspect of monetary analysis.

The concept of the transactions velocity of money is simple enough when defined as the number of times the money supply is used in a given period. But when it comes to the practical problem of measuring transactions velocity, or of explaining changes in the rate of deposit turnover during the course of the business cycle or in the long run, numerous complications arise. Since the ratio of payments to the stock of money may change either because the stock of money changes or because the flow of payments fluctuates, explanations for variations in velocity must be sought in factors which determine the level of deposit balances as well as those which influence the aggregate volume of check payments. The purpose of this study is to inquire into some of the factors underlying movements in monetary velocity and to explore their significance with respect to past experience as well as to prospective trends.

Transactions velocity (referred to in economic literature by the symbol V_t) is a statistical average of money that moves and money that is mostly at rest. Ideally, it would measure the rapidity with which cash balances turn over. Practically, it is computed as a ratio of debits to average balances in demand deposit accounts, other than interbank and United States Government accounts. Since the available data limit measurement to debits against demand deposits, the computation of V_t is affected by the fact that the proportion of all payments that involve the use of checks is not stable. Indeed, debits represent the most important, but only one, part of the flow of payments; their relation to the sum total of all payments may vary over time if currency or other means of payment, such as money orders, gain or lose in relative importance. The proportion of payments that are offset either through bookkeeping entries or through compensating arrangements may also vary over time. On the other hand, the endeavor to apply scientific principles to the management of cash necessarily leads to a shuffling around of cash resources within each business firm. For example, in order to centralize cash holdings and to minimize the balances required to meet a given flow of payments and to satisfy general liquidity requirements.

amounts accumulated by a large corporation in various depositaries will continuously be transferred to the points of disbursement or to principal accounts. Since such transfers of private deposits are recorded as debits, the very act of making progress toward a more efficient management of money balances tends to increase deposit activity and, taken together with the smaller average balances resulting from this more economical use, is reflected statistically in higher rates of deposit turnover.

Velocity also depends on the proportion of total balances held for purposes other than payments. This proportion depends largely upon the preference of business firms, individuals, and other economic units as between demand deposits and various other liquidity instruments which, although they must be converted into cash before being spent, have the advantage of yielding a return to their owners.

There is an alternative way of looking at the work performed by the money supply. Instead of relating it to the volume of aggregate money payments it can be considered in relation to the value of goods and services produced, as measured, for instance, by the official series on the gross national product (GNP). In this way, current measures of "income velocity" are obtained by dividing GNP by the total money supply.

Thus defined, income velocity (V_y) is merely the reciprocal of a ratio between money supply and total economic activity, and an analysis of this form of velocity, as in the case of transactions velocity, is actually a form of liquidity analysis. As already pointed out, part of the money supply is held for reasons which are only indirectly related to the size of current income or output. Moreover, at any given level of income the need for holding cash may vary, depending upon institutional and other changes in payments techniques and upon the activity arising from trading in existing assets. These changes in payments streams and in the money transfer mechanism, as well as in the increasing or decreasing proportion of idle or semidormant deposits in the money stock, can best be traced through the transactions approach. Yet for other purposes, income velocity is an equally meaningful analytical tool. As will be shown below, the two velocity concepts are, indeed, interrelated. Analysis based on either concept of velocity will normally lead to similar conclusions with respect to the significance of fluctuations in velocity for the effectiveness of monetary policy.

Actually, neither of the two velocity ratios, computed as indicated above, measures what its name suggests. Transactions velocity does not depend on turnover of transactions balances since these cannot be separated in any mean-

ingful way from other ("idle") balances. On the other hand, and for a similar reason, income velocity does not measure variations in the rate at which money balances are transformed into income, since some part of the money supply is held for purposes other than to facilitate income-producing activities. Indeed, few dollars serve only one purpose, and most render a variety of services simultaneously. Any attempt to separate the various functions neatly will lead to untenable abstractions running counter to what is known about attitudes and actions of various economic groups.

If the volume of payments chargeable to deposit accounts moved always in rigid proportion to GNP, transactions and income velocity would move in perfect unison, and the ratio between the two measures of money turnover would be stable. Discrepancies arise from divergencies of the movements in these two aggregates. The money supply represents the link between the two series, being the denominator of income as well as of transactions velocity. The link is not perfect. For instance, only the major component of the money supply—demand deposits—enters into transactions velocity, so that changes in the relative importance of currency may cause the two series to diverge. In the long run as well as cyclically, both velocity ratios are influenced by the degree to which the various assets in which liquidity reserves are held acquire attributes of "moneyness" and substitute for cash balances.

To sum up, turnover rates of demand deposits depend, first, on what part of the total "money work" is performed by checks rather than by currency and such money substitutes as money orders. They depend also upon the volume of balances held for liquidity and for other purposes not directly related to the volume of payments, and such balances are subject to influences that affect the competitive use of other liquidity instruments. Finally, turnover rates reflect the money transfers between accounts of the same firm or person as well as payments for goods and services and for various types of financial transactions which involve trading in existing assets.

Recent behavior of transactions velocity has underlined the need for a better understanding of forces making for changes in turnover rates. Deposit turnover has been increasing almost continuously since the wartime years of excess liquidity. The increase in deposit turnover was particularly rapid from 1955 to the middle of 1957. Deposit velocity declined during the 1957-58 recession but rose again with the recovery in business. Despite these increases, however, demand deposits now turn over less rapidly than in the twenties and only about two thirds as rapidly as in the peak year 1929.

As the rates of deposit turnover began to move upward after the close of World War II, and showed especially sharp advances in periods of rapid cyclical expansion when monetary policy was more restrictive, numerous questions concerning the behavior of the money supply began to be asked, to which we are still seeking answers. How far can rates of deposit turnover rise? What will prevent them from rising to the level observed in the late twenties, that is, roughly forty times a year as compared with about fifteen times at the end of World War II? Or are we approaching some kind of "velocity ceiling" and, if so, for what reasons? In the face of substantial evidence that efforts were being made all around to economize on cash balances, why were turnover rates during the final stages of expansion of 1953, or of 1957, so much lower than during the comparable stage in 1929?

In addition, there is the question of whether changes in velocity interfere with effective monetary policy. In this connection it should be recognized that the fact that velocity increases when monetary policy becomes restrictive may actually contribute to the effectiveness of monetary policy. Because changes in velocity help to absorb the initial effects, the monetary authorities are able to take restrictive action which would otherwise have an unduly sharp initial impact on the economy. To take account of possible changes in velocity, however, the monetary authorities must be aware of the factors behind past changes in velocity.

Changes in velocity cannot be explained by merely re-examining and analyzing historical statistics. Rates of deposit turnover reflect shifts in attitudes toward money and liquidity, changes in payments habits, in cash management and banking techniques, and variations in the composition of payments streams, to mention only some of the more obvious influences. In order to bring these complex developments into focus, considerable exploratory work was required, including tracking down various types of changes in payments patterns and operating techniques that are not easily gleaned from statistical data or from conveniently arranged descriptive material. In this booklet, some of the results of this continuing research have been brought together to provide a better factual basis for appraising changes in velocity, some of which are of a long-run and others of a cyclical nature.

The present study deals first with the problems of measuring rates of deposit turnover in Chapter II, followed by a brief review of the statistical record in Chapter III. The functions performed by deposit balances are discussed in Chapter IV. In order to obtain a clearer view of the forces which determine

the sizes of the numerator and the denominator of the turnover ratio, some of the factors which determine the ownership of demand deposits and the composition of payments flows are explored in Chapters V and VI. Chapter VII deals with forces which affect velocity in the long run as well as over the business cycle. The main findings of the study are summarized in the final chapter.

II. How Velocity Is Measured

Rates of deposit turnover reflect, of course, the specific institutional arrangements that underlie the payments mechanism. Moreover, various limitations of the underlying statistical data are reflected in current estimates of rates of deposit turnover.

Monthly data are currently published on the frequency of the use of demand deposits, other than interbank and United States Government deposits. No distinctions are made with respect to the underlying transactions so long as a payment by check or some other form of settlement is involved which results in a charge to a customer's account. Thus, the cashing of a check at the teller's window to obtain currency results in a debit and is reflected in rates of deposit turnover, and so are purchases of securities and various charges for services performed by the bank. Nor are any distinctions made between various categories of deposit accounts: special checking accounts, for instance, are pooled with regular personal or business accounts. Aggregate demand deposits include even the fairly inactive escrow accounts and funds under litigation, but their amount is very small indeed.

Thus, rates of turnover are actually averages of rates at which particular deposit dollars are used; some portion of the total may be very active and another part may remain virtually at rest. Whether particular deposit balances are slow or quick movers depends upon their ownership, their origin, and general business conditions, as well as upon many other factors some of which will be investigated in subsequent chapters.

DEMAND, TIME, AND TOTAL DEPOSITS

Most monetary analysts exclude savings and other time deposits[1] from the money supply on the grounds that, even though they may be (in contrast to other near moneys) a commercial bank liability, they must be converted into checkbook or folding money before they can be spent. While savings deposits cannot perform the payments function of money, they can, and do, in common with other near moneys, satisfy, to varying degrees, liquidity needs of at least certain sectors of the economy, primarily consumers. To this extent, they compete with demand deposits (and currency as well) in the same way that money

[1]According to a special supplement to the bank call report of June 1958, about 80 per cent of all time deposits are personal savings time deposits; the remainder are business, government, foreign, or bank time deposits.

market instruments compete with demand deposits as a means of fulfilling the needs of corporate liquidity.

In a growing economy, the total volume of assets is expanding and the distribution of liquidity reserves between demand and time deposits reflects the preferences of asset holders. The large growth of savings deposits since World War II indicates that individuals have tended to make substantial additions to liquid assets held in this form. Special inquiries conducted by the Federal Reserve System in the middle thirties and data currently collected by the American Bankers Association indicate that each year aggregate withdrawals amount to about half of total savings balances; in other words, savings deposits turn over about once every two years. This ratio has been very stable from year to year, at least during the last thirty years or so, and is little influenced by changes in business activity. Rates of turnover of savings deposits in commercial banks are about twice those of savings deposits in mutual savings banks (judging from data available for New York State institutions) and in savings and loan associations.[2] Other types of time deposits may turn over more rapidly than savings deposits.

Obviously, velocity of *total* deposits, including time deposits, is considerably lower than that computed for demand deposits alone. The precise difference between the two sets of ratios would depend on the relative share of time deposits in the total as well as on the respective turnover rates of the two types of deposits.

NATURE OF STATISTICAL DATA ON DEMAND DEPOSIT TURNOVER

Ideally, only balances subject to check or, even better, balances shown on checkbook stubs of depositors should be used to compute velocity rates. Unfortunately, monthly estimates of demand deposits as they appear on holder records are not available and, for a number of technical reasons, turnover rates are computed from gross demand deposits as they appear on bank records rather than from net balances subject to check. Banking statistics show ledger balances which are substantially higher than the balances which are shown on the combined checkbook stubs of all individuals and business firms. The reason for this discrepancy is that a time element intervenes in making payments and collecting

[2]For a detailed discussion, see George Garvy, "The Velocity of Time Deposits", *Journal of the American Statistical Association*, June 1953, pp. 176-91. The data for 1952-58 that are now available for the various series given in the article confirm the great stability of the turnover of savings deposits. Data on turnover rates of time deposits collected by the Federal Reserve Bank of Chicago since 1953 also confirm this conclusion. See Federal Reserve Bank of Chicago, "What is Behind Recent Changes in Time Deposits", *Business Conditions*, January 1959.

checks. The process of mailing checks to payees and their subsequent collection through the banking system involves delays. During part of this period, the payment covered by a check is already deducted from the payer's checkbook stub (and thus ceases to be part of the effective money supply) but is not yet credited to the account of the payee (this is known as the "mail float"). Subsequently, there is a period when the money involved appears simultaneously in the bank ledger of the two units involved in the transaction (the so-called "bank float"), although holder records contain no such duplication. This bank float is fairly large (about 10 per cent) in relation to reported deposits, and the mail float may be even larger, but there are currently no means of measuring it.

Also, bank float cannot be allocated to individual banks and, therefore, it is not possible to estimate *net* deposits (gross deposits minus bank float) of the banks in any city or group of cities for which turnover rates are computed. For this reason, and to simplify and speed up the release of statistical data, rates of turnover are computed from *gross* deposits. While, therefore, the rates of net deposit turnover are perhaps one-tenth higher than the published rates, it is likely that the difference between gross and net deposits is sufficiently stable to justify the use of the available velocity series at least for short-run comparisons. The speeding-up of check collection, however, tends to reduce gross deposits in relation to net demand deposits, and for long-term comparisons this fact should be taken into account; we shall return to this problem in Chapter VI which deals with the various factors affecting velocity.

But is it sufficient to adjust demand deposits for bank float? What is really at each point of time the amount of deposits that business units, individuals, and other owners of deposit accounts consider to be their free balances available for making payments? Analysts generally agree that checks written but not yet received by the payees (the so-called mail float) should be deducted as well. Also, banks do not generally give immediate credit for uncollected checks on distant points. However, no basis for statistically reliable estimation of mail float or information on practices with respect to the drawing on uncollected funds is available; the best we can do, therefore, is to emphasize again that rates of turnover are best interpreted as indicating *changes* in the rate of money use rather than the *precise frequency* with which balances available for immediate withdrawal are actually being put to work.

To sum up, rates of deposit turnover reflect the statistical techniques used to compute them; they also depend on a variety of banking practices that change over time. This may be illustrated by considering the various arrangements in

existence in many European countries for effectuating payments through special institutions without the use of checks known as "giro transfers".[3] If a similar system were in existence in this country, certain categories of payments would have been removed from the flow of bank checks and this would be reflected in the average velocity of deposit balances in commercial banks in the United States.

A separate velocity series is published for New York City. Turnover rates of demand deposits in New York City reflect to an unusual degree purely financial activities, including transactions arising from dealings on the New York Stock Exchange as well as in other securities markets and, in particular since the end of World War II, from trading in United States Government securities.[4] Financial activity is, indeed, not limited to New York City, and for this reason, since 1943, data for the six leading financial centers outside New York City are also shown separately. The discussion that follows relates, unless otherwise stated, to the national series on velocity rates in the 337 "other" centers, which since 1943 excludes Chicago, Boston, Philadelphia, Detroit, San Francisco, and Los Angeles in addition to New York City.

SECTOR VELOCITIES

Obviously, the relationship between required transactions balances and the volume of payments differs among the various types of economic units (sometimes referred to as "categories of transactors") and even among individual units belonging to the same general category. Indeed, not all families earning $10,000 a year will hold the same average balance in their checking account. Nor will all furniture manufacturing concerns with annual sales of $10 million operate on the basis of an identical bank balance. Similarly, the liquidity requirements of various categories of transactors will vary widely. As a result, there are significant differences in average rates of deposit turnover among broad categories of bank depositors. Total velocity may best be viewed as the weighted average of a number of sector velocities.

It is unlikely that cyclical changes in velocity are identical for accounts of all sectors, and it is also unlikely that the pattern of deposit ownership is insensitive to cyclical influences. Changes in rates of deposit turnover,

[3]See John Hein, "A Note on the Giro Transfer System", in a forthcoming issue of the *Journal of Finance*.

[4]For a discussion of the particular factors affecting velocity in New York City, see George Garvy, *Debits and Clearings Statistics and Their Use*, Board of Governors of the Federal Reserve System, Washington, D. C., 1959, Chapters III and VII.

as now computed, may reflect any or all of the cyclical and long-run influences discussed in greater detail below. Changes in the over-all measure of velocity can, of course, occur as a result of changes in the relative share of each category of accounts (such as personal, corporate, State and local, etc.) in total demand deposits even when the specific velocities for each category remain unchanged.

Regular statistical data are not available to compute or compare rates of turnover of individual economic sectors or groups of accounts classified by the predominant type of activity, or by the extent to which they satisfy needs other than to serve as a means for making payments. The available fragmentary data suggest, however, that the major reason why the turnover velocity of demand deposits is now lower than before World War II, and in particular than during the late twenties, seems to lie in changes that have occurred in the patterns of ownership of demand deposits and in the type-composition of payments rather than in a general decline in the frequency with which payments are made from deposit balances owned by each of the principal economic groups.

III. The Statistical Record

LONG-RUN CHANGES

Statistical data on deposit velocity are available only since the end of World War I when the collection of debits was inaugurated. Little can be definitely said about the frequency with which deposit balances were used before World War I, but on the basis of clearings data, which are closely enough related to debits to permit a broad statement, there does not appear to have been any clear-cut secular change during the forty years or so prior to World War I.[5]

Much has been written about historical trends in transactions and income velocity, and numerous series have been constructed in order to study long-term trends,[6] even though for the years prior to 1919 such series are by necessity based on assumptions and interpolations which in some cases are of dubious reliability. Many of the contradictions in the conclusions as to the existence of a secular trend in transactions velocity reached by the various investigators result from divergencies in the definitions of the money supply, in the volume of transactions, and also in the time periods covered. Indeed, the more the analysis is extended into the past, the more the estimates of the relevant magnitudes become uncertain. The dividing line between demand and time deposits becomes blurred, while the relationship between clearings and debits to private accounts (used in current estimates of V_t) becomes more and more uncertain. Prior to the banking reform of 1933 which, among other changes, prohibited payment of interest on demand deposits, their holding involved only a differential, not an absolute, loss of income. Still earlier (before the establishment of the Federal Reserve System in 1913), legal reserve requirements did not distinguish between the two types of deposits. Banks and supervisory authorities then had no strong reasons for enforcing proper classification and reporting; indeed, banking statistics for those years include a large volume of unclassified deposits. Many students, furthermore, believe that in subsequent years, but prior to the banking reform of 1933, a substantial volume of demand deposits was misclassified as time deposits.

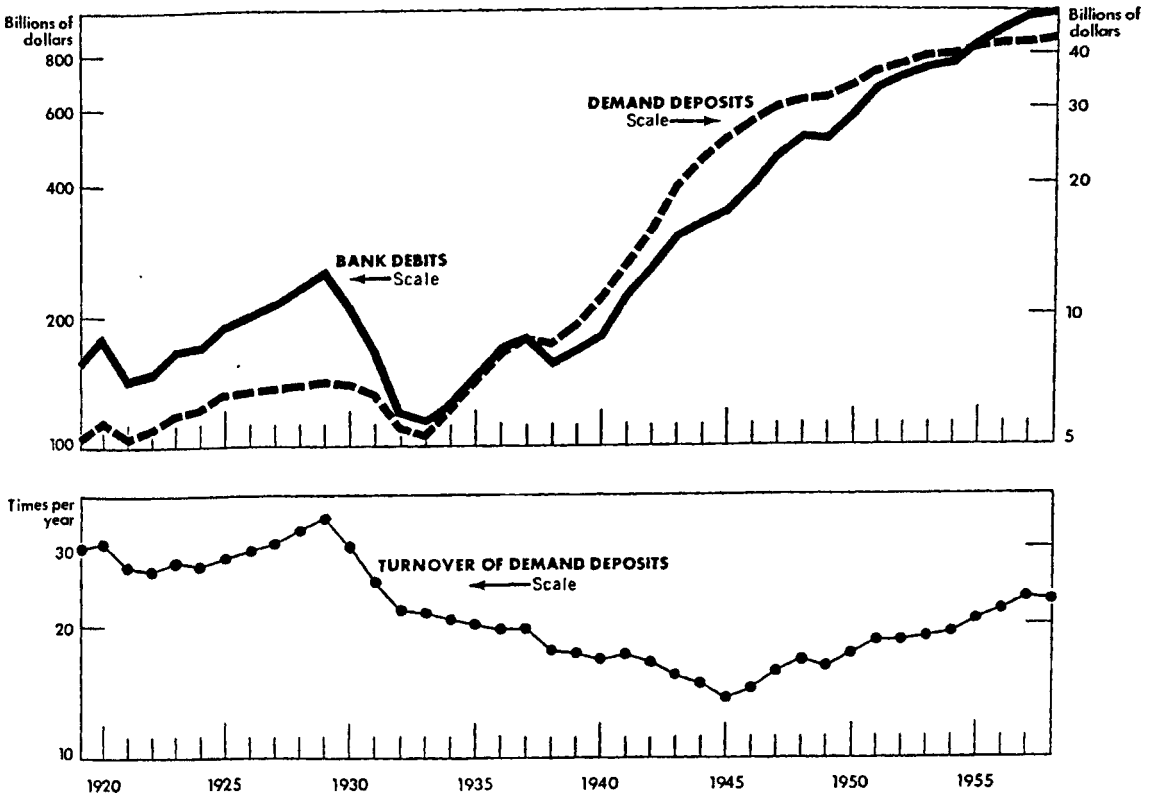
After a slight drop from the peak reached during the postwar boom year of 1920 (the particularly sharp increase in debits in Chicago in 1920 can be traced

[5]For a detailed description of the various velocity and related series, and a discussion of technical points, see George Garvy, *Debits and Clearings Statistics and Their Use.*

[6]A number of these are conveniently tabulated by R. T. Selden, "Monetary Velocity in the United States", *Studies in the Quantity Theory of Money*, ed. by Milton Friedman, Chicago, 1956.

CHART 1

BANK DEBITS, DEMAND DEPOSITS, AND RATE OF TURNOVER IN "OUTSIDE" CENTERS



Note: Data for 1943–58 are for 337 centers outside New York City and six other financial centers. Estimates for earlier years are based on data for weekly reporting member banks in 93 cities outside New York City for 1935–42 and in 100 cities outside New York City for 1919–34. Debits for March 1933 are estimated. A logarithmic scale is used to show proportionate changes.

to commodity speculation before the collapse of commodity prices), the rate of demand deposit turnover increased fairly steadily through 1929 (see Chart 1). In that year, an all-time peak was reached when the rate of turnover for the year as a whole averaged thirty-six times deposits, and was as high as forty in October.[7] The rate of turnover declined sharply through 1933, while business

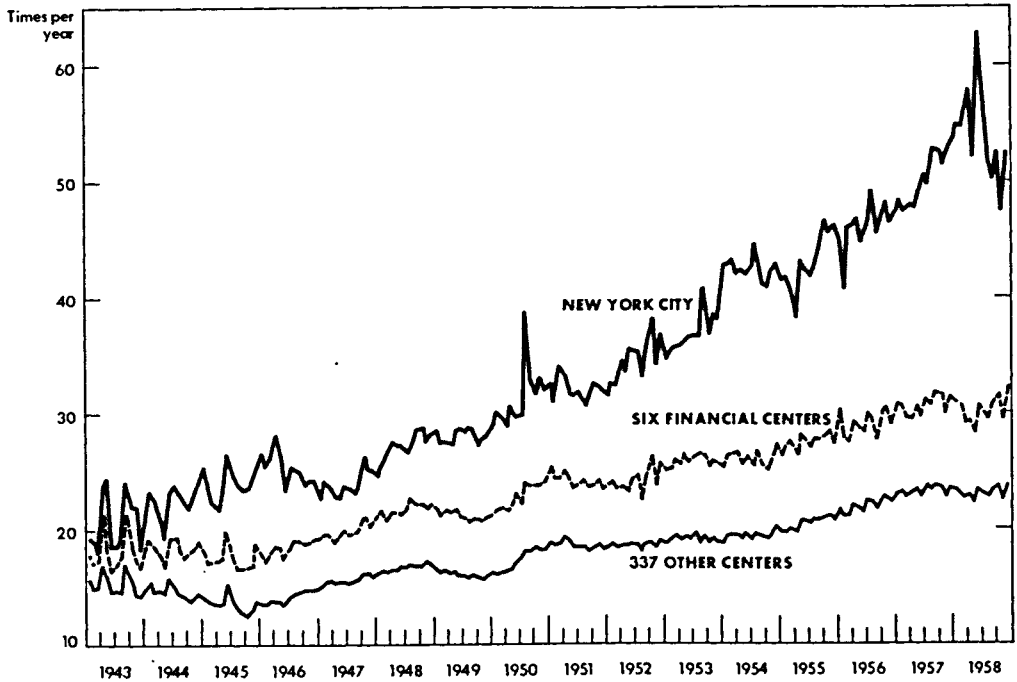
[7]The data for the years prior to 1942 have been spliced to the new series which begins in that year to make them comparable. This splicing has had the effect of reducing the level of the earlier two segments, which include fewer smaller cities with lower average velocity. In addition, turnover rates in the earliest period (prior to 1934) were based on *net* demand deposits, which tended to raise computed rates even more.

activity was rapidly contracting. In subsequent years, the decline continued almost uninterruptedly as a result of the excess liquidity of the economy. In these years the volume of deposits grew more rapidly than business activity as measured by bank debits. Even though production and all other aspects of business activity increased rapidly during World War II, the huge volume of deposits created in the process of war financing continued to depress the rate of deposit turnover, which fell to an all-time low in 1945. As business activity expanded during the postwar period, the rate of growth of the money supply slowed down and the rate of deposit turnover in the 337 other centers began to rise again, from a low point of 12.4 in October 1945 to about 24 by the end of 1958 (see Chart 2). The fairly continuous rise in the rate of demand deposit turnover since the end of World War II—interrupted but hardly reversed during the three postwar recessions—is more in line with the expectations of the long-run trend in deposit velocity expressed by the earlier students of its movements

CHART 2

RATES OF TURNOVER OF DEMAND DEPOSITS

Seasonally adjusted, monthly 1943-58



than the slight downward trend through World War II. The fact that velocity has been rising since World War II is perhaps more significant than the fact that observed rates are still lower than those which prevailed in the late twenties.

CYCLICAL FLUCTUATIONS

Velocity rises and declines with business activity. In part, these fluctuations in velocity reflect the more intensive and efficient use of checkbook money during periods of rising business activity. In part, higher turnover rates in periods of rapid expansion result from the larger share of financial transactions in total debits. Since capital formation is more volatile than the flow of national income, rising activity is accompanied by a more-than-proportionate increase in capital expenditures and in the various activities related to their financing. Availability of new securities tends to give rise to a chain reaction in portfolio adjustments, and activity in outstanding securities generally increases as profits expectations rise, but not uniformly, thus offering additional inducements for switches. Additional opportunities for portfolio adjustments arise from changes in the relationship of long- and short-term rates and among various long-term rates. There are sufficient data to show that trading in existing assets tends to rise more rapidly than physical activity.

The close relationship between the level of business activity and rates of use of demand deposits was first recognized in the early twenties when for a time an index of transactions velocity was computed at the New York Reserve Bank as an indicator of business activity.[8] This same relationship can be discerned also in the years since World War II when the rate of deposit turnover showed a clear cyclical pattern. Turnover rates of total deposits for 1870 to 1914, based on related data on bank clearings, also clearly reflect the pattern of business fluctuations during those years.

Since transactions velocity is measured as the ratio of debits to demand deposits, its movements may reflect changes in the divisor, in the dividend, or in both. Usually, rates of turnover rise sharply during the final period of a business expansion. In such periods, although deposits also expand, debits rise even more rapidly. Frequently, such rises result from the increase in the volume of transactions at a time when the monetary authorities aimed at limiting the growth of the money supply.

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[8]See Carl Snyder, "Deposits Activity as a Measure of Business Activity", *Review of Economics and Statistics*, October 1924, pp. 253-9. See also J. W. Angell, *The Behavior of Money*, New York, 1936, especially Chapter IV.

Table 1 shows that rates of deposit turnover rose substantially in cities outside the main financial centers in each period of expansion since the end of World War II, and declined consistently in each recession (see column 3). As the money supply expanded almost continuously in this period, cyclical fluctuations in velocity reflected, in the main, changes in the volume of payments rather than in checkbook balances. In the periods of business expansion, demand deposits rose as well as debits, but at a much smaller rate, as shown in columns 1 and 2. In the periods of declining business activity, debits always declined, but again deposit levels were reduced by much smaller percentages.

Table 1

CYCLICAL SWINGS IN DEPOSITS, DEBITS, AND TRANSACTIONS VELOCITY

Percentage changes in periods of expansion and contraction, 1945-58

*Cyclical phase**	*Demand deposits adjusted* (1)	*Debits*† (2)	*Transactions velocity*† (3)
October 1945—November 1948 (expansion)	+ 9	+62	+38
November 1948—October 1949 (contraction)	− 1	− 7	− 8
October 1949—July 1953 (expansion)	+19	+56	+24
July 1953—August 1954 (contraction)	+ 2	− 2	− 1
August 1954—July 1957 (expansion)	+ 7	+35	+22
July 1957—April 1958 (contraction)	− 1	− 4	− 4

*Between troughs and peaks, as determined by the National Bureau of Economic Research. All data adjusted for seasonal fluctuations.

†In 337 cities outside New York City and six other financial centers.

Out of the various elements that affect the cyclical behavior of rates of deposit turnover emerges the central fact that, when business activity expands, the amount of activity that bank balances support rises more than proportionally to the increase in the physical volume of production and distribution. Business firms, individuals, and government units as well as other groups of transactors tend to add to their balances by borrowing additional funds. But at the same time, they double their efforts to economize on balances, to find better ways to coordinate their receipts with payments, to expedite collections, and to use funds whenever and wherever they accumulate—in other words, to increase the efficiency of money.

Many of the improvements in the use of transactions cash adopted in a period of limited availability and rising cost of money are, however, not reversed in periods of easy money. Similarly, the experience gained in investing

excess cash in income-yielding securities in periods when such a rearrangement of liquid assets is advantageous is not lost in times when the attractiveness of such investments is much lessened. Advances in the "technology" of managing transactions as well as liquidity balances have a lasting effect and become a long-run influence affecting the turnover rate of demand deposits. While many of the various techniques designed to economize on the use of cash originate or become more widespread in periods of rising demand for balances, they ultimately become part of normal business practices.

Many analysts have found in the rise and fall of interest rates a ready explanation for the cyclical behavior of rates of turnover. Short-term interest rates as well as velocity fluctuate with the general level of business activity, but it is not possible to establish empirically whether or to what extent fluctuations in velocity are caused directly and uniquely by changes in the attractiveness of yields available on money market instruments rather than by the more general change in the economic environment caused by the advancing and receding tides of economic activity.

IV. Why Hold Cash Balances?

Monetary theory has always recognized that in modern society money performs several basic functions. There is, however, a diversity of views as to the best way of classifying uses of money and as to the rationale underlying such classifications. The distinction between money as a means of payment and as a store of value is familiar from the older writings of monetary economists. In more recent monetary theory, the motives for holding liquid funds for other-than-transactions purposes are variously rationalized. In the literature, in accordance with the analytical framework first developed by Keynes, precautionary and speculative motives are imputed. Holdings of money have been termed defensive in periods of fluctuating equity values. A distinction has been made between "current" and "capital" balances. In other types of analysis, both similar and different terminology or rationalizations are encountered. The analysis has been gradually widened to include a whole spectrum of liquidity instruments in addition to money.

Without choosing between alternative theoretical models or lines of reasoning, it is sufficient to recognize that there are several motives for holding demand deposit balances other than the need for maintaining cash balances proportionate to the volume of anticipated payments. The rate of turnover of demand deposits may, therefore, change for two main reasons:

1. Because the cash balances required to make a given amount of payments may vary (as a result of changes in the composition and timing of the payments flow, in the speed of check collection, in requirements as to compensating balances, etc.), and
2. Because the amount of balances maintained for reasons other than to serve as a basis for meeting payments requirements may vary absolutely as well as in relation to transactions balances.

It is sufficient to recognize that fluctuations in the level of both business activity and prices of goods and services and in the volume of trading in intangible assets, the irregularities in the flow of income and expenditure, the requirements of growth, and many of the uncertainties of modern life make it desirable to own liquid reserves in addition to cash balances held to meet normal payments flows. The need for liquidity is basic to the operation of our economic system. But any attempt merely to enumerate the various factors that come into play in determining the liquidity requirements of each transactor group and to distinguish such needs from transactions requirements would immediately

reveal numerous difficulties. For instance, does an oil company, which regularly bids for oil leases, keep "speculative" balances, or are funds kept in readiness to make such bids part of ordinary transactions balances? Or how should funds being accumulated by institutional investors in order to participate in an anticipated private placement be classified? Indeed, in many cases, reasons for holding money are overlapping rather than additive. For our subsequent discussion it is sufficient to recognize that in the case of business firms there will be, at times, in addition to planned liquidity reserves, some temporarily redundant funds that are also kept in liquid form pending their use in current operations, investment in real or in financial assets, or for repayment of debt.

HOW ARE LIQUIDITY NEEDS MET?

Money is a liquidity instrument "par excellence". Yet, as there are alternatives to money in discharging obligations, there are also substitute sources of liquidity. Money has a preferred place in the spectrum of liquidity instruments, but the level of demand for money as an instrument of liquidity depends on its competitive position in relation to alternative instruments. The range of liquidity instruments available to, or preferred by, the various categories of economic units is not the same. Furthermore, the liquidity instruments available and the prevailing views as to their moneyness have varied over time.

Thus, most people would consider time deposits, postal savings deposits, and shares in savings and loan associations (even though theoretically these shares are merely claims on realizable assets) as near substitutes for cash. Moreover, in all three instances, withdrawal before the interest or dividend payment dates involves a cost in the form of a loss of income since the last interest period.

The growth of savings and other time deposits in commercial and savings banks and of holdings of shares in savings and loan associations reflects primarily the demand for such liquidity instruments on the part of consumers (in part offset by the declining popularity of postal savings accounts). The various types of time deposits constitute the most important type of asset holdings for individuals; individual spending units hold more of their liquid assets in savings accounts than in checking accounts and United States Savings bonds combined. Savings institutions are fully aware of the fact that their attractiveness depends to an appreciable extent upon their ability to endow their liabilities with the characteristics of near money. To maintain this attitude in the minds of their depositors, they normally waive any legal requirements with respect to prior withdrawal notice that may exist, and make passbook loans almost automatically.

Some of these institutions go so far as to issue checks or money orders and, in general, try to emphasize not only security and income but also the ready availability of funds entrusted to them. Another important source of liquidity for individuals is Federal Government securities. Savings bonds are widely held by all, including the lower income groups; some individuals in the upper income groups also use short-term marketable securities as a source of liquidity.

Corporations usually hold their liquid reserves in the form of demand deposits and open market securities. In contrast to individuals, they do not normally maintain currency reserves and make relatively little use of time deposits; they do not hold savings and loan shares or deposits in mutual savings banks to any extent. In the twenties, call loans, Treasury certificates of indebtedness, bankers' acceptances, and commercial paper provided the most convenient instruments for holding corporate reserves, but since the thirties Treasury bills (first introduced in 1929) have come to occupy a position of predominance. Since the end of World War II, several types of short-term securities of Government agencies were added to the range of liquidity instruments used by corporations. Among private obligations, finance company paper rose rapidly in importance after World War II. It has an important advantage arising from the ability of the issuer to tailor the size and maturity of each obligation to the specific needs of corporations (or of other investors) anxious to find employment for temporarily idle funds. Similarly, some corporations have utilized repurchase agreements with Government securities dealers to obtain short-term investments that would fit their needs.

The liquidity instruments that are used by various kinds of economic units overlap to a large extent. The preference for various categories depends upon the ease and cost of conversion into money (in itself a function of the size, organization, and activity of the market for each security), the comparative earnings available on competing instruments, tax considerations, etc. Over time, and most markedly since World War II, there has been a substantial increase in the variety of instruments and of institutional arrangements available. At the same time, the need periodically to accumulate large reserves has been intensified by the rise both in income taxes and in other forms of taxation.

Numerous other developments have had important and, in part, contradictory influences upon the need for bank balances and their rate of use. Growing urbanization, the decline of agriculture as a source of income, the rise in average family income, the simultaneous decrease in the importance of income paid in kind, the decline in the proportion of the foreign born (unfamiliar with or

distrustful of banking operations), the general increase in levels of education, and the growing importance of the corporate form of doing business are some of the influences tending to increase the demand for deposit balances. Important factors in the opposite direction include the increased share of government in income and expenditures, the expansion of consumer credit, and the use of charge-account facilities.

Demand for liquidity reserves is in the main related to uncertainty. Important institutional developments that have taken place since the thirties have increased the ability of the individual to meet contingencies without immediate recourse to cash; similarly, the growth of consumer credit facilities and, more generally, the greater availability of bank credit to individuals have tended to reduce the need to carry protective balances. All forms of government and private compulsory or voluntary insurance tend to obviate the need to accumulate a backlog for the proverbial rainy day and to keep at least part of it liquid. A large and increasing proportion of the population is protected against (at least the first) impact of unemployment, sickness, and accidents on the job and on the road, so that the proper identification card is often a substitute for cash.

Currency is the main competitor of checking accounts in performing the payments function and, to a limited extent, also as a liquidity reserve. Indeed, with increased per capita income, currency in the hands of the public now is much larger in relation to GNP than in the twenties. There are, furthermore, additional ways of making payments which we shall examine in Chapter VII, together with various factors affecting the efficiency with which deposit balances are used.

BALANCES HELD TO COMPENSATE BANKS

It is usually assumed that the size of the average balance held by each economic unit (family, business firm, or governmental unit) is regulated by its transactions and liquidity requirements. Insufficient attention is paid, however, to the fact that a very large part of total demand deposit balances serves to compensate banks for services performed in handling payments and in providing credit facilities.

Individuals as well as businesses usually have an option to pay an *explicit* service charge for the handling of their accounts or to compensate their banks *implicitly* by holding balances on which the banks can earn an income equivalent

to the service charge.[9] A substantial part of banking services is paid for by keeping appropriate compensating balances, and such balances are a large proportion of total demand deposits. The significance of the compensating balance has grown in recent decades (it should be recalled that before 1933 the holder of demand deposits, instead of being charged for services, was paid interest) as the use of account analysis for determining charges has been generalized.

In the case of individuals, tax laws often make it advantageous to pay for banking services through compensating balances. The depositor foregoes income on the balance maintained, but in many cases he would have to invest a larger amount to earn enough income after taxes to pay bank charges.[10] Only in exceptional cases do corporations pay explicit service charges for routine services (such as payment of checks, preparation of payrolls, wire transfer of funds, credit inquiries, etc.). This happens, for instance, when an account is used only intermittently, or when the corporation judges that the bank's requirements substantially exceed the amount which it holds to be proper on the basis of its own analysis. Corporate trust services (such as issuance of dividend checks and stock certificate transfers) comprise the main category of services to business firms that give rise to the payment of explicit service charges.

Banks analyze periodically the activity of business and other large accounts in general in order to determine their profitability. Although the idea of service charges began to take root before the turn of the century, by 1929 (when banks still paid interest on demand deposit accounts) only a little more than one third of all banks had adopted the practice of making charges for services rendered by them. The depression, but also the discussion of banking codes under the National Recovery Administration, gave a boost to the movement toward the application of service charges, and the Bank Management Commission of the American Bankers Association (ABA) shifted its attention from small to large checking accounts. Subsequently, account analysis became an almost general practice, and payment for banking services by maintaining adequate balances

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[9]The United States Government also compensates commercial banks for certain services by keeping appropriate balances (see H. J. Cooke, "Managing the Treasury's Cash Balances", in *The Treasury and the Money Market*, Federal Reserve Bank of New York, 1954, p. 8). However, neither debits nor deposits currently used to compute the index of deposit turnover include United States Government accounts (although they were included prior to 1943).

[10]The extent to which compensating balances are used in connection with other personal bank business varies. In rare cases, even the handling of personal investment management accounts is compensated for by appropriate inactive balances.

was encouraged in preference to the payment of explicit charges.[11] Activity charges are computed on the basis of a fairly standardized analysis which is based on the principle that earnings credit[12] allowed on average (or minimum) balances, after deduction for applicable legal reserves, should be equal to the actual cost incurred, plus a fair profit margin.

Charges made for various types of services, and the rate used to compute earnings credit, are not uniform among banks. Corporate treasurers usually review independently the account analyses made by their bankers. In determining the level of compensating balances, they may allow for perhaps an even wider range of services than those considered by the banks by taking into account various intangible services performed by banks. In addition to the routine banking services, services rendered to a corporation's employees, such as assisting transferred employees in locating and financing homes, may also be considered. Considerations relating to community goodwill or the maintenance of long-established banking connections may also play a role. Some corporations maintain as a matter of policy a certain minimum balance with each local depositary.[13]

Banks, particularly large institutions, also ordinarily require or expect their customers to maintain appropriate balances in return for the extension of credit lines.[14] Such balances are usually referred to as compensating or commensurate balances; we shall use below the latter term to distinguish them from balances maintained at banks for checking and similar services. A recent survey of approximately 100 of the largest banks indicates that more than 70 per cent of these banks require commensurate balances; other banks require such balances usually, but not always, or only from certain categories of borrowers, such as finance companies. An equally large proportion of banks require commensurate balances for term loans as well. More than half of the responding

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[11]The ABA issued in 1935 its first *Manual for Determining Per Item Costs*, followed in 1939 by *Uniform Account Analysis*.

[12]Most banks compute earnings credit on the basis of collected balances, but others compute them on ledger balances. F. P. Gallot ("Why Compensating Balances?—Part II", *Bulletin of the Robert Morris Associates*, August 1958, pp. 309-19) found, on the basis of a questionnaire survey addressed to 100 of the largest banks, that 62 per cent used collected and 38 per cent ledger (total included uncollected) balances. Because of its limited coverage, the results of this survey cannot claim general validity. In comparison with a similar survey made in 1954, there was a noticeable trend toward increased use of collected balances.

[13]See George Katona, *Business Looks at Banks*, Ann Arbor, Mich., 1957, Chapter 6. Also J. E. Walter, "Liquidity and Corporate Spending", *Journal of Finance*, December 1953, pp. 369-87.

[14]Roughly one third of all member banks with total deposits between $20 million and $50 million require such balances, and for the largest institutions (with deposits of $500 million and over) this percentage rises to 93. See "Credit Lines and Minimum Balance Requirements", *Federal Reserve Bulletin*, June 1956, pp. 573-9, for data based on the October 1955 survey of commercial and industrial loans at member banks. See also D. P. Jacobs, "Sources and Costs of Funds of Large Sales Finance Companies", *Consumer Instalment Credit*, Part II, Vol. 1, Board of Governors of the Federal Reserve System, Washington, D. C., 1957, pp. 341-52.

banks also require commensurate balances for specific loans.[15] Such balances are determined as a certain percentage (usually 15 to 20 per cent) of the amount of borrowing outstanding or (about 10 to 20 per cent) of credit lines granted. Frequently, corporations which do not establish formal credit lines maintain sufficiently large balances with their main banks in order to facilitate access to credit in the case of need. Indeed, most of the banks which have no formal minimum balance requirements would, nevertheless, take the customer's usual deposit balance into account in providing loan accommodations and in setting the interest rate on loans.

The amount of compensating (or commensurate) balances is determined by the primary functions which they perform: to compensate banks for costs incurred in rendering a wide range of services and to assure adequate access to credit. Yet, at the same time, they may satisfy part or all of the liquidity requirements of their owners. Indeed, compensating balances are not completely immobilized and can be withdrawn in case of need, usually at the cost of incurring service charges. Since compensating balances are normally based on average rather than on minimum balances, they can be drawn down temporarily to meet unexpected drains of funds. Bank policies with respect to compensating balances are quite flexible (but not necessarily in periods of tight money), and many business customers rightly consider such balances as part of their liquid reserves.

Neither consumer nor mortgage loans involve commensurate balances, nor do most types of financial loans such as loans to brokers. The share of commensurate balances in the total deposits of a given bank will thus depend on the composition of its loan portfolio. This is significant when comparing turnover ratios among individual banks or localities and where assessing long-run changes in transactions velocity in the light of changes in the composition of assets of the banking system as a whole.

Prior to 1933 commercial banks paid interest on demand deposits, no compensating balances in the current sense were held, and the practice of requiring commensurate balances was less prevalent than now. This is an important and perhaps even one of the major reasons why the transactions velocity of demand deposits in the fifties is considerably lower than in the twenties in spite of the great progress that has been made in collecting and managing funds by large holders of demand balances.

[15] F. P. Gallot, "Why Compensating Balances?—Part II", *op. cit.*

The lodgment in the deposit structure of a large volume of compensating balances has the effect of dampening cyclical swings in velocity. Their aggregate volume tends to be related to the activity of an account; any increase in activity calls for a corresponding increase in balances. Compensating balances are sensitive to interest rates only to a limited extent. The earnings credit, on the basis of which the size of required balances is computed, moves with the general level of interest rates, but rates used for computing earnings credit are adjusted only when major changes in interest levels take place, and even then with a lag.[16] Compensating and "goodwill" balances are, on the whole, rather insensitive to fluctuations in interest rates, although in times of monetary stringency corporations will tend to reduce them. Furthermore, under the pressure of high or rising interest rates some depositors maintaining a large number of accounts will tend to eliminate certain low-activity accounts. Bankers, however, will place more emphasis on commensurate balances when loan demand is strong. It is, indeed, generally believed that commensurate balances are used as a credit-rationing device and that bankers raise their requirements in times of tight money; one of their effects is to increase effective yields on loans. In the 1958 Robert Morris Associates survey, about as many bankers indicated that the general availability of funds did not influence balance requirements as the number replying in the affirmative. Although the split of views was about the same in 1954, the general and significant tightening of requirements revealed by comparing survey results on the two dates suggests that commensurate balances are used to ration credit. And, indeed, in the 1958 survey, bankers declared, by a margin of more than two to one, that the "tight money" climate of the past few years focused attention on commensurate balances. Experience in these years indicates that, when money becomes more plentiful, banks tend to maintain but are ready to reduce the balances required against credit lines.

This fact that commensurate balances are related to activity acts as a kind of automatic brake, tending to counteract any sharp rise or fall in velocity, even though it cannot be assumed that compensating and commensurate balances rise and fall in direct proportion to the level of business activity or of aggregate deposits. On the other hand, the volume of such deposits is clearly considerably less sensitive to changes in interest rates than funds which are held exclusively for liquidity or speculative purposes.

[16] If, in a period of expansion, reserve requirements are raised, higher earnings credit may be offset, in part or entirely, since required reserves are deducted from compensating balances on which the earnings credit is based.

The relationship between compensating and commensurate balances, on the one hand, and the level of business activity and of interest rates, on the other, is sufficiently complex to suggest that a simplification of the analysis by treating them as part of transaction balances is inadequate. This is particularly true when analysis of transactions velocity is extended to the twenties.

ACTIVATION OF IDLE BALANCES

It is frequently said that in periods of expanding business activity "idle balances are drawn into circulation". The distinction between "active" and "idle" balances (distinguished frequently in academic literature as M_1 and M_2) is, indeed, essentially an expository device. While there are some demand deposit accounts that are virtually dormant for prolonged periods of time (or that are occasionally increased, but not drawn against), nearly all accounts show *some* degree of activity. What is meant by reference to idle balances is the excess over amounts normally required to meet smoothly an anticipated flow of payments. For each business firm, individual, or other spending unit, the amount of idle balances depends on a number of factors, such as the nature of the business of the account owner, the geographic and time pattern of payments, and the requirements of the bank as to minimum or compensating balances, to name only the most important. All these factors may be subject to long-run as well as to cyclical influences.

When business activity expands, business firms require larger balances to support a larger volume of production and distribution. Some firms will have ample cash resources to meet increased needs (and what earlier appeared as idle or redundant balances will now be drawn into active use), while others will replenish their cash balance through borrowing. Currency requirements also tend to increase in periods of business expansion, and since additional currency is normally obtained by drawing against deposit balances, the initial impact is a reduction in such balances. During a period of business contraction, the reverse process takes place, as funds obtained from the liquidation of inventories and other business funds not needed for transacting a reduced volume of business are banked at a time when reduced yields on alternative liquidity instruments reduce their attractiveness. Those who hold cash for speculative purposes may change their expectations as to the future of prices of goods and/or securities or of yields on various types of securities; or they may use balances built up earlier to acquire goods or securities as the favorable situations which they anticipated materialize. Balances withdrawn to purchase income-yielding liquid-

ity instruments are of course not lost to the banking system, unless these instruments are acquired from a bank. They may reappear as demand deposits of other holders who need to increase their transactions balances and for this purpose are willing to part with other types of liquidity instruments (or with investments that do not possess a high degree of liquidity), or in other ways.

Economic units which distribute their liquid reserves among cash and securities (including time deposits in various forms) will normally alter this distribution in response to changing liquidity needs and to the relative returns available on different types of securities. Any change in the proportion of demand deposits held for transactions and for all other purposes combined tends to be reflected statistically in the rate of deposit turnover. There is, of course, no way of ascertaining to what extent a rise or fall in this rate is due to a changed composition of demand deposits resulting from a shift in the purposes for which they are held, and to what extent it is due to a more or less efficient use of deposits in making payments.

The volume and composition of credit outstanding is bound to have an influence on cyclical changes in the rate of deposit turnover. If a large volume of credit is used by firms which experience a decline in activity, the accompanying contraction of working capital (for instance, as a result of inventory liquidation) will most likely result in loan repayments or retirement of callable or maturing long-term debt. Such firms are likely to be in a better position to bring their bank balances into a better relationship with payments than businesses that do not use outside funds. Firms or individuals who cannot (or choose not to) reduce their balances by repaying bank loans or retiring longer term indebtedness will attempt to make the best possible use of redundant funds by investing them; when such funds are allocated among various types of liquid investments, some part is likely to be kept in the form of demand deposits.

It is frequently said that balances created through loan extension are particularly active, since their very creation attests to the need for additional transactions balances. This may or may not be so, depending on the subsequent use made of the additional balances. When borrowed funds are drawn down rapidly to pay for materials or services, they immediately enter the payments stream and, from the second round on, are indistinguishable from other checkbook money. All that can be said is that the deposits created through additional loan extension probably increase transactions balances initially and, by reducing the relative share of other balances, contribute to the increase in over-all velocity.

But if the borrowed money is used to provide a more comfortable cash margin and to relieve the comptroller from worries about keeping a close check on the cash flow, the net result may be a slowing-down, rather than an acceleration, of turnover. In any case, however, the volume and structure of bank loans and of other borrowing in relation to the level of demand deposits have to be considered as one of the elements determining velocity.

The process which is frequently referred to as the activation of idle balances is best looked upon as a reshuffling in the ownership distribution of checkbook money (in part as a result of the expansion of the money supply) and, more generally, in liquid-asset holdings as interest rates rise. As the volume of payments rises with business activity, existing accounts become more active. Some balances are ample enough to support additional transactions and their turnover rates accordingly rise; other accounts that have been kept close to minimum needs include no margin of idle funds and have to be built up by borrowing or by conversion of liquid assets into cash. Their rates of turnover may not change much as balances and transactions rise more or less in step, but the growth of such balances will increase the share of active accounts in total demand balances.

In addition to the more active use of balances to transact a larger volume of business, several additional developments tend to influence the cyclical increase of velocity. One is the relative growth of trading in private securities. Since capital formation is more volatile than the flow of national income, rising activity is accompanied by a more-than-proportionate increase in capital expenditures and in the various activities related to their financing. Availability of new securities tends to give rise to a chain reaction in portfolio adjustments, and activity in outstanding securities generally increases as profits expectations rise, but not uniformly, thus offering additional inducements for switches. Additional opportunities for portfolio adjustments arise from changes in the relationship of long- and short-term rates and among various long-term rates. There are sufficient data to show that trading in existing assets tends to rise more rapidly than physical activity.

Rising interest rates which typically accompany an improvement in business activity make holdings of reserves in money market instruments increasingly attractive. As a result, temporarily redundant funds are invested in income-yielding securities, frequently even when funds can be invested for only a few days. The various instruments and techniques available for such temporary utilization of cash are described in the following chapter. The amount of debits arising from the purchase and quick resale (or redemption) of securities or from

repurchase agreements in periods of rising market rates of interest is very large. On the other hand, when rates are low, the return available on such short-term investments is not worth the effort since the brokerage fees and other costs are relatively inflexible, being related to the amounts involved rather than to the yields expected.[17] In periods of low money market rates, the cost involved in investing such funds for a few days or weeks may be prohibitive, but this hurdle is overcome when rates rise.

The activation of balances is thus a complex process, involving an increased use of balances owned by the *same* economic unit, shifts of deposit balances *among* units which rearrange their holdings of liquidity instruments, and loan expansion. It would appear that the influence of rising interest rates on velocity operates primarily not through a reduction of idle funds (included in the denominator of the turnover ratio), but through the considerable volume of debits generated by the endeavor of corporate treasurers and also of State and municipal financial officers to earn income on the last dollar of temporarily redundant funds (which increases the numerator). To a considerable extent, statistical data showing rising turnover velocity reflect the churning-over of funds rather than the cyclical reduction of hoards.

The size and use of demand deposit accounts maintained by various depositor groups and the mode and frequency of their use have been undergoing long-run changes which are as yet insufficiently explored. These involve in part changes in attitudes on the part of various depositor groups with respect to their transactions and liquidity needs, and in part changes in banking techniques which affect the size of balances required to meet a given flow of payments and to assure related banking services. Transactions velocity of demand deposits can thus be viewed as the statistical reflection of at least two sets of forces: one is the extent to which demand deposits are used in preference to other means of payments and liquidity instruments; the other is the "efficiency" with which demand deposits are used, which in turn represents prevailing payments procedures of individuals or business firms as well as banking practices.

[17]For a theoretical model discussing the effect of cost on investment of excess funds, see W. J. Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach", *Quarterly Journal of Economics*, November 1952, pp. 545-56.

V. Who Owns Demand Deposits?

The different payments streams arising from the production and distribution of goods and services as well as from financial activities require the holding of cash balances that for each economic unit must be adequate in relation to the volume, timing, and degree of certainty of the payments to be made. There are wide variations in the size of such balances required per dollar of prospective payments, not only between the various types of payments, but also within each payments category. Differences between average cash holdings of the various categories of economic units, in turn, reflect the underlying differences in the payments streams which they have to meet and their effort and ability to anticipate correctly fluctuations in their cash income and outgo, as well as their effort and ability to make the best use possible of their available cash resources and to obtain easy access to additional funds if necessary.

DISTRIBUTION BY HOLDER GROUPS

The necessarily very rough statistics on ownership distribution of business and individual deposits for three selected years is summarized in Table 2.

Table 2
OWNERSHIP DISTRIBUTION OF DEMAND DEPOSITS AMONG SELECTED GROUPS OF DEPOSITORS* (In billions of dollars)

Group	*End of 1939*	*End of 1947*	*End of 1954*
Nonfinancial corporations	8.3	20.8	25.2
Financial corporations	1.1	2.2	3.1
Total corporate	9.4	23.0	28.3
Unincorporated business	3.1	11.8	12.8
Total business	12.5	34.8	41.1
Individuals (including farmers)	7.3	30.5	34.7
Trust funds	1.2	1.6	1.6
Total	21.0	66.9	77.4

*Derived from bank-record surveys on the basis of certain assumptions as to the size and distribution of the mail float. The estimated mail float is relatively large, amounting in recent years to about 20 per cent of private demand deposits as per bank records.

The outstanding changes between the end of 1939 and of 1954 (the first and last date for which estimates are available) may be summarized as follows:

1. The share of deposits of individuals increased from less than 35 to nearly 45 per cent of the total.

2. Conversely, the share of nonfinancial corporations declined from nearly 40 to less than 33 per cent.
3. The share of unincorporated business rose slightly from less than 15 per cent to more than 16 per cent.

Even though, according to these estimates, business deposits amount to not much more than half of all demand deposits, they account for a much larger proportion of debits, since such accounts are much more active than personal accounts. Indeed, it is mainly due to the pyramiding of business, and in particular of corporate, payments that aggregate check payments are about ten times as large as personal income payments (after allowance for imputed income and wages paid in currency).

Corporate payments may be presumed to be the largest single factor affecting velocity. Some of the most important variations in transactions velocity arise from the changes in the turnover rates of corporate accounts; yet much of the academic discussion of the factors determining changes in the transactions velocity of money runs in terms of the liquidity and transactions needs of individuals rather than of business.

PERSONAL CHECKING ACCOUNTS

Even before the turn of the century the bulk of all payments was made by check. A setback occurred as a result of the banking crisis of the thirties, but subsequently the use of checks by individuals rose rapidly. The number of checking accounts of individuals, partnerships, and corporations (the latter accounting for but a small fraction of the total) at insured commercial banks rose from 22.1 million in 1936 to 54.4 million in 1959. In 1959, nearly one out of every two persons, twenty-one years or older, owns a checking account, compared with only one out of four in 1936.

More people currently enjoy an income level at which ownership of a checking account becomes a convenience that can be afforded. The postwar changes in the size distribution of family income and the sharp increase of income available for "discretionary spending" (above the mere necessities of life) have favored the wider use of checks by individuals. The shift of mortgages to an amortized basis, the growth of instalment credit, the increased use of charge accounts of all types, and the expansion of mail-order business to new fields have increased the outflow of checks, frequently to distant points. The practice of paying wages by check has contributed to the use of checking accounts by the lower income families. The wider use of checks in paying hourly employees is

shown by successive surveys of a sample of companies undertaken by the National Industrial Conference Board which indicate that the percentage of companies paying hourly workers by check increased from 69.8 in 1937 to 82.6 in 1954.[18]

The sharp increase in personal checking accounts can be traced to the establishment of no-minimum-balance checking accounts and perhaps also to deposit insurance. One New York State bank instituted this type of checking account as early as 1929, and this service was vigorously promoted by banks throughout the country after 1935 when it was introduced under the name of "Checkmaster Plan". Subsequently, banks throughout the country promoted "special" checking accounts to develop the use of banking services by individuals.[19]

According to the annual Survey of Consumer Finances, the percentage of spending units not owning a checking account declined from 66 per cent in 1946 to 45 per cent in 1959. The bulk of the units hold small balances: early in 1959, the balance in more than 40 per cent of all personal checking accounts was less than $200. Conversely, a very small number of spending units hold relatively large checking accounts (of $2,000 or more). These relatively large accounts represent in part business accounts, since large accounts are more frequently held by the self-employed, farmers, and professional people. Almost one out of five spending units with a money income of $10,000 or over kept balances of $2,000 or more while, for the spending units with income below the $7,500 level, only about one out of forty units kept as much in a checking account.

There is very little factual information regarding the average rates of turnover of personal checking accounts.[20] Presumably, as in the case of many other categories of deposit accounts, bank balances owned by individuals range from fairly inactive accounts owned by wealthy individuals who prefer and can afford to keep substantial liquid reserves to convenience accounts of people of modest means in which cash is deposited only to be checked out almost immediately to pay for current bills. What evidence there is suggests that *on the average* personal checking accounts turn over less rapidly than those held by business firms

[18]National Industrial Conference Board, *Personal Practices Governing Factory and Office Administration* (NICB Studies No. 233, 1937) and *Personnel Practices in Factory and Office* (NICB Studies in Personnel Policy No. 145, 1954).

[19]Fewer than 200 banks had introduced such special checking accounts by 1938, but their use has become very widespread since the war. See S. E. Milne, *A Study of the Development and Feasibility of Pay-as-You-Go Checking Accounts*, Thesis, The Graduate School of Banking, Rutgers, 1939.

[20]A study by the Federal Reserve Bank of Chicago based on correlation analysis of deposits in thirty Midwestern cities found that "business accounts turned over twenty-eight times per year; while annual debits to individuals' accounts averaged only three times balances".

despite the fact that a large proportion of individuals make use of special accounts with no-minimum-balance requirement. Among the main reasons for the relatively lower velocity of turnover of personal checking accounts are the following: (1) Some individuals prefer to keep all or a large part of their liquid reserves in the form of demand deposits.[21] Some do so because they do not regard it as worthwhile to maintain separate savings accounts or because they wish to avoid service charges, while others, particularly wealthy individuals, accumulate funds temporarily in this form because they intend to diversify their holdings of liquid assets. Yet the existence of a relatively few large, though essentially inactive, checking accounts tends to lower the average turnover rates of personal deposits. (2) Individuals frequently obtain cash for daily expenditures by cashing salary or other income checks over the bank counter or in local stores; many people utilize their checking accounts primarily to set aside funds in order to meet periodic outlays (for such recurrent items as mortgage payments, rent, instalment contracts, insurance premiums, and so on). They thus hold such funds temporarily in their checking accounts either because the period of accumulation may be too brief or the amounts involved too small to warrant their investment in income-earning assets. (3) Many individuals (such as farmers) whose incomes are characterized by pronounced seasonal swings do not ordinarily invest funds received in peak periods which they expect shortly to draw down as their incomes fall off. (4) Business accounts in the aggregate include an appreciable proportion of borrowed funds and frequently can be readily reduced to desired levels by loan repayments. In contrast, most personal balances are derived from deposits of income checks, and frequent adjustments in the volume of borrowings are not a feasible way of keeping demand balances at a desired level. (5) When individuals borrow to finance the purchase of a house, a car, or some other major outlay, the proceeds of the loan generally bypass their checking accounts (that is, the loan check is endorsed over to the seller and is, therefore, not reflected in debits to their account). Thus, large expenditures very frequently are not reflected in debits to their deposit accounts.

Surprisingly enough, even the no-minimum-balance special checking accounts are by no means characteristically rapid-turnover accounts. On the basis of very fragmentary data for some New York City banks, it appears that such accounts turn over about fourteen times a year, which is less than rates typical of business

[21]The Survey of Consumer Finances found, for example, that units that did not maintain savings accounts held on the average larger demand balances in relation to income than those which did (*Federal Reserve Bulletin*, August 1957, p. 886).

accounts, but certainly higher than those for large regular checking accounts owned by individuals.

SIZE DISTRIBUTION OF DEPOSIT BALANCES

Since information on the ownership of the money supply by economic sectors is so meager, it may be useful to supplement it by whatever data are available on the size distribution of demand deposits. Such a distribution is available on a bank-record basis only, and is given in Table 3 for the most recent date available for all accounts of individuals, partnerships, and corporations at insured commercial banks. It indicates that the 100,000 or so large balances ($100,000 and over) account for a dollar amount nearly four times as large as the 41½ million accounts of $1,000 or less which belong mostly to individuals. Fewer than 1 per cent of all accounts (those over $25,000) hold more than half of all deposit balances. It may be presumed that these accounts, which with relatively few exceptions are business balances, account for an even larger proportion of debits and that their activity has a more-than-proportionate impact on average velocity as well as on cyclical and long-run changes in velocity.

The estimated distribution of deposits by major ownership groups and the size distribution of deposits as they appear on bank records indicate that the number of personal checking accounts is growing rapidly and their share in total deposits is rising (even though 1939, the earliest year available, may not be

Table 3
DISTRIBUTION OF DEMAND DEPOSIT ACCOUNTS OF INDIVIDUALS, PARTNERSHIPS, AND CORPORATIONS*
January 28, 1959

Size of account	*Number*		*Amount*	
	Thousands	*Per cent*	*Million dollars*	*Per cent*
Under $1,000	41,585	80.9	9,107	9.2
$ 1,000 - $ 5,000	7,270	14.1	15,754	15.9
5,000 - 10,000	1,313	2.6	9,080	9.2
10,000 - 25,000	776	1.5	11,669	11.8
25,000 - 100,000	366	0.7	16,527	16.7
100,000 and over	102	0.2	36,735	37.2
Total	51,412	100.0	98,872	100.0

*Excluding deposits of nonprofit organizations, trust departments of banks, and foreigners. For a more detailed breakdown, see the *Federal Reserve Bulletin*, April 1959, pp. 378-81.

typical of the share of business in total demand deposits in the pre-World War II period and notably in the twenties). Yet, in spite of the decline of the share of business in total demand deposits, cyclical as well as long-run changes in turnover rates reflect mainly activity in business accounts.

VI. The Flow of Check Payments

The efficiency with which money is being used by each specific economic group depends upon a number of factors, among which the ability and cost of obtaining additional balances, that is, the cost of borrowing, is generally recognized as meriting special attention. Earlier or later, further attempts to increase the efficiency of use will meet with obstacles arising from technical and institutional factors. Some of them arise from differences in timing and are usually discussed under the heading of a lack of synchronization of receipts and expenditures. Others can be traced to the space element in the payments process. Thus, when a payment is made at a distant point, some time will elapse before the check is cleared and charged against the payer's account; the money has been checked out, but since the check has not yet been presented for payment, the payer's bank balance is larger than his own checkbook stub balance—but it is the former which is used to compute rates of deposit turnover. The greater the proportion of payments made at distant points, the more will turnover rates be affected by collection delays.

SYNCHRONIZATION OF RECEIPTS AND EXPENDITURES

The flow of goods through the various stages of production and distribution involves payments to the various agents of production, such as labor and capital, and also whenever the ownership of either intermediate or final products passes from one economic unit to another. As the flow of sales receipts is not perfectly matched by the flow of payments to the agents of production or to the sellers of intermediate products, business units hold cash balances to meet payments when they fall due. The amount of cash held in relation to the volume of payments depends, on the one hand, upon the frequency of receipts, which itself depends on billing practices in the given industry and the characteristic seasonal pattern of its sales, and, on the other, upon the schedule of disbursements, on which the frequency of wage and salary payments and the frequency of purchases of raw materials are among the most important influences.

By using a mathematical model, it can easily be shown that the need for cash balances declines with the closer synchronization in the flow of business payments; that the shorter the pay period, the smaller the balance which the average consumer will have to hold in relation to his expenditures; and that the more the production process is integrated, the fewer the number of successive business units through which goods travel before they reach the ultimate consumer.

All these considerations, which in academic literature[22] are discussed under such headings as income periods, overlapping of payments, or time intervals between interfirm payments, have a tangible empirical aspect, since we can observe from experience that changes in payments patterns occur continuously. Indeed, in some cases business firms have introduced new payments or billing procedures specifically to improve the synchronization in payments flows and to reduce the need for holding transactions balances. It is convenient to discuss the significance of payments patterns separately for business firms and for consumers.

The fewer the number of stages through which a product passes before it reaches its final destination, the fewer the number of independent business units involved, and therefore the fewer the number of cases where the gap between receipts and expenditures needs to be bridged. The process of vertical integration in production and distribution reduces the need for transactions balances, even though some of the payments originally made between independent firms subsequently become intrafirm transfers of funds. But corporate treasurers of large firms with diversified products are in a better position to anticipate and synchronize payments flows than independent units linked by market relationships, with all the attendant uncertainties and needs for protective margins.

The problem of synchronization arises primarily in connection with the production and distribution of current output rather than with trading in existing assets. Of course, not all sales of existing assets are immediately matched by purchases, and some assets are liquidated to obtain funds to pay for purchases for current consumption. Other transactions in existing assets are more in the nature of portfolio adjustments with sales and purchases fairly well matched in time, although from time to time cash positions are temporarily built up and reduced only after the market situation changes and a return to a fully invested position becomes desirable. The point, however, is that transactions in existing assets, being determined by such considerations as the relative yield patterns of various types of investments and the liquidity needs of business firms and of individuals, lack the regularity of wage, tax, rent, bill, dividend, and other payments streams that arise from the process of producing and distributing current

[22]See, in particular, Irving Fisher, *Purchasing Power of Money*, New York, 1911; J. W. Angell, "The Components of the Circular Velocity of Money", *Quarterly Journal of Economics*, February 1937, pp. 224-72; and H. S. Ellis, "Some Fundamentals in the Theory of Velocity", *Quarterly Journal of Economics*, May 1938, pp. 431-72.

output. As a result, the level of cash balances arising from, or held in connection with, trading in existing assets varies with business conditions, with movements in interest rates, and other factors. Numerous institutional arrangements have been developed to minimize the need for cash when trading in existing assets, and the most important of these are discussed in Chapter VII.

PATTERNS OF PAYMENTS FLOWS

Numerous forces other than integration are important in shaping business payments flows. Interbusiness financing, including supplying of raw materials or parts to subcontractors and prepayments on contracts, and customer financing are obvious examples. The use of book credit and the offsetting of interbusiness payments tend to reduce cash needs. Changes in patterns of business financing take place continuously, and the relative importance of individual industries in which interbusiness financing or the use of book credit is important changes over the long pull; more importantly, the lengthening of billing periods and the extension of sales-credit terms typically occur during periods of declining business and, by temporarily modifying the frequency of payments, tend to slow down velocity cyclically.

The total volume of check payments is unknown, but it is, of course, many times the value of GNP or personal income. The relationship between the aggregate volume of check payments and the level of national income is not rigid. First, the amount of payments associated with the production of one dollar's worth of final product is not constant over time. Second, transactions in existing assets and several other types of payments are only loosely, or not at all, associated with the processes of production and distribution, thus further weakening the links between current output and the volume of debits. Furthermore, some payments are made by using currency rather than checkbook money, while other payments are obviated through various types of compensating arrangements. Finally, United States Treasury checks payable at Federal Reserve Banks, which account for the bulk of Federal Government payments, are not included when computing rates of deposit turnover. It is convenient to consider money payments under three main headings: those associated with current production, those representing intrafirm and other transfers between accounts of the same economic entity, and finally financial payments.

PAYMENTS FOR FINAL PRODUCTS

A large part of all payments made goes to the agents of production for the purchase of intermediate products, or arises when finished products are distributed to final users. As raw materials pass through several stages of fabrication before the finished product reaches the final consumer, several transactions between independent business firms take place; all of them normally give rise to money payments. As a result, the volume of check payments exceeds by several times the value of final goods and services produced, even though nearly all goods and services purchased by the Federal Government are paid for by United States Treasury checks which are not recorded in reported debits. However, while finished products purchased by the Federal Government are almost completely excluded from reported debits, the payments for productive resources by private producers (who, in turn, sell to the government) as well as the related payments arising from the manufacture of intermediate products are, of course, reflected in debits. Furthermore, payment of taxes by individuals and businesses may be regarded as charges against private accounts for goods and services purchased by the government. Nevertheless, an increase in the government's share of the economy's output will normally tend to reduce debits in relation to the value of aggregate national output, because the Federal Government, as well as the lower units of government, usually purchases directly from producers with the result that various stages of distribution are eliminated.

More generally, any shifts in the composition of GNP may affect the volume of money payments required. Consider, for instance, a shift away from goods in favor of services. Goods pass through several stages of fabrication and distribution, whereas services are usually sold directly by the "producers" of services to users. The relative growth of the service component in GNP tends to reduce the volume of intermediate transactions and thus the total volume of payments in relation to the value of final output. Whether the velocity of deposits will also be reduced in the process will depend on whether average deposit balances are adjusted to the changing volume of intermediary transactions.

Our present state of knowledge is insufficient to state definitely in which way changes that are continuously taking place in the composition of the final output of goods by industry and of services by type affect the related cash balances and payments flows. Yet, on the basis of flow-of-funds and GNP estimates, one can conclude that changes over time in the composition of the flow of final purchases and their financing must have resulted in considerable

changes in the composition of payments flows. In the long run, developments such as the growth of the shares of government and changes in the respective shares of goods and services (other than those paid for largely in kind, such as domestic services) in private output must have been reflected in the composition of check-payment flows and the ratio of check payments to the value of final output.

Similarly, changes in the frequency of wage and salary payments influence the velocity of personal deposit balances. The more frequently workers are paid, the smaller the average cash balance that will be in their hands in relation to the annual volume of expenditures. Over time, changes in the frequency of wage and salary payments and in consumer spending have been compounded by a gradual, but not continuous, shift from the use of cash to the use of checks.

INTRACORPORATE TRANSFERS OF FUNDS

A large part of economic activity, on the production as well as on the distribution level, is carried out by corporations operating over extensive areas, often nation-wide; indeed, in recent years, corporate sales alone have been equal to almost one fourth of estimated total debits at all commercial banks. Total corporate payments, including internal transfers of funds, must have accounted for a much larger portion of the total. The importance of intrafirm transfers of funds can be shown by taking a closer look at the cash management of a typical corporation.

Practices and policies involved in the management of corporate cash balances are as varied as patterns of corporate cash flows. There are innumerable variants in the basic pattern of matching the flow of payments with the flow of receipts and for bridging temporal (seasonal and cyclical) gaps in these flows. The management of corporate cash is one of the main responsibilities of the corporate treasurer. In some large corporations, a special banking division (or a similarly designated unit in the treasurer's function) is in charge of bank relations and cash management policies. In the larger corporations, banking needs are analyzed systematically and adjustments are made when needed. The selection of depositary banks tends to be made increasingly on the basis of a systematic analysis of the cash and payments flow of the corporation.

The growing complexity of corporate structures, resulting from the diversification of output, from mergers, from the tendency to decentralize operations, and from other causes, leads to the multiplication of separate bank accounts. The trend seems to have been toward separating disbursement accounts from

collection accounts; special purpose disbursement accounts are usually established mainly for accounting convenience and to facilitate reporting and auditing. Frequently, a corporation maintains several separate collection and disbursement accounts at the same bank.

Usually the bulk of receipts is concentrated in the principal treasury account which is the focal point of cash management policies of the corporation. This account may be split among several large banks located in New York City and perhaps in some of the other principal money centers in cases where the head office of the business concern is not in New York City.

While the three-layer structure of collection, central treasury, and disbursement accounts is fairly common, in very large corporations there may be intermediate layers, such as regional concentration accounts for collections and divisional disbursement accounts. Instead of being concentrated at the corporate headquarters, collection of remittances may be decentralized in a number of regional centers. Similarly, disbursement checks may be drawn against a single treasurer's account, or the disbursement account may be decentralized to a varying extent. Payroll accounts are typically local disbursement accounts, while checks in payment for raw materials or freight charges, as well as for dividend and Federal tax purposes, are usually drawn against central treasury accounts. National corporations (which account for the bulk of corporate sales) usually maintain collection and/or disbursement accounts in most or all localities in which they do business. It is not infrequent for individual corporations to maintain several hundreds of individual accounts; for national retail organizations, the number of accounts may run into the thousands.

Some corporations transfer funds from collection accounts directly to local disbursement accounts in order to minimize unnecessary cross-country transfers. Other companies, to facilitate the control of cash flows or for other reasons, pass all collected funds through their principal treasury account. In either case, funds are withdrawn periodically (daily for very large collections) from collection accounts, frequently by using preprinted depositary transfer checks.

The centralization of corporate cash is usually put on a semiautomatic basis by instructing the depositary bank to transfer daily collections to a central or regional account, or to make such transfers when the account exceeds a specified level. In still other cases, an arrangement is made whereby the manager of the corporation's local branch or sales office, when depositing cash and checks for collection, simultaneously deposits a draft in favor of a bank holding one of the main corporate accounts.

Interaccount transfers of funds are usually made by wire, although mails are still widely used for transfers to remote localities or for transfers of small amounts. The wire-transfer facilities of the Federal Reserve System have always been available to member banks for rapid transfer of funds for the account of their customers. The establishment in 1950 of the "bank wire", which links more than 200 banks in nearly sixty cities (about double the number served by the Federal Reserve facilities) through a privately operated network further facilitated the centralization of corporate cash balances and their rapid transfer to points of disbursement. These facilities have made money at distant points available almost instantaneously in New York or in any other money center of the country. They have contributed materially to the reduction of over-all cash needs of national corporations. Corporations with a relatively small number of collection (or concentration) accounts frequently arrange to have the amounts of balances wired daily to the bank handling their principal account. On the basis of daily summaries supplied by this bank in the morning hours, the treasurer decides on the required transfers or other dispositions of funds.

Similar intraunit transfers take place among separate accounts maintained by government units on the State and local levels. Wealthy individuals may also maintain multiple bank accounts. The maintenance of separate checking accounts either for different purposes or in different localities or at different banks by individuals, businesses, and governmental units gives rise to a substantial volume of debits.

In addition to transfers between separate accounts of the same economic unit, of which intracorporate shifts of funds are the most significant, there are other types of transfers which are directly related neither to the current volume of national production nor to trading in existing assets or other types of financial assets. Such transactions have been called "agency transactions". They include collection activities of agents on behalf of principals (such as, for instance, central billing by the Diners Club), payments into escrow funds, good faith deposits on public biddings, etc. All these payments are an integral part of our economic system, and changes in ways of doing business or in legal provisions affect the volume of such payments in relation to debits.

PAYMENTS ARISING FROM SAVING AND INVESTING

Finally, a third principal category of check payments arises from savings and investment activities, including portfolio adjustments and trading in existing real or financial assets. This category includes a large variety of payments,

ranging from what have been called "money-changer transactions" to payments related to trading on organized securities exchanges. Exchanges of one kind of money for another may involve debits to deposit accounts, as, for instance, when checks are drawn to cash or for the purchase of traveler's checks, foreign currency, or for the opening of letters of credit. Debits of this category also arise when deposits are transferred from demand to time accounts, when checks are deposited in accounts at mutual savings banks or savings and loan associations, or when money market instruments are purchased to invest temporarily redundant funds.

The flow of savings into investment may occur directly (and in this case the purchase of production goods by the investor is not much different from the purchase of consumer goods) or through the purchase of corporate, municipal, or United States Government securities; or it may involve financial intermediaries. One of the functions of financial intermediaries is to concentrate small pools of savings and to make them available to large users of funds. Such activities involve intrafirm transfer of funds similar to those described above for industrial corporations. Indeed, life insurance companies, the largest of the financial intermediaries, use a network of local depositaries and of concentration accounts in much the same way as do nonfinancial corporations. They also usually maintain numerous separate disbursement and investment accounts. In the case of some financial intermediaries, such as private pension funds, the channeling of savings funds into investment normally involves a minimum of debits. On the other hand, a considerable volume of debits may arise from the very process of pooling savings of individuals—as in the case of mutual investment funds with their elaborate sales organizations. As financial intermediaries aim at obtaining a maximum return on their funds consistent with safety and applicable legal and other limitations, a large volume of financial payments arises from replacement of investments that fall due (such as bonds or mortgages) or that become less attractive than alternative investment outlets.

In a growing economy, financial payments are continuously generated in the process of floating and distributing new securities. Their underwriting and distribution usually involve large funds raised by syndicates of investment bankers. The very process of pooling funds and their transfer to the ultimate borrower frequently generates debits totaling several times the amount of financing involved. In terms of aggregate debits generated, this pyramiding of payments in connection with new issues cannot be compared, however, with those arising from trading in existing securities. Such trading reflects portfolio ad-

justments of financial intermediaries, institutional investors (including college and similar endowment funds), corporations, and individuals as well as the activities of professional speculators. It takes place on organized stock exchanges as well as on over-the-counter markets or through bond (trading) departments of commercial banks. These various markets have different rules as to the payment for purchases, and some have arrangements for offsetting payments among brokers and dealers. As a result, changes in the share of transactions handled by the different markets have a definite effect on rates of deposit turnover.

Current estimates of the total value of securities sold are not available. The only comprehensive study of this kind covers a three months' period in late 1949, a time of low business activity. It is estimated that during that period total securities sales, including new securities, in all markets averaged nearly $12 billion a month; about three fourths of this volume consisted of Government securities.[23] Next in importance were corporate securities, mostly stocks, traded on organized exchanges, among which for many years the New York Stock Exchange has had the lion's share of business. It is only since World War II that the volume of Federal Government securities has become very large in relation to private securities, and trading in United States Treasury securities has become the most important component of trading in financial markets. After the introduction in 1929 of the Treasury bill as a money market instrument and the inauguration of the weekly issuance of such bills, active trading in outstanding issues began to generate a large volume of debits. Throughout the twenties, it may be presumed that trading on organized stock exchanges accounted for the bulk of financial transactions.

Perhaps the most important change in the composition of the volume of recorded check payments in financial transactions as compared with the late twenties has resulted from the relative decline of personal financial transactions, mainly associated with the relatively reduced importance of trading on organized stock exchanges. There is no way of measuring the volume of payments arising from stock market trading and its influence on velocity. Trading in stocks and bonds is reflected in the accounts of dealers and brokers as well as of those of the principals, such as individuals, insurance companies, and trust and pension funds, even though some part of the transactions arising from portfolio adjustments give rise to debits (and credits) to customers' accounts with brokers rather than to the ultimate buyers' accounts at their banks.

[23]Irwin Friend and Associates, *The Over-the-Counter Securities Markets*, New York, 1958, p. 116.

Indirect evidence suggests that since World War II stock market transactions have been generating a considerably smaller proportion of total check payments than in the late twenties. Thus, in the peak year 1929 the value of total shares traded at the New York Stock Exchange was equivalent to nearly 120 per cent of GNP;[24] in contrast, it was equal to only 7½ per cent of GNP in the bull market year of 1958. In general, during the entire postwar period this percentage has been much lower than during the peak of the boom of the late twenties. Similar comparisons hold for sales of corporate stock on all national exchanges and over-the-counter markets.[25]

As a matter of fact, the value of corporate shares outstanding is now only about one half as large in relation to GNP as in 1929 and the decline of the ratio of corporate bonds to GNP has been almost as sharp. A much larger proportion of all corporate securities (one fifth in 1949 against one fifteenth in 1929) is held by nonbank financial intermediaries; it may be presumed that on balance portfolios managed by institutional investors turn over less rapidly than those held by individual investors. Thus, the growing importance of institutional investors in relation to professional and occasional traders was probably an important factor in explaining the relative decline in the turnover of outstanding securities. The relative shift from stock to bond financing and the larger importance of private placements had a similar effect.

Other types of financial transactions have not experienced the same decline relative to the general level of economic activity (as measured by GNP) as corporate stocks, while certain types such as trading in Government securities (especially in Treasury bills) have grown in importance since the late twenties. A large volume of debits arises, in addition, from Treasury refinancing operations, including the weekly bill auctions, and from repurchase agreements of Government bond dealers, the volume of which has risen very rapidly in recent years, and also from the fact that average bank balances maintained by such dealers are small in relation to the volume of payments made.

Accounts of United States Government securities dealers are presumably the most active deposit accounts handled by banks. A special survey conducted by the New York Clearing House Association shows that in February 1959 such accounts at the fourteen New York downtown banks turned over at an annual rate of 11,264 times, or nearly fifty times a working day (while accounts

[24]The New York Stock Exchange, *Fact Book*, 1959.
[25]According to estimates through 1949 in Irwin Friend and Associates, *op. cit.*, p. 109.

of members of the Stock Exchange and of investment bankers turned over at a rate of 300 times a year).[26] This fantastically high turnover rate reflects the peculiar way in which bank balances of Government securities dealers are used as clearing accounts. Each day the bank with dealer balances makes and receives numerous deliveries of securities for the account of the dealer and receives or makes the corresponding payments. The amount of payments made will exceed many times (about fifty times, as the February 1959 figures show) the amount of the opening balance in the account but will normally be roughly offset by an equal amount of credits. Borrowing on securities and borrowing of funds also swells the volume of debits but will generally leave the closing balance unaffected, unless the transactions fail to balance out by an amount large enough to require an overnight loan.

A rise in debits, while normally associated with a quickened pace of economic activity, may at other times reflect primarily greater financial activity, including debt operations of the United States Treasury. Among the various types of transactions in existing assets, stock market activities have tended to generate a sufficiently large volume of debits in periods of peak activity to have an independent influence upon rates of deposit turnover, at least in financial centers. It is quite likely, however, that the relatively large volume of debits in financial centers in recent years reflects to an increasing degree debits arising from short-term investment of surplus funds in money market instruments (not only by nonfinancial corporations, but also by insurance companies, State and local governments, pension and trust funds, etc.) rather than stock market activity—which in recent years has been a much less significant contributor to financial debits than it was during the late twenties.

[26]New York Clearing House Association, *An Analysis and Recommendations Prepared for the Committee on Banking and Currency, United States House of Representatives*, New York, April 6, 1959, p. 14.

VII. Velocity in the Long Run

The system of payments in the community is constantly undergoing changes, but these changes are gradual and usually irreversible. Similarly, the geographic pattern of payments flows changes with shifts in the distribution of population, with growing urbanization, and with the spread of mail-order business, but again such changes are more likely to provide an explanation for changes taking place in transactions velocity in the longer run than to account for cyclical or other short-run variations.

The numerous factors which in the long pull affect the rates of deposit turnover can be grouped under four main headings. First, any changes in the proportion of payments made by using folding rather than checkbook money will affect deposit turnover rates. In a second category are the arrangements to settle payments without using money, which operate mainly to reduce the volume of financial debits. A third important and rapidly developing category is comprised of arrangements, made mostly by business firms, to reduce the amount of balances required to meet a given payments flow; we discuss them under the heading of "economizing on corporate cash". The fourth category includes other arrangements to reduce checking activity, which are used mainly by individuals.

FOLDING MONEY VERSUS CHECKBOOK MONEY

Changes in the proportion of currency in the money supply are likely to reflect primarily variations in the use of currency in the personal transactions sphere. Turnover rates of personal checking accounts depend, in part, upon the proportion of income received, and of personal expenditures made, in currency rather than by check. The smaller the use of currency for personal expenditures, the larger the relative weight of personal check payments in total debits and the larger the influence of personal transactions on total deposit velocity.

The use of currency in interbusiness transactions is very limited. Business firms typically hold a substantial proportion of the currency in the hands of the public, but most of it is not held for making payments to other businesses (or to pay taxes), but rather to pay wages and salaries (when they are paid in currency) or as till cash (in retail and service establishments); much of the rest represents the day's cash receipts prior to their deposit in banks. Almost all business-to-business transactions are made by check, so that the volume of currency in the hands of the public is more closely related to consumer expendi-

tures than to the volume of interbusiness transactions. Financial transactions, including the flow of savings into investments and portfolio adjustment activities of individual and institutional investors, also involve almost exclusively check payments.

In making local payments for a fairly wide range of current household expenditures, the individual usually has the choice between using currency or checks. Payments at distant points are ordinarily made by check, but people who do not own checking accounts use postal money orders, bank money orders, or cashier's checks purchased for cash. The various means of transferring funds that do not require owning a demand deposit account—and hence are not reported as debits—are used by individuals rather than by business firms. Therefore, increase in their use will result in the reduction of the relative importance of personal expenditures in determining deposit velocity. It is unlikely, however, that changes in the use of postal and bank money orders and similar payments instruments have been large enough since the twenties (either in the long or short run) to have affected demand deposit turnover ratios significantly. Since 1929, for instance, the rise in the volume of postal money orders has roughly paralleled the increase in debits.

Several possible effects of the changing composition of the effective money supply on deposit velocity can be envisaged. If transactions that typically are associated with slow-moving check balances are increasingly made by using currency, a more-than-proportionate rise in the share of currency in the effective money supply will be associated with a rising secular trend in the rates of deposit turnover. The opposite would be true if the switch to currency resulted in the relative growth of liquidity balances (in relation to transactions balances) within the deposit total, thus tending to cause deposit velocity to decline secularly. However, if there were a tendency to keep larger amounts of cash on hand, or even to hoard currency as a liquidity reserve, then idle deposits would be likely to diminish and turnover rates to rise. Established facts are insufficient to provide a clear-cut answer as to the effect of shifts in the composition of the money supply, but such shifts have been of some importance.[27]

The ratio of currency to demand deposits has been subject to a long-run declining trend, to judge from estimates that are available as far back as 1867. (Although before 1914 time and demand deposits of commercial banks are not

[27]The lack of turnover figures for currency makes it impossible to compute the turnover of the total money supply which would permit a direct comparison with income velocity (the ratio of GNP to money supply).

estimated separately, it seems reasonable to assume that the trend of the ratio of currency to demand deposits would be similar to the trend of the ratio of currency to total deposits in commercial banks.) It is estimated that at the end of the Civil War for every $100 in deposits at commercial banks the public (business firms as well as consumers) held more than $80 in currency. Since then, the ratio of currency to deposits has been declining almost continuously. By the time the Great Depression broke out, only $8 in currency was held for every $100 in total deposits and only $15 of currency was held for every $100 of demand deposits. The declining importance of currency in the money supply was subject to sharp reversals during both World Wars and also following the banking crisis of the early thirties. Thus in 1933 the share of currency in the money supply was about twice as large as in 1930; and, while the decline was renewed in subsequent years, the relative importance of currency increased around 50 per cent during World War II. The decline since World War II has been relatively gradual, and by 1958 the share of currency in the money supply was still far from touching the lows of 1929 and 1930. At the end of 1958, $25 was held in currency for every $100 in demand deposits, against $16 in 1930.[28]

It seems plausible that with the rise in the average family income more people would make use of checks. Yet, while the number of checking accounts owned by individuals has grown rapidly (see p. 39 ff.), the amount of currency has also grown substantially in relation to the value of goods and services. Between 1929 and 1956, currency outside banks increased eight times while GNP increased only four times. Clearly, the increase in the amount of currency in the hands of the public was much sharper than the combined increase in population and in per capita income. It is, however, not known whether the growth in the amount of currency in the hands of the public was accompanied by any corresponding decline in the rates of currency turnover.

For the earlier period, between the end of the Civil War and World War I, the gradual decline of agriculture as a source of income (and the related shrinkage of the self-sufficient sector) and growing urbanization are usually considered

[28] Data for 1867 through 1945 are based on unpublished data from a forthcoming National Bureau of Economic Research publication by Milton Friedman and Anna Schwartz. All data on the amount of currency in the hands of the public suffer from the shortcoming that the amounts of currency lost, destroyed, and held abroad are unknown. Estimates run into billions, but are based on fragmentary and indirect evidence.

See Federal Reserve Bank of New York, "Changes in Currency Circulation", *Monthly Review*, March 1948, pp. 27-8, and "Currency Hoarding", *ibid.*, July 1948, p. 74, which includes the following statements: "Of the approximately $25 billion of currency outside the banks possibly as much as $9 or $10 billion apparently is being hoarded, here or abroad, or has been lost or destroyed." And further on: "Opinions differ widely as to the amount of foreign holdings of United States currency; some estimate them at less than a billion dollars, others as high as $4 billion."

sufficient explanations for the rise in currency holdings per capita. In the early thirties, bank failures and the resultant weakened confidence in the banking system provided an explanation for a strong preference for currency. Subsequently, wartime dislocations, population shifts, the sharp rise in military pay (paid in currency rather than by check), and income tax evasion enhanced the demand for currency. The total amount in the hands of the public has increased a little since World War II,[29] but has declined slightly in relation to demand deposits and on a per capita basis.

It is not immediately apparent why currency holdings in the hands of the public should have increased markedly since the twenties in relation to GNP. Some analysts hold that the higher level of average family income is a sufficient explanation of the higher cash holdings, even though the use of checks has been spreading. Several other explanations have been offered for this increase,[30] but none of them seem sufficiently persuasive.

Perhaps the trend toward a larger volume of personal (rather than domestic) services, eating out, and travel, together with the wider use of vending machines, can be listed among the factors accounting for larger per capita holdings of cash, in addition to the main factor of rising per capita income. Other factors, such as growing market orientation of agriculture and the continuing large volume of military pay, can be added to the list. Since it is unlikely that there has been a shift toward the increased use of currency for any important types of business transactions, the conclusion seems warranted that the increasing share of currency in the money supply over the past three decades means that a larger part of household expenses is paid for in cash rather than by check.

On the other hand, several developments which ought to reduce the need for carrying cash have taken place since the end of World War II. These include withholding at source of income taxes, union dues, payments into welfare funds, subscriptions to Blue Cross and similar plans, and deductions for systematic savings by employers. The spreading of charge (including "revolving credit" and similar) accounts, the proliferation of book, record, candy, and other

[29]This development is, indeed, not limited to the United States. The share of currency in circulation in the money supply (defined similarly to ours) was higher in the United Kingdom at the end than before the war (28.3 per cent in 1946 as compared with 26.2 per cent in 1938). It subsequently declined through 1950, but climbed steadily thereafter and at 33.2 per cent in 1958 was considerably higher than toward the end of the thirties. See "Bank Deposits and Currency", *Midland Bank Review*, November 1957, pp. 1-3.

[30]Phillip Cagan, "The Demand for Currency Relative to Total Money Supply", *Occasional Paper 62*, National Bureau of Economic Research, New York, 1958; S. L. McDonald, "Some Factors Affecting the Increased Relative Use of Currency Since 1939", *Journal of Finance*, September 1956, pp. 313-27; and Solomon Shapiro, "The Distribution of Deposits and Currency in the United States", *Journal of the American Statistical Association*, December 1943, pp. 438-44.

"of-the-month" clubs (there are now about 100 book clubs alone), and the growth of credit cards all have tended to increase the use of checks as well as to bring about a closer gearing of payments to income receipt dates. Credit cards have been in use for many years; they range in form from credit cards issued by railroads to charge plates for department stores. After the end of World War II, the use of credit cards issued by the major oil companies and hotel chains became fairly widespread. More recently, their use has been rapidly extended through the creation of general purpose credit cards which permit charging a wide range of purchases of goods and services[31] and make such cards the equivalent of instant money. Some, and perhaps a large part, of the payments charged represent business rather than personal expenses. The carrying of a credit card—or of a whole collection of credit cards—makes it unnecessary for the individual doing the spending to carry large amounts of cash, either his company's or his own. Only the future will tell whether wider use of credit cards and similar arrangements (including a wider use of traveler's checks) will tend to limit, and ultimately to reverse, the increase in the share of currency in the money supply observable since the thirties.

COMPENSATING ARRANGEMENTS

Arrangements aimed at obviating the need for making payments tend to reduce the volume of checks issued and indirectly the need for balances to support check activity. Most arrangements of this nature involve the offsetting of credits and debits, usually through the intermediary of a clearing agency. Some of these clearing arrangements go back to the nineteenth century; others are of relatively recent inception, while new variants are being devised continuously.

One older example of the simplest form of compensation that does not involve any special arrangements is the case of merchants who extend credit to farmers and credit their accounts for produce purchased from them. A certain amount of debits and credits were (and still are) offset on the books of many types of merchants ranging from the country store to import-export firms. A certain amount of netting-out is involved in various types of interbusiness transactions, including subcontracting and open book credit arrangements. The largest volume of offsetting arises, however, from the activities of various types of organizations created for the specific purpose of clearing purchase and sales contracts or related payments. The details of all these arrangements vary, but

[31] See Robert Bendiner, "Credit Cards: The Thirty-Day Tycoons", *The Reporter*, February 5, 1959, pp. 26-30.

the one common feature is that only net balances are paid, and these balances are only a portion of the gross amounts cleared.

Some arrangements to offset payments arising from stock trading on the New York Stock Exchange were initiated as early as 1880. A stock clearing house was formally established in 1892 and the scope of its activities was considerably enlarged in subsequent years.[32] Similar clearings arrangements for offsetting payments associated with transactions among their members were organized by stock exchanges in other cities. Compensating arrangements of essentially the same kind have also been developed by commodity exchanges. The New York Produce Exchange began an arrangement for compensating contracts and payments in 1879, and most produce exchanges, including those with a large volume of futures contracts, followed suit.[33] As a result, only a small proportion of payments arising from the trading of securities on organized stock exchanges and/or dealings on commodity markets requires drawing of checks, since only net balances are settled among the participants. In the absence of such compensating arrangements, the volume of financial payments (including a large volume of speculative transactions in commodity futures) would have been a much larger proportion of total debits than they currently are.

Similar clearings arrangements have been inaugurated in other industries in which frequent payments between a limited number of firms give rise to numerous credit and debit transactions which can be obviated in large part by a netting-out process. A recent example is in the trucking industry, where the first clearings system for compensating interline payments was inaugurated in Salt Lake City soon after World War II. Similar arrangements were subsequently established in several cities in the West and, more recently, clearings arrangements of this nature were adopted in New York City and several other centers on the East Coast.[34] Another example is the operation of a clearings arrangement for the major scheduled airlines by one New York City bank.[35] Various other clearings arrangements are operated by other banks throughout the country.

Still other compensating arrangements have been developed by banks. Thus, in contrast to private securities, the bulk of the trading in United States Government securities takes place over the counter rather than on organized exchanges. Yet the volume of payments between dealers in Government securities (and

[32]See George Garvy, *Debits and Clearings Statistics and Their Use*, pp. 18 ff.

[33]*Ibid.*, p. 66, footnote 2.

[34]See *The New York Times*, April 27, 1958. These arrangements combine interline clearings of payments with a factoring function involving financial receivables of trucking firms.

[35]Chase Manhattan Bank, *Annual Report for 1956*.

their principal customers) is reduced substantially by an arrangement maintained by one New York City bank which undertakes to clear transactions in short-term securities between dealers and also certain other large participants in the market for United States Government securities.

While the specific details differ,[36] the basic principle is always the same: a certain part of the gross payments is obviated by an offsetting process among participants, with the result that the net amount of checks written in settlement of balances is only a fraction of the amount of the gross transactions, and that required transactions balances are reduced. As a result, those types of transactions for which offsetting arrangements are important tend to affect turnover rates proportionately less than activities which are fully reflected in debits. On balance, various types of compensating arrangements may be counted among forces which, in the long run, have tended to counteract forces making for a rise in transactions velocity.

In contrast to transactions among members of organized exchanges and closely related business firms, there is little room for netting-out in payments made by individuals. The outstanding exceptions are customer balances carried by stockbrokers where securities purchases and sales, borrowings for margin purposes and related repayments, and in some cases also receipts of dividends are offset on the books of brokers so that only net withdrawals result in debits.

ECONOMIZING ON CORPORATE CASH

The rise in the cost of money since the end of World War II has put pressure upon corporate treasurers to reduce their cash requirements to a minimum. At the same time, it has offered new possibilities to earn an attractive return on excess cash. Although these two related developments have attracted considerable attention of late, neither of them is entirely new. Corporate funds were widely used to finance the stock market boom in the late twenties.[37] The low interest rates of the thirties and during the war years offered little attraction for the investment of such funds, but the situation changed rapidly with the unpegging of rates on Government securities. At the same time, the growing tendency of banks to charge business depositors for their services and the general trend toward applying more scientific methods to all (including financial) aspects

[36] In some cases, a bank acts as an exclusive settlement agent for an autonomous organization (the Airlines Clearing House), and in others (like the Transport Clearings of New York, Inc.) the clearings organization has no direct tie-up with a bank.

[37] Loans to brokers by the weekly reporting New York City member banks "for others"—mostly corporations—rose from $579 million at the end of June 1926 to a peak of nearly $4 billion during the first part of October 1929.

of corporate management have prompted efforts toward a more efficient use of corporate cash. This development was fostered by a number of other factors, including the rise in corporate tax rates, the availability of a wider range of money market instruments, and at times higher short-term interest rates. The extent to which short-term Government securities have become a substitute for cash is exemplified by the annual reports of leading railroad companies which show "cash and invested cash" as a single item.

The size of aggregate corporate balances is essentially determined by the volume of corporate payments. But the minimum amount of such working balances is also determined by the need to compensate depositary banks for their services; the extent to which average cash balances exceed this amount—for liquidity and other purposes—varies among corporations.

Sales are the best available measure of total corporate payments, but they fall far short of total debits to the deposit accounts of corporations. By using the cash-sales ratio, some types of payments, such as intracorporate transfers of funds, which are relevant to the study of changes in the transactions velocity of corporate balances, are disregarded.[38]

The table below indicates that cash holdings of business corporations per dollar of sales have decreased significantly since the end of World War II. They were in 1956 (the last year for which data are available) considerably lower than during the last year before the outbreak of World War II, when the cost of credit was low, and in 1929. More limited data for leading industrial corporations suggest that this trend has continued. Moreover, it is likely, for reasons to be discussed later, that the level of average corporate balances in relation to the volume of debits has declined even more rapidly than the ratio of cash to sales.

Table 4

CASH AS A PERCENTAGE OF GROSS SALES OF NONFINANCIAL CORPORATIONS

Year	*Ratio*
1929	6.81
1939	8.54
1946	8.70
1949	7.41
1953	6.16
1954	6.70
1955	5.93
1956	5.61

Source: Internal Revenue Service, *Statistics of Income, Part II.* Corporations filing balance sheets only. Ratio for 1929 estimated on the basis of the ratio for all corporations.

[38]Also omitted are transactions between corporations and the banking system and the money and capital markets. Any increased reliance on bank credit (which generates debits when loans are retired) or on long-term financing automatically increases the corporations' financial debits; so does investment of excess cash in short-term securities.

Substantial interindustry differences exist in the corporate cash-to-sales ratios, and important variations may be found among corporations in the same industry. Obviously, conditions differ widely among industries and individual companies, depending on the seasonal patterns of production, purchase of materials and sales of final products, billing and payments patterns, the degree of vertical and horizontal integration, reliance on bank credit to meet seasonal needs, and on numerous other factors, some of which are peculiar to an individual industry (or even to a company) while others have wider applicability.[39] Liquidity needs of individual corporations also differ widely, depending on their respective financial policies, capital structure, long-term indebtedness, current and future plant and equipment expenditures, and the structure of markets in which they operate as buyers and sellers. Whether or not the firm is conservatively financed is probably one of the most important distinctions.

The trend toward the concentration of business affects not only payments flows, but also the speed with which innovations in handling cash flows spread through the business universe. In this field, as in most others, there are always pioneers and innovators; the relatively small number of large corporations that handle the bulk of business in manufacturing, public utilities, transportation and communications, and increasingly in retail trade explains why ways of handling cash, developed by one, become generalized fairly rapidly among other leading corporations.[40]

Efforts to increase the efficiency of corporate working cash include projecting monthly, weekly, and even daily cash needs on the basis of cash budgets, centralizing the cash flows, speeding up the collection of remittances, reducing the amount of uncollected funds, and using more rapid means for the intracorporate transfer of funds. These efforts are stimulated by some large commercial banks, particularly by those in financial centers, some of which have special departments[41] or officers working with corporate officials on the improvement of cash management. Efforts by commercial banks in financial centers to attract

[39]Morris Copeland (*A Study of Money Flows*, National Bureau of Economic Research, New York, 1952, Chapter II) has studied differences in the ratio of cash to receipts in selected industries and by size of firm. Similar analyses, based on balance-sheet data available in *Statistics of Income*, have also been undertaken by other students. There is likely to be less intra-industry uniformity in transactions velocity than in income velocity (i.e., the reciprocal of cash-to-sales ratios), since the volume of bank debits related to a given amount of sales depends on the way in which each corporation handles the collection and disbursement of its funds and the related intracorporate transfers.

[40]The 276 large corporations studied by *Fortune* magazine held 20 per cent of all corporate cash in 1956.

[41]At least one bank had been working with corporate treasurers on problems of cash analysis and management as far back as the late twenties.

balances by assisting corporate treasurers in developing proper procedures for increasing the efficiency of cash management as well as higher interest rates have given a new stimulus to the trend toward economizing on balances in recent years.

ANALYSIS OF CORPORATE CASH FLOWS. The key to any effort to minimize the ratio of cash holdings to the sum total of corporate payments is a systematic analysis of the corporation's cash flows. Systematic analysis and projecting of corporate cash flows are of relatively recent inception.[42] The development of the appropriate procedures and organizational forms in large measure has taken place since World War II.

A corporation that becomes aware of the need to husband its cash resources will discover opportunities for doing so even without undertaking comprehensive cash-flow studies. Frequently cash needs can be reduced by more nearly synchronizing the flow of receipts and payments or by reviewing the need for dormant or duplicating accounts.[43]

An increasing number of corporations are using cash budgets which are in some cases prepared for several years in advance and which are frequently reviewed and revised for nearby periods. Such budgeting involves relating cash needs to projected levels of sales and capital expenditures under stated alternative assumptions. Execution of cash budgets requires close control over all available cash resources and centralized information on cash balances spread throughout the country. Centralized (daily or weekly) reporting of balances held throughout the country (a service now provided by banks specializing in corporate banking services), together with cash budgeting, makes it possible to reduce over-all cash needs by shifting funds to meet seasonal and other peak requirements of the various divisions.

Internal corporate policies developed to make executives aware of the significance of their operations for the corporation's cash needs are manifold. A large merchandising organization, for example, leaves the determination of the average balance to be carried locally with the manager of each store. A relatively high rate of interest on the funds so employed is charged, however, against the operating income of the branch in the profits of which the manager shares. Another example would be the disbursement accounts which tobacco companies establish in tobacco auction centers. Although each company's buyers operate at identical locations each year, local bank accounts are closed out after the

[42]See "That's Why Companies Go for Cash Forecasts", *Business Week*, April 28, 1956, pp. 46 ff., and "Making Money Work Harder", *loc. cit.*, February 9, 1957, pp. 112-18.

[43]Trends toward banking concentration (which permit elimination of duplicate balances maintained in the same locality for goodwill reasons) operate in the same direction.

auction season and re-established in the following year in order not to carry idle balances between seasons. In the case of at least one large tobacco company, funds employed are kept at a minimum by transferring to the local bank each day the exact amount needed to cover purchases made that day. Similar practices are known to exist in some livestock markets.

The spreading use of cash-flow analysis has been attended by efforts to minimize cash needs on a systematic basis. The substantial increase of corporate income taxes (as well as several changes in their timing) seems to have exerted a powerful influence in this direction. More generally, the changes in corporate thinking and operating procedures which have taken place since World War II have been conducive to the long-range planning of cash flows. Not all corporations have been responding in the same way to the new opportunities and pressures. Some have gone to great lengths in analyzing their cash needs and in devising means of meeting them with a minimum of average balances. Others have not recognized the existing opportunities or have judged the possible savings too negligible to justify the required changes in their operations and policies.

REDUCING MAIL AND BANK FLOAT. Some of the most substantial economies in cash needs can usually be achieved internally by better coordination of the timing of receipts and payments and by planning ahead for meeting large periodic disbursements, such as income tax and dividend payments. Other economies are obtainable from special arrangements made to accelerate the movement of corporate cash and, above all, to be able to use sales proceeds as promptly as possible.

A very substantial part of the country's money supply is idle because of a gap between the time a check is mailed (and thus deducted from the payer's account) and the time it is deposited by the payee and added to his cash balance. This so-called mail float is very substantial, although there is no firm statistical basis for estimating its size or the pattern of its fluctuations. The Federal Reserve Board's staff estimates that in recent years close to 30 per cent of corporate demand deposits, as shown on bank records, consisted of check float.

Uncollected balances are normally deducted when computing service charges. Alert corporate treasurers are continuously searching for ways and means of reducing them as well as the mail float. By reducing the time between the mailing of a remittance check by the customer and its collection, the company's working cash is increased (and, at the same time, credit losses are reduced).

Efforts to reduce the mail float and the volume of uncollected balances include the decentralization of remittance collections. Establishment of regional

collection accounts reduces mailing time. If the corporate office receiving a relatively large volume of remittances is unfavorably located in relation to transportation facilities, checks may be delivered directly to other points participating in consolidated air shipments.

In recent years, the Post Office lock-box system has gained wide popularity.[44] It involves the interception of checks and their feeding into collection channels as near to their point of origin as economically feasible. The firm making use of this system instructs its customers in a given area to remit to a Post Office box address. The depositary bank makes frequent pickups from this lock box. Checks are immediately processed for collection, while photostats (or detached stubs) are forwarded to the corporation's home office for accounting purposes. An Eastern company's billings in California, for instance (which otherwise would result in remittances being sent East and then returned to California for collection), would now be made payable at a Post Office box address in San Francisco; the check mailing time from coast to coast and back is thus eliminated. The benefits that a corporation may derive from making use of "remittance banking" depend on the geographic pattern of its collections. Normally, only corporations with annual sales in excess of $50 million are likely to make use of this device.

Efforts aiming at the reduction of the mail and bank floats were aided by the gradual shortening of Federal Reserve availability schedules since the early twenties (when the maximum was eight days), culminating in the establishment of a two-day maximum deferment schedule in 1951. Bank officials specializing in the analysis of corporate cash flows estimate that, for a firm with national sales, remittance banking may reduce float on the average of perhaps three days, most of it through the reduction of mail float.[45] The reduction of the mail and bank float tends to increase aggregate "good" balances of payees without correspondingly decreasing those of payers.

USE OF DRAFTS ON BUSINESS FIRMS. Another means of reducing cash needs is the use of drafts on corporate treasurers instead of checks drawn on banks. In recent years, there has been a distinct trend toward the wider use of such drafts, in part because it permits a reduction in the average level of bank balances required to make an identical volume of payments. Funds to

[44]A more detailed description of these arrangements may be found in various publicity pamphlets published by banks, such as "Remittance Banking" issued by the Chase Manhattan Bank.

[45]To the extent that the efforts of a company to reduce its remittance float meshes in with similar efforts of its suppliers, the float on its own checks will also tend to be reduced. This, in turn, tends to increase the velocity of its cash balance by reducing the difference between the checkbook and the ledger balances.

cover drafts need not be available in the bank through which they are paid until the drafts are actually presented for payment. By contrast, checks should, of course, be drawn only against "good" funds available in the account, and balances must be maintained to cover checks issued even though not promptly cashed.

An example is the use of drafts by the American Telephone and Telegraph Company when paying its quarterly dividends. By studying the time pattern of collection of its dividend checks, the American Telephone and Telegraph Company concluded that significant savings could be realized by substituting drafts for checks. Instead of immediately depositing with the paying bank an amount equal to all dividend checks issued on a particular date, it now deposits each day only an amount calculated to cover the drafts expected (on the basis of a mathematical probability model) to be presented on that day, thus retaining the use of funds due shareholders who delay cashing dividend drafts.

An example of combining the shift to drafts with the centralization of balances is provided by a large Midwestern meat packer. In 1954, this company changed the method by which it made payments for livestock purchased. Instead of making payments by checks drawn on local banks, it began making payments with drafts drawn on itself and payable through one of the banks in the localities in which its packing plants are situated (such as Sioux Falls, South Dakota, and Ottumwa, Iowa). Each day, the local bank is given a check on a Chicago bank covering all the drafts paid during the day. Thus, all the deposit activity shows up in the central treasury account of the company at a Chicago bank, but no debits arise at the banks in the cities in which it purchases livestock (although a dormant account is maintained to compensate local banks for their services).

Efforts of payers to delay the outflow of cash are matched by those of payees to speed up collections by the use of drafts. An example is the use, by at least one major automobile company, of drafts on dealers, which are deposited by the driver of the delivery truck on arrival at his destination. Thus the automobile manufacturer may come into possession of the sales proceeds even before the delivery truck returns to the assembly plant. The use of such drafts tends to speed up the flow of payments and to increase the turnover rates of business balances.

INVESTING TEMPORARILY REDUNDANT CASH. In periods of expanding activity, business firms require additional working capital. Conversely, in periods of declining activity, business as a whole tends to experience excess

liquidity and to accumulate cash balances in excess of current needs. Numerous statistical attempts have been made to estimate the volume of such "excess" cash. It is usually assumed that, in a period of money tightness, cash balances reach their irreducible minimum in relation to total payments. The volume of corporate payments is approximated by corporate sales, a figure that is more readily available from published statements. By applying this minimum cash-sales ratio to the volume of sales, transactions balances may be estimated for the other years and the amount of idle or excess cash estimated by deducting these transactions balances from balances actually held.[46] It has been demonstrated by many students that the volume of excess balances is correlated with the level of interest rates, and that high excess balances tend to be associated with low interest rates. Low interest rates as well as a high degree of business liquidity are traceable to a common cause—slack business. And rates usually rise at a time when business improves and the need for working capital increases: rising rates and reduced holdings of idle cash go hand in hand.

With the postwar rise in interest rates and the increase in the volume and range of instruments available for combining a high degree of liquidity with remunerative investment, there has been a strong tendency toward keeping cash holdings geared as closely as possible to anticipated needs. In recent years, corporate officials have been much more aware of available opportunities to invest temporarily surplus cash[47] and have made extensive use of them. No doubt, the endeavor and ability of corporations to make effective temporary use of excess cash has contributed significantly to the volume of reported debits (by contributing to what from an analytical point of view should be considered as financial debits) and to the turnover rates of corporate cash balances.

Corporate funds available for short-term investment usually belong to one of the following broad categories: (a) accumulation of tax reserves, in particular for the quarterly payment of corporate income taxes; (b) accumulation of funds for the payment of dividends and interest and for debt repayment or amortization; (c) funds temporarily redundant because of the seasonal nature of sales or of certain categories of operating expenditures; (d) funds kept liquid to take advantage of attractive business opportunities (to acquire inventories, to ex-

[46]This method was originated by Avram Kisselgoff ("Liquidity Preference of Large Manufacturing Corporations", *Econometrica*, October 1945, pp. 334-44) and used by F. A. Lutz (*Corporate Cash Balances, 1914-43*, National Bureau of Economic Research, New York, 1945); in both cases, 1929 was used as the base year.

[47]See, for instance, "Making Money Work Harder", *Business Week*, February 9, 1957, pp. 112-18; "Making Cash Work Overtime", *ibid.*, July 12, 1958, pp. 121-2; and C. E. Silberman, "The Big Corporate Lenders", *Fortune*, August 1956, pp. 111 ff.

ercise options, to make deposits on bids, etc.); (e) proceeds of long-term financing held pending their disbursement in connection with investment in plant and equipment; and (f) general liquidity reserves, including what some writers, following Keynes, describe as speculative or precautionary balances.

Corporate treasurers may also have to provide for the temporary investment of funds accruing to self-administered pension or profit-sharing funds of their companies. In some corporations, such funds (arising from the accumulation of contributions, investment income, and proceeds of redemptions of securities held in the investment portfolios) may add up to amounts that are large even in relation to investable operating cash.

The growing eagerness of corporate treasurers to invest excess cash, in part in response to the higher returns available in recent years, has been discussed on various levels, ranging from popularized accounts in business periodicals to mathematical models developed in academic publications.[48]

The range of instruments in which corporate cash may be invested is usually limited to short-term United States Government securities (and not infrequently to Treasury bills only) and to commercial, including finance company, paper. Quite substantial differences exist, however, in the latitude given corporate treasurers. Some corporations are more liberal than others with respect to the maturity of eligible Government securities. Some treasurers have also been successful in persuading their boards of directors that Public Housing Authority notes, obligations of Federal Land Banks, and similar securities, while not direct obligations of the United States Government, offer substantially the same security with appreciably higher yields. Other short-term securities used include bankers' acceptances and municipal issues.

Finance company paper is uniformly popular with corporate treasurers, perhaps in part because many companies which issue such paper are willing to tailor amounts to fit the convenience of the borrower and to set maturities to coincide with his payment needs (such as tax or dividend payment dates). A more recent development has been the use of repurchase agreements on Government securities to employ corporate excess cash for brief periods, even of only a few days. The volume of short-term securities of the type purchased by nonfinancial corporations for the temporary investment of excess funds is now considerably larger than in the twenties.

[48] See, for instance, the article by C. E. Silberman, *ibid.*; J. S. Sprowls, *Short-Term Investment Practices of Large Nonfinancial Corporations* (unpublished M.B.A. essay, University of Pittsburgh, 1953); and D. P. Jacobs, "Sources and Costs of Funds of Large Sales Finance Companies", *op. cit.*, pp. 324-413.

By and large, Government securities dealers as well as finance companies have been both imaginative and aggressive in developing techniques[49] to obtain access to temporary pools of corporate excess cash. Some corporate treasurers (most notably those who have graduated from a banking career) have long been alert to the opportunities available in times of tight credit and high money rates.[50] The widening use of repurchase agreements has resulted to some extent from the efforts of users who have systematically sought out corporations likely to be, at least intermittently, a source of money market funds. On the other hand, some treasurers are taking the view that income obtainable from the investment of surplus funds and from a reduction of balances in general is not worth the extra effort required, and that such policies entail a risk of antagonizing the bankers whose goodwill the corporation wishes to retain.

EFFECTS OF ECONOMIZING CORPORATE CASH. The various means available to business firms, and in particular to national corporations, to reduce cash needs in relation to a given volume of payments are an important factor responsible for increased turnover rates of corporate balances since World War II. The institutional developments, many of which have taken place since World War II, discussed in this section, tend to increase velocity in the long run and not merely cyclically. This is one of the manifestations of the familiar ratchet effect: a process put in motion by a given cause (high or rising money rates) is not reversed once the cause disappears or its intensity diminishes. High money rates lead to economizing on balances, but once new techniques are developed to achieve such economizing, they become a more or less permanent feature of payment and cash management techniques.

Any reduction in the ratio of cash to the value of corporate sales necessarily increases the income velocity of corporate deposit balances. While income velocity of all corporations combined has been increasing but slowly, some individual corporations have achieved spectacular results in reducing their cash needs, which suggests that in the long run income velocity of corporate cash is likely to increase. One large corporation, which may well represent an extreme case, has been able to increase the ratio of its sales to cash from 5 or 6 in 1928-9 to 19 in 1947 and 68 in 1956.

The wide variety of cash-sales ratios between industries and among firms

[49]Which in at least one case involves a direct telephone line from a corporate treasurer to a money market firm.

[50]A recent sample survey indicates that 84 per cent of the large corporations and almost two thirds of medium-sized firms invest in open market securities and tax anticipation notes. See George Katona, *op. cit.*, p. 90, for detailed table.

within the same industry suggests that cash needs in relation to the volume of payments are subject to wide differences arising from the nature of the business as well as from a number of other factors; it also suggests that some industries and firms have been more enterprising in reducing their cash needs than others, and that progress in this direction has been uneven, in part because some firms have for a long time realized all possible economies, while others are too small to warrant expenditure of such efforts or are unable to make substantial economies because of the nature of their business.

Efforts at economizing on cash usually involve a large volume of intracorporate transfers of funds and of financial payments which tend to increase still further the transactions velocity of corporate cash. The speeding-up of collections, the centralization of treasury cash, and policies designed to reduce cash needs by interaccount transfers of cash all tend to pyramid debits associated with a given volume of final products. Thus, when regional collection points are established, a duplicate debit occurs at the local bank when funds are transferred to the concentration bank; additional debits arise if the process of centralizing funds involves more than two stages. The tendency to concentrate all funds in a main treasury account and to multiply special purpose disbursement accounts leads to an increase in the volume of intracorporate transfers (compared with practices whereby payroll and other disbursement checks are drawn against local collection accounts and only collections in excess of local needs are centralized).

Similarly, the tendency to invest excess cash in short-term securities results in a relatively large volume of additional debits. The more use is made of repurchase agreements and other means of investing surpluses available for very short periods, the larger the resulting volume of financial debits to corporate accounts. Obviously, a corporation which funds its quarterly tax liabilities by accumulating Treasury bills[51] (or other money market instruments) or by simply building up its bank balance will add relatively less to total debits than a corporation of similar size which has a policy of investing all cash in excess of a certain amount, be it only over a week end. The shorter the average period over which excess cash is invested, the larger the associated volume of financial debits. (At least one corporation held in some recent periods a larger volume of United States Treasury bills than the Federal Reserve System.)

[51]No additional debits arise, however, when special tax bills are purchased; since the Treasury accepts them in payment of taxes, checks in payment for such bills are merely substituted for tax checks.

While it is impossible even to suggest the volume of debits that arise from the temporary investment of corporate funds, it is likely to be very large. For instance, the amount of securities bought during 1956 by one of the leading corporations for short-term investment of temporarily redundant cash was nearly equal to the amount of its total sales (which were in the over-a-billion-dollar category). Moreover, every debit to corporate account made when the security is purchased is duplicated in the account of a dealer or broker if the security is repurchased. When the instrument is commercial paper, two debits arise to corporate accounts (one when the paper is sold and another when it is retired), in addition to the related debits to the broker's account.

Progress along the lines of "money mobilization", to use a term that has come into wide use, is likely to continue, although (as in the past) its pace will depend to a certain extent upon the pressure exerted by money rates and upon the availability of credit. There clearly are limits to which economizing of cash can be pushed. They arise from the need to maintain a minimum number of convenience accounts and to transact business over a wide range of activities. Also, they arise from unavoidable delays in mail service and as a consequence of the need to keep protective balances in case the actual cash flows deviate from projections made. Yet clearly, by 1958 the "irreducible" minimum transactions cash-sales ratio had definitely been reduced to a level considerably lower than in 1929.

REDUCING THE ACTIVITY IN PERSONAL ACCOUNTS

Checks received by individuals represent mainly payments of wages and salaries and for services performed, and are received at frequent intervals. Individuals have few opportunities for more closely synchronizing receipts and expenditures on their own initiative. Many of the devices adopted by business firms to control better their cash flows (such as cycle billing, a system under which department stores space out the billing of customers over the month) have, however, their counterparts in the cash flows of consumers. The average level of the bank balance maintained by a consumer is determined, as discussed more fully above,[52] essentially by the volume of the check payments he has to make, by the relative attractiveness of alternative liquidity instruments, and by the costs of maintaining a checking account, including the level of required compensating balances. To reduce activity, and thus the cost of his checking account, as well as to save

[52]See p. 39 ff.

time and effort, the individual may take advantage of several possibilities of making payments or obtaining cash without drawing a check. He can, for instance, resort to one or several of the following alternatives: (1) cash his wage (or other income) check at a store rather than deposit it, (2) endorse it over to pay bills, or (3) use drafts or cashier's checks obtained by making withdrawals from savings accounts.

Small businessmen, such as independent retailers, service establishments, and contractors, not infrequently endorse checks received from customers to pay suppliers. More generally, individuals pay for personal purchases by endorsing over salary and other checks. Merchants, food chains, and most business organizations dealing directly with consumers will accept such checks and pay out the balance in cash, especially if the checks are issued by national corporations or known local employers, or governmental units. United States Treasury checks (which currently account for 20 per cent of wage and transfer income) can be cashed easily almost everywhere, as can paychecks of local and State governments.

Retail stores have traditionally cashed checks for their customers. Since World War II, supermarkets have become a favorite check-cashing facility. The volume of check cashing has assumed such proportions that, partly in an effort to avoid delays at check-out counters, many supermarkets in recent years have established special "service booths" or "courtesy booths" to cash the checks of their customers[53] (and to perform other services, such as the selling of money orders and postage stamps or accepting utility bill payments). Evidently, the more people are paid by check, the more checks do double and triple duty before being debited to the account of the original issuer. When, instead of being cashed or deposited at the bank, checks are cashed in stores, debits as well as the demand for currency are reduced.

There are no empirical data upon which to base conclusions as to the relative growth of the proportion of checks that do multiple duty or on which to assess the importance of any such trends on over-all deposit velocity. Nor is it certain that cashing checks at the retail counter rather than at the bank window or by mailing them to the bank actually lengthens the time between the issuance and cancellation of the checks, thus reducing velocity, although the presumption is

[53]A recent survey indicates that all of the 48 newest and largest supermarkets in all parts of the country and 893 of the 1,064 supermarkets of the 26 chains surveyed had service booths, virtually all of which cashed checks. See *Courtesy Center in Today's Supermarket*, a report published by the American Express Company which looks upon this development as a promising outlet for its money order business. See also "Why Stores and Trucks Cash Checks", *Business Week*, January 31, 1959, pp. 140-1.

strongly in this direction. But in any case the endorsing-over of checks reduces the volume of recorded debits in relation to the actual volume of payments made and thus tends to reduce the share of personal expenditures as a determinant of over-all deposit turnover rates.

Some people who have no checking accounts make a practice of depositing some, if not all, checks received in savings banks or savings and loan associations, and of withdrawing amounts needed immediately in currency or in the form of cashier's checks which they can use to make payments by mail.[54] Many savings institutions are anxious to discourage accounts of this kind which frequently fail to build up a large backlog of savings and serve only as convenience accounts to avoid the cost of maintaining a checking account. Some are willing to cash checks for their customers up to some fixed limit in order to save bookkeeping costs; others customarily require that a part of the amount of the check cashed be added to the account. In any case, cashing of checks at savings institutions, or by holders of savings accounts in commercial banks, does not directly affect turnover rates of demand deposits. It does, however, affect the proportion of household expenditures reflected in aggregate debits, and is thus relevant in explaining changes in over-all velocity of checkbook money. The more recent endeavor of savings banks to attract savings deposits by advertising "free checks"[55] for depositors (actually, cashier's checks, the number of which is related to the size of the account) has the same effect.

CREDIT LINES VERSUS LIQUIDITY RESERVES

The use of credit reduces the need for maintaining balances in order to pay for cash purchases and permits a better planning of cash needs by taking into account customary billing dates. The lengthening of billing periods (such as bimonthly billing introduced by some utilities during World War II as a labor-savings device) and cycle billing (adopted by department stores to distribute the workload of accounting departments over the month) affect the level of balances maintained by payers and payees as well as the timing of cash flows. The greater use of credit by consumers is, however, but one of the manifestations of changes that have occurred in the economic and financial structure of

[54]Investments in securities or in real estate are frequently made by endorsing over cashier's checks obtained by making withdrawals from savings accounts rather than by drawing against checking accounts. Weldon Welfling ("Some Characteristics of Savings Deposits", *American Economic Review*, December 1940, pp. 748-58), in studying a sample of accounts at New York State savings banks, has uncovered substantial evidence of the use of checks issued by savings banks for the purchase of securities in the boom of the late twenties.

[55]At least one New York savings bank has been advertising this service.

the country which tend to reduce the need not only for transactions balances but also for liquidity balances.

It is likely that the absence of any severe and prolonged period of depression since World War II has affected attitudes of consumers toward liquidity. The great increase in job security since the generalization of collective bargaining, the spread of seniority rules, unemployment insurance, and other forms of social security have considerably reduced the need for protection against sudden changes in income. Blue Cross and other medical plans mitigate the financial impact of sudden illness. In addition to greater job security and protection against contingencies, the rise in average income has improved the credit standing of large groups of the population to such an extent that a very large segment of consumers has almost automatic access to bank credit.

Since the thirties, commercial banks have continuously widened the range of credit facilities available to individuals for personal expenditures. They have increasingly advertised these activities (which are among the most profitable forms of lending) and have competed quite successfully with specialized financial institutions in this area. More recently, some banks at least have moved in the direction of extending what amounts to limited overdraft facilities for personal spending purposes by giving customers the privilege of drawing checks without first establishing a balance by either making a deposit or borrowing. Loan balances are established automatically when checks are drawn, and are subsequently amortized by periodic payments, like regular personal loans, while balances outstanding can be increased by drawing additional checks, as needed, provided an agreed-upon ceiling is not exceeded. This plan, first introduced by The First National Bank of Boston several years ago as "checks on credit", has been duplicated in other parts of the country, in particular since 1958.[56] By giving consumers access to "instant money" for *any* purpose on a perpetual credit basis, such arrangements are likely to reduce further the aggregate consumer demand for liquidity reserves in the form of bank balances.

Just as bank services in the personal credit field have expanded rapidly since the war, so have other sources of funds for emergencies, such as personal finance companies, credit unions, and union and company welfare funds. While the

[56]Another plan which is spreading rapidly since it was the first introduced in 1958 is "charge account banking", under which credit-worthy customers receive a charge account plate with which they can charge purchases from cooperating merchants. One consolidated bill is sent by the bank monthly, and if the customer elects he can spread the payment over a number of months (usually up to six). See "Charge Account Check-Credit Operations Continue Growth; More Banks Enter Field", *American Banker*, February 19, 1959; "Banks Take on the Customer", *Business Week*, March 7, 1959, pp. 55-61; and Federal Reserve Bank of Philadelphia, Revolving Check Credit: "Is It Fad or Fixture?", *Business Review*, September 1959, pp. 2-7.

ability to borrow rapidly in emergencies tends to reduce the need for precautionary reserves, it is uncertain to what extent all these developments have actually reduced the average reserves held by individuals as demand deposits rather than in other forms. It is, for instance, possible that on the average consumers hold smaller reserves for liquidity purposes (either in absolute terms or as a percentage of their current incomes) but that a larger part of such reserves is held in demand deposit accounts rather than tucked away in currency, since more people now own checking accounts and average incomes are higher. We can only speculate on the possible effects of greater economic security and easier access to credit on the amount of protective personal reserves lodged in the deposit structure. Since it seems impossible to reconstruct earlier patterns of personal asset holdings and to ascertain the motivational basis of the preference shown for different types of assets, we shall probably never be in a position to determine the precise nature of past changes, even if more information is obtained on current asset structures and the purposes for which various types of liquid assets are intended.

The accessibility to, and the availability of, credit are more important with respect to business firms and have to be taken into account when interpreting long-run changes as well as cyclical fluctuations in velocity. A firm that has established credit lines or has an almost automatic access to short-term credit because of its credit standing and close relationship with its bank or bankers will be able to maintain its cash balance more closely at the optimum level than otherwise.[57] Credit lines, and accessibility to credit, are under normal conditions equivalent to instant money. It is only when credit conditions become tight that money in the bank acquires a premium over money on demand, and preclusive borrowing tends to increase balances, thereby acting as a brake on the increase in velocity that typically occurs when business activity is approaching a cyclical peak. Thus, in a broad sense, while access to, and reliance upon, credit is an important long-run influence on the level of business—and, in particular, of corporate—balances, changes in credit availability are perhaps more relevant from a cyclical point of view.

FINANCIAL INTERMEDIARIES AND VELOCITY

It is now frequently claimed that the role of money, and by implication of the banking system, has undergone a substantial change because of the growth of

[57]The significance of established patterns or requirements with respect to balances to be held for securing credit lines, and the degree to which such requirements are enforced, have been pointed out above (p. 29 ff.).

financial intermediaries which provide money substitutes. This is not the place to enter into this debate. Yet, in the light of our discussion of the way business firms and non-Federal Government units manage their cash balances, the conclusion can be drawn that what really matters is not so much the nature of the institutions that provide liquidity instruments as the operations of the market which assure their liquidity. Furthermore, the notion of "financial intermediaries" is not very helpful in analyzing liquidity unless one stretches it to include the Federal Government. Of the two largest categories of private financial intermediaries—life insurance companies and personal trust funds—only the first one provides a limited degree of liquidity to individuals, and neither provides any liquidity instruments that are generally used as money substitutes. The large bulk of money market instruments is provided by the Federal Government. Other important money market instruments—commercial paper, finance company paper, and acceptances—are originated by business firms other than financial intermediaries.

It is, indeed, the development of the money market in which most categories of financial intermediaries participate (although to a varying degree), along with the large manufacturing and other corporations, that ultimately increased the moneyness of those financial instruments and arrangements which have come to compete with demand deposits as a means of liquidity. The existence of a large number of participants, with seasonally varying needs and sensitive in different degrees to cyclical influences, created a market that has been broadened, on the one hand, by the large supply of funds seeking temporary employment and, on the other, by the availability of a wide range of instruments of differing maturities and legal characteristics that are suited to the varied requirements of lenders and borrowers in the market. In this market, liquidity is provided through a maximum of shiftability, in part because of the variety of needs of the participants, in part because some investors are always willing to trade maturity for income, and ultimately because of the participation of the central bank.

The liquidity of the various instruments depends to a large extent on the efficiency of dealers, brokers, and other intermediaries which establish markets, seek out investable funds, and periodically develop new techniques, such as repurchase agreements on Government securities. It is the development of the money market, the perfection of its operating techniques, the participation of the banking system in this market, and the close touch maintained between it and the United States Treasury that have been instrumental in narrowing the gap between money and near money as a liquidity instrument, more than the

proliferation and expansion of financial intermediaries. And, indeed, in recent decades several advanced countries have experienced an equally, if not a more rapid, growth of financial intermediaries, in most cases paired with a spectacular growth of public-debt, without showing a parallel substitution of near moneys for money. The reason is that they did not succeed in developing a sufficiently broad money market with a proper range of instruments and techniques.

VIII. The Outlook for Velocity

One of the major conclusions of the preceding discussion is that transactions as well as income velocity reflect, to a large degree, changes in the liquidity needs of the economy. Shifts in liquidity reserves between money and near moneys and money market instruments are the most important single cause of fluctuations in turnover rates of demand deposits in the short run and, more particularly, over the business cycle. It has been rightly said that "people change balances, not velocity". But not all economic groups change their attitudes toward liquidity (cash balances) simultaneously, or with the same intensity, or even—at times—in the same direction. Thus, the one single over-all velocity figure computed by the statistician summarizes, by giving proper weight to shifts in the relative importance of the various segments of the economy, a multitude of specific changes that are taking place.

RELATION BETWEEN INCOME AND TRANSACTIONS VELOCITY

The preceding discussion suggests that major differences in the behavior of V_t and V_y arise mainly from (1) the shifting relationship between income-related payments and transactions in existing assets (with which, for the purpose of analysis, what had been referred to above as agency and money-changer transactions can usually be bracketed); (2) the increasing efficiency with which deposits are used in discharging payments; (3) the increase in the share of income arising from production for the market rather than for self-use; and (4) changes in the layering of transactions which back up an average dollar of final product. Most of these developments are of a long-run, rather than of a cyclical, nature; the record suggests that since the end of World War II these various influences have tended to offset each other so that the two measures of velocity show similar movements.

While it is possible to show that changes in V_t and V_y are consistent when the analysis is based on properly defined basic series and on an identical period, it is not possible to identify, and even less to measure, the relative importance of the various forces contributing to the long-run changes in either ratio. It is unlikely that efforts to provide and improve historical estimates will ever fully succeed in reconstructing changes that have taken place in payments streams, in the use of checkbook versus folding money, in the speed of check collection, in the share of nonmonetary income, and in other key factors underlying long-run changes in both measures of velocity and the divergencies between them when

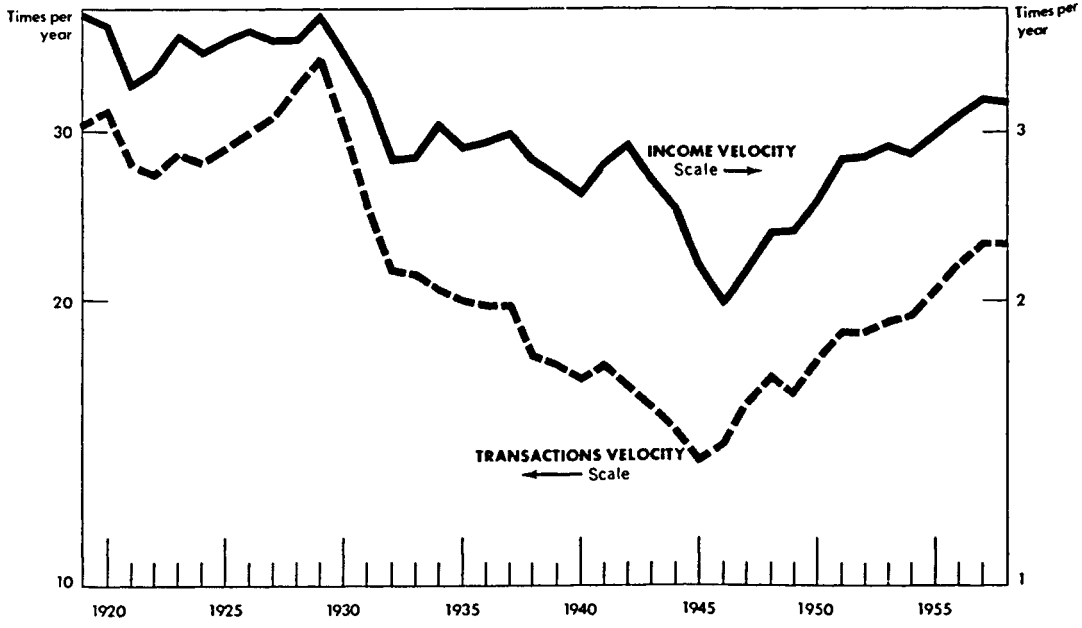
they have occurred. We shall therefore confine our concluding comments to the period since 1929.

Two important facts stand out from an examination of this period. First, there have been two breaks in the trend in both measures of velocity; second, many if not most of the forces that have acted upon velocity ratios in the past are still at work and may be expected to continue.

The first important change in direction occurred as a result of the Great Depression which inaugurated a period of excess liquidity that continued through the end of World War II and beyond. Transactions velocity declined more sharply than income velocity from their respective 1929 peaks (see Chart 3), because at that time deposit-turnover rates were considerably inflated by a large volume of stock exchange and other financial transactions. Although

CHART 3

INCOME AND TRANSACTIONS VELOCITY, 1919-58



Note: Income velocity is based on GNP divided by demand deposits adjusted plus currency owned by the public. Transactions velocity is the same series as in Chart 1. A logarithmic scale is used to show proportionate changes.

many of the policies and techniques devised for the more efficient management of cash balances and for expediting check collection originated in that period, cash balances continued throughout the thirties at excessive levels. The experience of the period of liquidation triggered by the collapse of the stock market in 1929, and the difficulties of the banking system culminating in the bank holiday of 1933, placed a premium on liquidity. At the same time the inflow of gold, stimulated first by monetary and later by political developments in Europe, provided the basis for monetary expansion. With interest rates at historical lows, it was inexpensive to satisfy the demand for money which was swelled by the desire born of recent experience not to be caught short again. As the various financial intermediaries also grew rapidly, the money supply expanded vigorously after the banking crisis was overcome while income stagnated and ultimately rose only gradually prior to the outbreak of the war. During the entire period, 1933-41, the growth of the money supply tended to offset long-run forces, which operated in the direction of increasing velocity, as well as some new influences, such as the development of modern cash-flow analysis and management methods which became such an important element in velocity determination after World War II. To put the same point differently, in the years between the start of the Great Depression and the end of World War II an expanding pool of idle money tended to offset any acceleration in active balances that may have taken place in the thirties. The plethora of money continued throughout the war years, as war financing made huge additions to the volume of money.

The second change in the direction of both measures of velocity occurred at the end of the war, as monetary authorities gradually regained and tightened control over the money supply while the dollar value of income and the total volume of check payments expanded under the dual impact of growing real output and a rising price level. Gross national output in real terms increased almost steadily, apart from three moderate cyclical recession periods, by nearly 40 per cent between 1946 and 1958. The economy gradually grew up to the money supply inherited from the war period, in part at the price of a sizable rise in the price level, but at the same time velocity rates became more sensitive to changes in the credit situation and their over-all drift changed to an upward direction. However, the postwar rise in velocity began from a much lower level than the one which prevailed during the twenties (the earliest period for which comparable rates of deposit turnover are available). Changes in the ownership distribution of deposits and the decline in the relative share of financial and,

more specifically, stock market transactions were among the most powerful forces operating to reduce average levels of deposit turnover. The postwar rise in velocity occurred as a result of developments which, in part, continued trends that had been operating for a long time but were overshadowed by other forces. In part, the rise in velocity represents a significant change in attitudes toward liquidity of managers of the cash position of corporations, State and local governments, investment institutions, and of other large pools of financial resources.

LOOKING FORWARD

What is the future outlook for velocity? What role can it be expected to play in relation to monetary policy? It will again be convenient to concentrate first on transactions velocity.

The expectation has been expressed recently that "in a country as financially developed as the United States, ... structural changes (affecting the demand for transactions balances) are largely a matter of the past".[58] Developments since the war, some of which have been referred to earlier in this chapter, do not seem to bear out this view. On the contrary, the lesson seems to be that the more developed a financial mechanism is, the greater the likelihood of further changes.

Clearly, some forms of economizing in the use of money for making payments cannot be carried much further. With present transportation technology, there are definite limits to a further reduction in bank as well as in mail float. Thus, the shift from surface to air transportation was a very significant step in cutting down collection delays (including mail as well as collection float). But further reduction of the flying time which already makes possible overnight delivery of checks between the two coasts is unlikely to result in substantial additional economies in the availability of funds.

We can, however, anticipate other important technological changes in the handling of checks. Indeed, the banking industry is only beginning to adapt electronic equipment to its routine operations, including processing of checks. At this stage, when the first experiments with the use of magnetic ink are being conducted successfully, it is impossible to know what the eventual potentialities of electronic processing are.

In addition to greater efficiency in handling checks, one can envisage further revolutionary improvements in the payments mechanism that would dispense, in

[58] E. S. Shaw and J. G. Gurley, "The Growth of Debt and Money in the United States, 1800-1950: A Suggested Interpretation", *Review of Economics and Statistics*, August 1957, pp. 250-62.

part or entirely, with the need of forwarding pieces of paper in order to make payments. Indeed, one of the greatest technical problems of commercial banking is the handling of the ever-rising flood of checks. The volume of checks processed has risen enormously with the growth of the economy, the widening of the use of personal checks, and the large volume of regular Government benefit payments. Commercial banks in clearings centers have been compelled not only to operate around the clock, but also in some cases to move clearings operations away from crowded downtown locations nearer to railroad stations and airports. Some industrial corporations are already using electronic equipment for centralizing issuance of payroll and other checks. It is conceivable that further progress in electronic processing will evolve some process through which many more types of payments could be made at distant points without the mailing of checks but simply through the transmission of electronic signals. For the time being, only fairly large transfers of funds among banks, and also for the benefit of large corporations and certain financial institutions, are made by using telegraphic or teletype facilities.

In any case, it is quite unlikely that the country has already reached a stage where no further improvements in the payments process should be envisaged. Evidently it is the payee, rather than the payer, who is usually interested in expediting the collection process. One of the lessons of the past is that the collection process is capable of being shortened substantially by such techniques as the use of private wire systems, lock-box banking, depositary transfer checks, etc. It is not unlikely that additional methods will be devised to reduce mail as well as bank float, thus further reducing the difference between bank-record and effective balances.[59]

We conclude that the efficiency of money is likely to continue to be subject to very much the same long-run influences as those discussed in the preceding chapters, although it is difficult to anticipate in which way and through what techniques the efficiency of the payments mechanism may be increased in the future; it is likely, however, that the institutional factors affecting velocity will continue to be subject to further changes in the direction of higher rates of turnover.

[59]The actual increase in turnover velocity tends to be somewhat exaggerated by turnover ratios as now computed. One of the significant developments in the efficiency of checkbook money since the twenties has been the decline in the statistical difference (the bank and mail float) between deposit balances recorded in bank ledgers and the amounts appearing in their owners' records. This narrowing of the gap, mainly as a result of an increase in transportation speed, but also because of the substantial increase in Federal Reserve float since 1951, has not been reflected in the deposit turnover ratio and only partly in the income velocity ratio.

Compensating and commensurate balances are now firmly imbedded in the deposit structure. But will they continue to be relevant primarily from the short-run point of view, or should a trend toward a larger volume of such balances in relation to total deposits be anticipated? Such a trend could be the result of further growth in preferences for implicit rather than explicit service charges. It could reflect changes in the structure of deposits which would give more weight to lines of business in which (as in the case of finance companies) commensurate balances generally form part of the loan agreement.

There is insufficient evidence to justify any specific anticipations with regard to compensating balances. There are, however, growing indications that an opposite development, represented by the introduction only a few years ago of what closely resembles the European practice of overdrafts, has since spread rapidly, although it is still essentially confined to personal accounts. From the point of view of monetary velocity, the basic difference between a conventional loan and an overdraft is that, in the first case, the deposit balance is increased before any activity in the account takes place; frequently, part of the loan proceeds remains inactive in the account during the life of the loan, either as a formal or an informal compensating or commensurate balance, or because the borrower wishes to obtain additional funds to be held against contingencies which did not materialize. Whether or not any balance is maintained in the borrower's account, credit extension in this form tends to increase the volume of aggregate demand deposits against which activity is measured.

By contrast, when liquidity needs can be satisfied, and provision for unforeseen contingencies can be made by merely obtaining prior approval for subsequent drawing of checks without prior establishment of balances, the identical volume of activity (as evidenced by checks drawn) will be related to a smaller volume of aggregate demand deposits. In such a case, velocity of the deposits in existence will increase to the extent that the relative importance of funds held for liquidity purposes or future transactions needs declines. In the case of checks drawn against "checks on credit" or similar overdraft facilities arranged for personal purposes and discussed in the previous chapter, debits are not reported (since checks issued under the arrangement are not drawn against private demand deposit accounts which alone need to be reported); this type of activity thus does not affect velocity at all. Indirectly, however, over-all measures of deposit velocity *are* affected by such overdraft arrangements because their spreading will have an effect on the composition of transactions which will continue to be included in reported debits and which thus affect velocity ratios.

We may or may not be at the beginning of a significant new development which, like the increased use of compensating and commensurate balances, is bound to be reflected in the level and cyclical sensitivity of velocity. It is too early, however, to judge how widespread the overdraft techniques will become and whether they will be extended to business accounts as well.[60]

The most important single factor in the post-World War II increase in velocity has been, however, not the continuing long-run changes in the payments and credit mechanism, but rather a widespread change in the general attitude toward the liquidity of money substitutes, since World War II. While money has lost none of its moneyness, other liquidity instruments have acquired a lot of it. There has been erosion in the role of money as a liquidity instrument. Its position has declined because of the development of the money market, the extension of the range of liquidity instruments, and a gradual but substantial and widespread change in the public's attitude toward money substitutes.

The investment of temporarily redundant funds stands out among the developments that since World War II have tended to increase turnover velocity. The use of money market instruments for the temporary investment of cash has attracted much attention in recent years; but, in the absence of comprehensive statistics, it is not easy to assess the extent to which this process is capable of still further extension. A relatively small number of large business firms and State and local government units ordinarily find it worthwhile to invest their funds in these money market instruments. Normally, temporary investment of small sums for only a few short intervals during the year is neither sufficiently remunerative nor of sufficient interest to users of funds in the money market. For both sides there are overhead costs that are unlikely to be justified in such situations. However, a very large proportion of aggregate business payments is concentrated in a relatively small number of corporations. In large part, the answer to the outlook for velocity depends on how much more room remains for money mobilization by corporations and other holders of large balances. Indications are that the degree to which large corporations have succeeded in reducing their cash holdings to the minimum is uneven. The use of United States Government securities and, to a more limited extent, of other money market instruments to meet liquidity needs as well as to obtain additional income from transactions balances is likely to continue to be an important element

[60]Under the present line of credit arrangements, which have the similar purpose of insuring access to credit in case of need, commensurate balances tend to increase deposits prior to the use of credit.

in reducing average deposit balances in relation to income and to the size of all other payments streams.

So long as the various techniques that have been evolved since the end of the war for the temporary investment of redundant funds continue to be employed, processes of cash management will entail a substantial volume of debits. A firm which on the average invests every week an amount equal to ½ of 1 per cent of its annual sales may easily generate debits (arising from repurchase agreements or the purchase and resale of Treasury bills or of commercial paper) equal to half of its annual sales. While not enough is known about the actual volume of corporate funds seeking temporary investment outlets and the average length of time during which they remain so immobilized, for many manufacturing corporations the above example does not seem to be much out of line. But, here again, much depends on the continuing use of present patterns of investment in money market instruments and procedures used in settling payments between borrowers, lenders, and the intermediaries.

Indeed, income velocity will continue to be subject to an upward drift as long as the process of substituting money market claims for money continues. Alternative computations relating income to money and money substitutes (variously defined) rather than to money alone clearly reflect this process of substitution. Such computations show an increasing gap between the lower and fairly horizontal rate of turnover for all liquidity instruments (understood to include money and its closest substitutes however defined) and money alone.

IMPLICATIONS FOR MONETARY POLICY

Since World War II, rates of deposit turnover have risen to levels at which they are again in touch with current credit conditions (as reflected, for instance, by movements in market rates of interest), even though so far cyclical fluctuations in these turnover rates have remained within a relatively narrow band. No doubt, the use of money market instruments by business firms, nonbank financial institutions, wealthy individuals, and governments has reached such proportions that cyclical fluctuations in transactions and income velocity have again become significant elements in the credit situation. We have already pointed out that the close correlation between velocity and cyclical swings in business conditions had attracted early attention within and also outside the Federal Reserve System. The temporary eclipse of transactions velocity as an element in monetary analysis coincided with a period when monetary policy was

relegated to second place and subordinated to countercyclical or war-geared fiscal policy.

With the re-emergence of a flexible monetary policy, velocity became a more significant, as well as a more meaningful, element in monetary analysis. Once market rates of interest became again an allocator of funds between alternative uses, and a broad range of market instruments became available as an alternative to holding cash, velocity ratios became a barometer rather than merely an interesting statistic. During the period when fluctuations in the money supply were not accompanied by significant changes in credit conditions, changes in velocity fell outside the range of analytical relevance.

With the return of the control of reserves to the central bank, it is now widely recognized that money supply has two dimensions: size and velocity. Fluctuations in velocity, which quarter by quarter and almost month by month reflect and respond to changes in credit conditions and monetary policy, have again become a relevant magnitude. The central bank can influence directly only the supply, but not the composition or use, of money. Changes in velocity thus become a mirror in which changes in the liquidity position of the various sectors of the economy are reflected. In acting upon the money supply, the central bank leaves it to the market to distribute credit to various sectors and uses. At the same time, greater or less degrees of credit stringency cause changes in the technical efficiency of money use. In a way, changes in velocity signal to the monetary authorities how impersonal actions on their part have actually affected the liquidity position of the economy as a whole, after the initial reactions to the change in monetary policy have been worked out by the various sectors and in money-using processes.

Far from being inimical to the execution of monetary policy, changes in velocity are actually another aspect of the system of checks and balances which characterize our economic system. Frequently, actions of the monetary authorities can be taken only in doses that are sufficiently massive to create temporary disturbances at their initial points of impact. It usually takes time before policy actions in the open market or changes in the discount rate or in reserve requirements permeate the entire credit structure. In such situations, velocity acts as a shock absorber and helps to cushion and diffuse the initial effects of policy actions. So long as monetary authorities are aware of the nature, extent, and possible range of these chain reactions, changes in velocity can be taken into account when determining the magnitude and timing of the required policy actions. The availability of quarterly GNP and monthly money supply and

debits figures makes it possible to keep track of changes in both measures of velocity on a basis not less current than all other monetary series that are now considered when exploring the need for, and effects of, policy actions.

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