STUDIES IN THE OPERATION OF FINANCIAL INTERMEDIARIES

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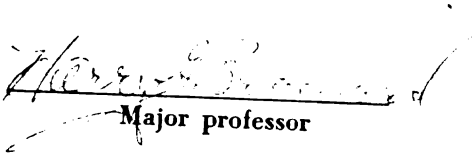

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STUDIES IN THE OPERATION OF FINANCIAL INTERMEDIARIES

By

Braxton Irvine Patterson

AN ABSTRACT OF A THESIS

Submitted to
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ABSTRACT

STUDIES IN THE OPERATION OF
FINANCIAL INTERMEDIARIES

by Braxton I. Patterson

This paper consists of a series of studies on the operation and impact of financial intermediaries in the United States, with particular attention paid to the influence that the mutual thrift institutions have on the effectiveness of monetary policy.

Chapter I examines the Gurley-Shaw hypothesis that financial intermediaries increase the liquidity of indirect debt, and the corollary that they increase the interest-elasticity of liquidity preference. Evidence supporting the former was taken from published sources. The resulting increase in the elasticity of liquidity preference arises largely from the fact that precautionary balances can be held in the form of money or near-money, with the income earned on the latter compensating the holder for the inconvenience involved. Examination of the volume of liquid assets and the rates of growth of financial intermediaries indicates the leakage from monetary controls since 1951 has been slight. Most of the effect probably occurs at low interest rates, so that intermediaries reduce the demand for money at any rate of interest, but with little change in the slope of the

function within the range of rates experienced recently.

Chapter II discusses the impact of intermediaries on the market for loanable funds. To the extent that they induce the public to accept indirect debt instead of money, intermediaries also cause the supply of loanable funds to increase. The net effect will depend on the degree to which liquidity preference is affected and on the interest-elasticity of the demand for current output. Evidence available from published sources indicates that some pessimistic appraisals are not justified. An attempt was made to estimate a liquidity multiplier for changes in bank reserves, taking account of induced changes in holdings of intermediary claims and currency. At best, the estimates indicate order of magnitude.

Chapter III discusses borrowing by intermediaries. The Federal Home Loan Banks have little effect on credit expansion, since they must obtain funds in competition with other borrowers. The Federal Reserve discount window could, under some conditions, permit a substantial leakage from monetary controls. Under present conditions, the only apparent leakage takes the form of a delay in the impact of policy measures rather than a reduction of the effectiveness.

Chapter IV summarizes the evidence of the first three

chapters concerning the effect of intermediaries on monetary policy. Examination of deviations from trend lines indicates that bank debits respond to monetary policy, while the non-bank intermediaries neither reenforce nor counteract changes in demand deposits. The evidence tends to support the position that direct controls over non-bank intermediaries is not necessary, but this point is not proven.

Chapters V and VI are an attempt to fit liquidity functions for member commercial banks and savings and loan associations, with the objective of finding a means of predicting the effect of changes in reserves on lending. Both multiple regression equations and contingency tables were used. The behavior of these institutions cannot be predicted accurately on the basis of this study, but an indication of the direction of influence was obtained in some cases. The ratio of cash reserves net of required reserves to account liability declines as size increases. This effect is stronger for commercial banks than for savings and loan associations, apparently reflecting the liquidity derived by banks from required reserves. Government securities serve, to some extent, as a substitute for cash holdings. Any cyclical influence on liquidity appears to affect government security holdings rather than cash. For commercial banks, there are substantial variations in cash holdings

that seem to reflect differences in the type of business and the nature of competition from other institutions.

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INTRODUCTION

The recent literature bears witness to a growing concern about the economic implications of the rapid growth of nonbank financial intermediaries. While there is general agreement that intermediaries increase the liquidity of the economy, the policy implications drawn range from the conclusion that they have little net effect on the stability of our economy to the opposite position that monetary controls are virtually useless in the absence of controls over some of the intermediaries. The intent of this paper is to shed some additional light on the impact of intermediaries, with particular attention to the group of intermediaries that are closest to commercial banks in nature and operation—the mutual thrift institutions. This paper cannot pretend to have the final answers to the questions asked, but may provide some information.

The paper consists of two largely independent sections. The first section is devoted to a discussion of the effect of intermediaries in general, with some indication of the effects of liquid assets that are not claims on intermediaries. The second section

is an attempt to determine liquidity preference functions for two groups of intermediaries, commercial banks and savings and loan associations.

In the first chapter, the Gurley-Shaw hypothesis that financial intermediaries increase the liquidity of the economy,[1] and the related hypothesis that this increase in liquidity increases the interest-elasticity of the demand for money, will be examined. For the latter hypothesis, our analysis will apply equally well to some direct debt, notably government savings bonds, treasury bills, and postal savings accounts. This type of debt provides the holder with as much liquidity as obligations of the nonbank intermediaries.

In Chapter II we will examine the hypothesis that, because of the increase in liquidity provided by intermediaries, the supply of loanable funds will be increased. We will then try to trace

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[1] For various statements, see John G. Gurley and E. S. Shaw, "Financial Aspects of Economic Development," American Economic Review, XLV No. 4, pp 515–38; "Financial Intermediaries and the Saving-Investment Process," Journal of Finance, XI No. 2, pp 257–76; "The Growth of Debt and Money in the United States, 1800–1950: A Suggested Interpretation," Review of Economics and Statistics, XXXIX No. 3, pp 250–62, and Money in a Theory of Finance (Washington: The Brookings Institution, 1960).

through the implications for investment, considering both the volume and the direction.

In Chapter III the effect of central bank lending to financial intermediaries, with particular attention to the effect on the volume of reserves and hence on credit expansion, will be examined. Then, in Chapter IV, the combined effects of these factors on the ability of the Federal Reserve System to stabilize the economy will be examined.

Chapters V and VI contain the results of an attempt to determine a statistical liquidity function for member banks, and a similar function for savings and loan associations. The two factors which will be examined are the items that may change the cash reserves, with deposits held constant, and the ratio of changes in cash reserves to changes in deposits. The latter, in particular, can indicate the appropriate expansion factor for new reserves, if it can be obtained with sufficient accuracy. It may be noted that life insurance companies have been excluded from the definition of mutual thrift institutions, and from most of this study. There are two reasons for this. One is that, although the assured can borrow against the cash value of the policy, and many policyholders probably consider the cash value to be less liquid than the obligations of the institutions which

are being studied.[1] This justifies giving them less stress where liquidity is important. They were omitted from the statistical study because, as far as their cash holdings are concerned, there is nothing to study. The flow of funds through life insurance companies is apparently so predictable that cash reserves could be virtually zero. Actual holdings are adjusted to other assets and to future commitments.[2]

For convenience, some terms are used consistently with a meaning that may not correspond precisely to common usage. The definitions are:

Effective reserve ratio: The ratio of cash reserves to account liabilities that the intermediaries try to maintain. For commercial banks, this will generally be somewhat higher than the required ratio.

Free cash: Total cash holdings of banks minus required reserves. This includes those cash items that are not part of legal reserves.

Intermediaries: Those financial institutions that hold direct debt, and in turn issue their own obligations in order to obtain resources.

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[1] See Donald Shelby, "Some Implications of the Growth of Financial Intermediaries," Journal of Finance, XIII No. 4, pp 527–41.

[2] See James J. O'Leary, "The Institutional Saving-Investment Process and Current Economic Theory," American Economic Review, XLIV No. 2, pp 455–70.

Liquid assets: Money and near-moneys, as defined below. This definition is more restricted than the term might imply, but this restriction is useful for our purposes.

Money: Those assets that are commonly used as a medium of exchange—currency outside banks plus demand deposits.

Mutual thrift institutions: Intermediaries of the depository type whose account-holders are also owners. These are mutual savings banks, savings and loan associations, and credit unions. For brevity, "the mutuals" is sometimes used.

Near-moneys: Those assets that the holder considers to be available for spending at any time, and hence are close substitutes for money as a store of value. These include time deposits, share accounts at the mutual thrift institutions, postal savings accounts, government savings bonds, and treasury bills. Cash value of life insurance policies and some private securities are at least close to the line.

Public: The economy exclusive of financial institutions and the federal government.

CHAPTER I

THE ROLE OF LIQUID ASSETS

Liquidity Preference

Contemporary monetary theory follows quite closely the suggestion of Hicks[1] that the decision to hold money as an asset should be concentrated upon, rather than relating money holdings to the flow of income. Much of the subsequent discussion, particularly at the most abstract levels, has relied on his frictions as a reason for holding money. These are mainly the cost of transfer (brokerage, or "bother"),[2] and risk or uncertainty as to the rate of return or timing of payments.[3]

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[1] J. R. Hicks, "A Suggestion for Simplifying the Theory of Money," Economica, N. S. II, pp 1–19, reprinted in Readings in Monetary Theory (New York: The Blakiston Co., 1951), pp 13–32.

[2] See J. R. Hicks, Value and Capital (2nd ed; Oxford: The Clarendon Press, 1946), Ch. 19.

[3] Don Patinkin, Money, Interest, and Prices (Evanston: Row, Peterson & Co., 1956), Ch. 7, relies on random timing of a predetermined amount of payment as the incentive to hold money.

Quantity theorists paid attention to both the long-run, when the motives for holding money are quite stable, and the short-run, when Fisher's velocity or the Cambridge k will fluctuate. However, Keynes's General Theory shifted most subsequent discussion to the short-term problem, with renewed attention both to the motives for holding money and to the path by which the economy adjusts to the actual quantity of money.[1] The transactions motive attracted little attention—probably because there is little to be added to what the quantity theorists and Keynes said. A great deal has been written in an attempt to evaluate or polish the treatment of the speculative and precautionary motives.[2] The Keynesian literature, departing from earlier quantity theory

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[1] J. M. Keynes, The General Theory of Employment, Interest, and Money (New York: Harcourt, Brace & Co., 1936), Ch. 13–15.

[2] See particularly Abba P. Lerner, "The Essential Properties of Interest and Money," Quarterly Journal of Economics, LXVI No. 2, pp 172–93; Davis W. Lusher, "The Structure of Interest Rates and the Keynesian Theory of Interest," Journal of Political Economy, L No. 2, pp 272–79; R. F. Kahn, "Some Notes on Liquidity Preference," The Manchester School of Economics and Social Studies, XXII, pp. 229–57; Michio Morishima, "Consumer Behavior and Liquidity Preference," Econometrica, XX No. 2, pp 223–46; Don Patinkin, "Liquidity Preference and Loanable Funds; Stock and Flow Analysis," Economica, N. S. XXV No. 100, pp 300–18; Ira O. Scott, Jr., "The Availability Doctrine: Theoretical Underpinnings," Review of Economic Studies, XXV (1) No. 66, pp 41–48; and James Tobin, "Asset Holdings and Spending Decisions," American Economic Review, XLII No. 2, pp 109–23.

treatment, assumes little or no direct effect of the money supply or liquidity on spending, but concentrates on substitution between money and securities. An increase in the money supply will cause holders of the excess money to purchase securities, thereby reducing interest rates and inducing spending units to increase investments, and perhaps consumption, although the Keynesians would claim that the major impact will be on the amount of hoards rather than spending. Lower interest rates will also increase the real value of securities and money, with a corresponding effect of wealth on spending.[1] Recent treatments, particularly by Patinkin, emphasize that changing prices will cancel or reduce the change in the real value of money, so that after all adjustments have been worked out, only the price level will be changed—output and employment will not be affected (although some real changes may be produced by changes in the mix of assets).[2] The

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[1] See Patinkin, Money, for a detailed discussion of the real balance effect; and Frank P. R. Brechling, "A Note on Bond Holdings and the Liquidity Preference Theory of Interest," Review of Economic Studies, XXIV (3) No. 65, pp 190–97, for the effect of changing interest rates on wealth.

[2] Lloyd A. Metzler, "Wealth, Saving, and the Rate of Interest," Journal of Political Economy, LIX No. 3, pp 93–116, points out that monetary policy will influence the real variables because it changes the real amount of bond holdings. The real balance effect will have a similar result.

real balance effect is probably of minor importance, at least over the time period appropriate for public policy.[1] If the real balance effect is actually small, or takes a long time to work itself out, we can safely assume it away under ceteris paribus in our discussion of the impact of intermediaries on liquidity.

Some recent empirical work on the demand for money appears to cast doubt on Keynes's motives for holding money. A study by Lydall,[2] based on data from the British Savings Survey, reflects differences in individual holdings. Lydall confirms the emphasis on assets rather than income, since differences between individual holdings are closely related to differences in assets. Some negative correlation is indicated between income and holdings of liquid assets. Lydall concludes that the precautionary motive is the important factor, with speculation playing a minor part. However, he also finds a substantial increase in money holdings by the wealthiest individuals, which he explains by the greater risks for the wealthy and the greater opportunities for

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[1] Thomas Mayer, "The Empirical Significance of the Real Balance Effect," Quarterly Journal of Economics, LXXIII No. 2, pp 275–91, and Tobin, American Economic Review, XLII No. 2.

[2] H. F. Lydall, "Income, Assets, and the Demand for Money," Review of Economics and Statistics, XL No. 1, pp 1–14.

profit. These factors are closely related to the speculative motive. Since these individuals account for a disproportionate share of total money holdings, and probably account for an even larger share of changes in such holdings, the speculative motive cannot be discarded on the basis of this evidence.

Another approach, closely associated with the Chicago rehabilitation of the quantity theory, is the attempt by Friedman and others to fit an empirical function for the aggregative demand for money.[1] The recent article by Friedman is a progress report on research that is currently being done, so some modifications can be expected. The dominant conclusion is that the demand for money, in the long run, is closely related to permanent income. This departs from the above-cited emphasis on the volume of assets as the important variable, but the difference may be more apparent than real. Friedman's permanent income may prove to be the best available measure of permanent wealth. Current market value of assets gives a poor measure of wealth for long-range planning if the market price is expected to change, as it would over the business cycle. Some assets are hard to evaluate

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[1] See Milton Friedman, "The Demand for Money: Some Theoretical and Empirical Results," Journal of Political Economy, LXVII No. 4, pp 327–51, and other sources cited therein.

because quantities are not known with any precision. Perhaps most important, human resources can be valued only through their influence on production and income. In summary, wealth is simply capitalized future income, which will relate closely to permanent income, ceteris parabus.

Friedman cites two other pieces of evidence to dispute the Keynesian motives for holding money. One is the relatively slight importance of interest rates in the empirical results. The other is the inverse relationship between income and the demand for money over the business cycle. The first implies that shifts of Keynes's liquidity preference function are more important than movements along the function. Combined with the other results, it indicates that some of the studies relating idle balances to the interest rate overstate the importance of interest rates, since the function appears to shift in a manner that increases the apparent elasticity. The observed relationship between cyclical fluctuations in the demand for money and income is consistent with Keynes's motives when we consider the cyclical variation in these motives. As aggregate income falls, expectations regarding future income and prices in the short run are likely to change in the same direction. When income is expected to decline—particularly when the family breadwinner expects to be laid off—consumption

expenditures will almost certainly be curtailed, and hoards increased. Each reduction in consumption, and similar reductions in investment, will bring more unemployment, and each new layoff increases the pessimism of those not yet affected. One expected result would be the observed one that the demand for money increases, at least relative to income, during economic declines, and falls as conditions improve.

In summary, we can say that an increase (decrease) in the quantity of money or liquidity will cause the public to try to increase (decrease) their holdings of securities, causing interest rates to fall (rise). Changing interest rates will increase (decrease) the aggregate demand for current output.

The Gurley-Shaw Thesis

Gurley and Shaw have contributed substantially to monetary theory by pointing out that all intermediaries increase liquidity of debt by providing indirect, instead of direct, debt.[1] While we can

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[1]The initial statement of the Gurley-Shaw thesis appears in American Economic Review, XLV No. 4. Further development of the same theme appears in Journal of Finance, XI No. 2, Review of Economics and Statistics, XXXIX No. 3, and finally Money in a Theory of Finance.

find earlier reference to this phenomenon,[1] the Gurley-Shaw articles have brought more attention to intermediaries.

The function of intermediaries is to diversify their portfolios in such a way as to reduce risk, and to provide the public with a wider variety of assets. The reduction of risk and the improved marketability of the diversified portfolios will increase liquidity. In this context, the law of large numbers states that, as the number of unrelated securities in a portfolio increases, the number that will be subject to default can be predicted with increasing accuracy. (We may note that one condition for the law of large numbers to be fully applicable, the requirement that the components must be independent, does not hold fully. If one company defaults on its obligations, the solvency of its creditors is also impaired. This reduces the liquidity resulting from diversification somewhat, but the effect is not enough to defeat the advantages of intermediation.) The intermediaries can also diversify through time, thereby offsetting some of the interaction within the portfolio and reducing the risk of changes in capital value resulting from changes in the interest rate. This diversification through time is accomplished by purchasing securities maturing at various

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[1] See particularly Hicks, Economica, N. S. II.

times. Then, if liquidation of part of the portfolio becomes necessary, it can be accomplished by not replacing securities that are currently maturing and by selling those securities that are most marketable at the time. The resulting reduction in risk, plus the economies of scale in portfolio management, enable intermediaries to make a profit by purchasing direct debt and issuing their own obligations. Individuals prefer to hold the indirect debt instead of direct debt because of its greater liquidity, despite the lower rate of return.

One writer disputes this direct versus indirect debt dichotomy on grounds that it is valid only if all indirect debt is more liquid than all direct debt.[1] He asks too much—and he asks something that obviously does not obtain. All that is required for intermediaries to increase the liquidity of the economy is for indirect debt to be more liquid, on the average, than the same debt held directly. The law of large numbers assures us that this condition will be met for most intermediaries.[2] This

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[1] J. M. Culbertson, "Intermediaries and Monetary Policy: A Criticism of the Gurley-Shaw Theory," American Economic Review, XLVIII No. 1, pp 119–31.

[2] See William J. Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach," Quarterly Journal of Economics, LXVI No. 4, pp 545–56.

does not imply, however, that the liquidity of a security can be determined solely on the basis of the direct-indirect dichotomy. Clearly, some direct debt (e.g., government savings bonds) is more liquid than some indirect debt (e.g., pension funds or shares in a new credit union).

Although the reduction of risk via diversification of the portfolio is sufficient to make debt of intermediaries more liquid than their assets would be if held directly, this factor does not account for the entire effect of intermediaries on liquidity. Some intermediaries increase liquidity further by issuing obligations with a shorter average maturity than that of the securities they hold in their portfolios. This is particularly true of the mutual thrift institutions and commercial banks. In practice, and under most conditions, their obligations can be liquidated by the holder on request, with little trouble or expense. In most cases, this involves loss of interest since the last date of payment, but this is a relatively minor consideration—it merely makes these accounts more like money if they are needed on short notice. This reduction of maturity can increase liquidity only if the intermediaries hold enough money to meet withdrawal requests as they are received. Here again, the law of large numbers comes to their aid. With a large number of depositors, an intermediary can

predict quite accurately the amount that will be withdrawn in any day or week, except under unusual circumstances. Thus cash on hand need be only a small fraction of payments that could be requested at any one time—this being the basis of our fractional reserve system of banking, as well as reserves for other intermediaries.

Of course, the maturity of intermediary obligations need not be shorter than that of their assets, and can be longer. Most pension funds can be drawn upon only after retirement (or, in some cases, disability). In many cases, the worker cannot obtain any cash under any circumstances, and may lose all rights if he leaves the company. The corporate securities that are held by such pension funds, and even the riskiest common stocks they are likely to hold, provide more liquidity, although perhaps less safety.

In summary, intermediaries increase the liquidity of the existing financial assets by providing diversified portfoliow—diversification that would be impossible for the smallest investors and more expensive for many of the larger ones. In addition, some intermediaries increase liquidity even more by providing shorter maturities than direct borrowers prefer to issue. We will defer discussion of the degree to which increased liquidity affects the two groups concerned, through a net increase in the liquidity of

lenders or through a net decrease in the liquidity of the direct debt that is actually issued, treating this phase of the problem in Chapter II.

Mutual Thrift Institutions and Liquidity Preference

Having shown that financial intermediaries increase the liquidity of indirect debt, let us turn to the second hypothesis, that they thereby increase the interest-elasticity of the demand for money. The major concern is the degree to which intermediaries reduce the effectiveness of monetary controls. To the extent that elasticity of liquidity preference is increased, tightening or easing of the money supply will be offset by shifts between money and money substitutes that would not occur in their absence. It is the degree to which this leakage is increased by the existence of intermediaries that we would like to estimate.

One of the early criticisms of Keynes was based on the fact that items other than money provide liquidity.[1] This comment on the oversimplification in The General Theory has been accepted, to the extent that the recent British inquiry into monetary controls stressed the importance of liquidity in the economy

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[1] Lusher, Journal of Political Economy, L No. 2.

rather than the money supply per se.[1] If any dispute remains, it is about the degree to which liquidity of assets other than the medium of exchange should modify our definition of money. One group would exclude from the money supply any asset that does not circulate as means of payment—thereby excluding commercial bank time deposits, along with other highly liquid assets.[2] At the other extreme, some would include anything that the holder considers to be available for immediate spending—thereby including everything that we call near-moneys.[3] When we are discussing liquidity, drawing a line at any point involves an oversimplification. Most assets provide some liquidity, and the differences between similar assets are usually too small to justify drawing a line except on the arbitrary basis that one must be drawn somewhere. The best place for the line to be drawn depends on the purpose. If the purpose is determination of interest rates via liquidity preference, or the influence of liquidity on spending,

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[1] See Nicholas Kaldor, "The Radcliffe Report," Review of Economics and Statistics, XLII No. 1, pp 14–19.

[2] See particularly Joseph Aschheim, "Commercial Banks and Financial Intermediaries—Fallacies and Policy Implications," Journal of Political Economy, LXVII No. 1, pp 59–71.

[3] See Gordon W. McKinley, "The Federal Home Loan Bank System and the Control of Credit," Journal of Finance, XII No. 3, pp 319–32.

inclusion of all highly liquid assets in the money supply provides a useful simplification, and one which is substantially better than exclusion of the near-moneys from any consideration. On the other hand, if we are interested in limitations on ability to make payment or if we are interested in the process of expansion of liquid assets and credit, differentiation between the medium of exchange and other assets may be more fruitful.

Evaluating the obligations of the mutual thrift institutions on the basis of the criteria listed by Lusher,[1] we find that they are quite liquid: (1) Marketability—they are redeemable at face value, without delay in practice although notice can be required. Some delay may be involved for accounts held away from the city of residence, since withdrawals must then usually be made by mail. (2) Maturity length—zero (in practice) if the holder is willing to forego some interest, a maximum of six months under most conditions if full interest is to be obtained. (3) Credit risks—varies with the particular institution, but virtually none for insured accounts. (4) Cost and troubles involved—somewhat greater than for demand deposits, since withdrawal must usually be made in person, or with some delay by mail, before an

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[1] Journal of Political Economy, L No. 2.

acceptable medium of exchange can be obtained. In some instances, even this reduction in liquidity is eliminated. Some mutual savings banks and savings and loan associations permit use of drafts, which can be used like checks for spending. On balance, these assets are not good substitutes for money for transactions purposes. Nothing would be gained, since funds would not be left on deposit long enough to earn any interest, while some trouble and delay is involved. However, for precautionary balances (undoubtedly the major factor in liquidity preference other than transactions balances for most holders of these accounts), the obligations of the safer mutual thrift institutions are virtually perfect substitutes for money. The trouble involved when cash is needed is slight, and more than compensated for by the interest earned when cash is not needed.

Thus we can expect that transfers between money and these accounts will not reduce liquidity noticeably, while high interest rates might induce transfer of some transactions balances to this form. This expectation is confirmed by the evidence. A recent study by Selden indicates that rising interest rates during the 1955–1957 period induced a sizable transfer of assets from money to money-substitutes, without influencing

spending to a great degree.[1] Some of this transfer may be a result of his definition of money (including all deposits, demand and time, at commercial banks and mutual savings banks, along with currency), since in many areas commercial banks reached the ceiling imposed on rates paid for time deposits while interest rates on the other near-moneys were rising.

The mutuals, then, provide a very substantial degree of liquidity, although not as great as that provided by currency and demand deposits. Based on Selden's study, it may be concluded that those individuals that are induced to accept mutual claims instead of money when interest rates rise consider these claims to be virtually perfect substitutes for money. For those who hold only transactions balances, the degree of liquidity is much lower, but these individuals are much less likely to shift to near-moneys in any case. Therefore, it appears that for marginal transfers between money and mutual claims, within reasonably narrow ranges, the degree of liquidity is very nearly constant. All that is needed to start a transfer is for the return on mutual claims to increase enough to compensate for a little additional bother, or for the return to decrease similarly.

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[1] Richard T. Selden, "Cost-Push Versus Demand-Pull Inflation, 1955–1957," Journal of Political Economy, LXVII No. 1, pp 1–20.

The extent to which the liquidity provided by mutual claims affects interest rates, the total volume of loans, and the amount of liquidity, depends on the choice of asset holdings by spending units.[1] In this connection, the degree of liquidity of various assets is more important than the nature of the issuer.[2] The shares of the mutuals are similar, although the degree of risk varies. We also have to consider a number of other assets, some of which are not obligations of intermediaries. These must include commercial bank time deposits, postal savings accounts, and some other government obligations. Series E bonds are certainly on the same order of liquidity, and have one advantage over even demand deposits for a person who is away from home and unknown—many banks will cash these bonds for strangers more readily than they will accept checks. Series H bonds involve some delay in obtaining cash, but are otherwise similar. Treasury bills do not appear in the portfolios of most households,

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[1] Two general discussions are found in Morishima, Econometrica, XX No. 2, and Scott, Review of Economic Studies, XXV (1) No. 66.

[2] Ronald N. McKean, "Liquidity Preference and a National Balance Sheet," Journal of Political Economy, LVII, pp 506–22, reprinted in Readings in Monetary Theory (New York: The Blakiston Co., 1951), pp. 63–88, discusses the contribution of various assets to liquidity.

but should be considered as equivalent to the other near-moneys for business firms and the wealthiest households. Various business obligations offer substantial liquidity, some nearly as much as the items listed above. The effects on the economy will be the same, but with the degree of effect decreasing with the degree of liquidity. The one unique characteristic of financial intermediaries is that they purchase assets which would fall far down the list, and provide households with assets which come near the head of the list.

In the process of creating liquidity, the mutuals and other intermediaries will influence consumer choice, while their rate of growth will be determined primarily by consumer choice between liquieity and the rate of return. Because of the latter factor, it is primarily the existence rather than the size of these institutions that influences the economy. Without them, households would have difficulty acquiring the liquid assets they desire, unless the quantity of money would be increased to conpensate for the desire for liquidity. In the absence of direct control over the size of existing intermediaries, other than commercial banks, their size is determined by the public.

Once intermediaries are introduced, they make it easier for the public to obtain the desired balance between current

spending, liquidity, and earning assets. Whether this will take the direction of affecting primarily spending or primarily the distribution of assets between money and securities is beyond the scope of this paper. Whichever direction it takes, current spending will be affected. In the first case, it is influenced directly. In the second case, funds made available for investment will be increased, with whatever effect lower interest rates and easier loans have on deficit spending units. In addition to the effect on spending at any one time, we must also consider the effect on interest-elasticity of liquidity preference. Kahn finds that, in a model containing only money and perpetuities, the interest-elasticity of liquidity preference comes entirely from the speculative motive.[1] According to Kahn, precautionary balances are held for the purpose of being able to pay for uncertain expenses. The holder must be able to obtain means of payment whenever any contingency arises. The margin of safety is substantially reduced when assets are held in perpetuities, and therefore perpetuities will be purchases only for long-term investment (to obtain a specified income) or for speculation (in anticipation of obtaining a capital gain when the rate of interest falls). Shifting between money

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[1]The Manchester School of Economic and Social Studies, XXII.

and perpetuities will occur only when the interest rate is expected to change, creating opportunities for capital gains, and any assets that the individual would consider shifting in this manner must be considered to be speculative balances. Thus Kahn concludes that when the only alternatives are money and very long-term assets, the demand for money will be influenced by interest rates only to the extent that speculators respond by holding more or less bonds in the hope of profiting by changes in their prices.

However, we live in a world with many intermediate opportunities. We can surrender liquidity by degrees in order to obtain a greater return. The only asset for which both the rate of return and the money value are completely fixed is money. A substantial amount of liquidity is held in precautionary balances, which can be accomplished in Kahn's model only by holding money. Near-moneys can and do serve the same purpose, although perhaps not quite so well. When spending becomes necessary or desirable, the holder must go to some trouble, and perhaps expense, in order to obtain an acceptable medium of exchange. Precautionary balances will be held in this form only if the rate of return is sufficient to compensate for this bother and expense, and the risk of losing opportunities that may not wait until money

can be obtained. As interest rates change, the return on near-moneys will normally change also. Unless the difficulty of using them changes also, near-moneys become more attractive for holders of precautionary balances when interest rates are high than when they are low. Short of a general liquidity crisis, when the liquidity of demand deposits as well as the liquidity of mutual shares is likely to be impaired, no such difficulties can be anticipated. This indicates that the existence of near-moneys makes liquidity preference more interest-elastic than it would be without them because it makes precautionary balances as well as speculative balances responsive to changes in interest rates.[1]

Two factors may tend to reduce the effect. For most people, the bother of converting near-moneys to money is slight, and probably can be compensated for by a relatively small return. Thus most of the effect on the slope of the liquidity preference function may occur at low interest rates, leaving the slope virtually unchanged within the normal range of interest. Also, existence of near-moneys may reduce the interest-elasticity of

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[1] James Tobin, "Liquidity Preference and Monetary Policy," Review of Economics and Statistics, XXIX No. 2, reprinted in Readings in Fiscal Policy (Homewood: Richard D. Irwin, Inc., 1955), pp 233–47, reaches the same conclusion about the interest-elasticity of precautionary balances without considering the nature of assets that must be available to achieve this result.

speculative balances. Since most of the near-moneys have a fixed money value, they provide an opportunity to earn some return on balances that are being held idle in anticipation of declining prices for other assets, if that decline is expected to take long enough to make the added bother worth while. The net effect of the influence on precautionary and speculative balances may increase or decrease the slope of the liquidity preference function, but with a smaller amount held at any given rate of interest.

The relevant question is, how much difference does the existence of the intermediaries make in the demand for money when interest rates change? To answer this question, we need first an estimate of the interest-elasticity of the demand for money, and then an estimate of the portion of this elasticity that is attributable to the existence of intermediaries. The best estimates of elasticity are those prepared by Bronfenbrenner and Mayer.[1] They obtain two estimates for the elasticity of all balances, including both active balances, which are assumed to be independent of interest rates, and idle balances, which are assumed to provide

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[1] Martin Bronfenbrenner & Thomas Mayer, "Liquidity Functions and the American Economy," Econometrica, XXVII No. 4, pp 810–35.

the entire elasticity. The lower estimate gives an elasticity of 0.09, from a regression equation including the previous year's balances as an independent variable. Omitting the past balances from the equation, a somewhat larger figure of 0.22 is obtained. The smaller estimate is probably more reliable, since autocorrelation of the residuals exists in the series omitting past balances. However, we will use an estimate of 0.20 in our calculations to avoid underestimating the effect of our intermediaries. Using the higher figure may also help to compensate for the fact that the estimated balances fluctuate less than the actual balances —although this characteristic cannot necessarily be taken as evidence that the interest-elasticity was actually underestimated.

Next, an attempt will be made to obtain an estimate of the part of this elasticity that can be attributed to the existence of uncontrolled intermediaries. First the effect the speculative balances must be separated from that of precautionary balances. The only lead available is Lydall's conclusion that speculative balances are only a small part of idle balances, and his conclusion that most of the interest elasticity of liquidity preference is attributable to precautionary balances.[1] However, his analysis

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[1] Review of Economics and Statistics, XL No. 1.

indicated both that speculative balances are important for the wealthier individuals, and that these individuals are more responsive to interest rates than are those whose balances are smaller. Further, it has been indicated above that the elasticity of speculative balances may be less when near-moneys are available. With no quantitative information about either the portion of idle balances attributable to speculative and precautionary motives, or about the relative elasticities, we will suppose that 10 percent of the elasticity is a result of the speculative motive. The remaining 90 percent will be attributed to precautionary balances. The arbitrary nature of this distribution must be kept in mind in evaluating the estimates that follow.

The next step is to estimate the portion of the elasticity of precautionary balances that can be attributed to intermediaries. We indicated above that the entire interest-elasticity of these balances results from the availability of near-moneys and other quite liquid assets. However, the intermediaries with which we are concerned provide only a part of the available near-moneys, while some other direct debt provides a degree of liquidity. The intermediaries that are outside the system of direct monetary controls probably are responsible for no more of the elasticity of liquidity preference than in proportion to their contribution to the

supply of near-moneys. The fact that the public selects a particular asset from a group of similar assets indicates a preference for that particular item over others of the group, and a preference for the group over other, less similar, alternatives. The latter preference would appear, a priori, to be the stronger. For example, elimination of savings and loan associations, or limitation on their ability to expand, ceteris parabus, should result primarily in a transfer of funds to bank savings accounts and government savings bonds, although some might be transferred to demand deposits and other, less liquid, assets. Evidence of high cross-elasticity of demand for the various savings outlets indicates that most of the effect on liquidity preference must be attributed to existence of near-moneys as a whole, rather than to any portion of the group.[1] Individuals would still have access to other liquid assets if the intermediary claims were not available.

Further weakening of the effect can be found in the fact that most corporate balances are not placed in the hands of the

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[1]Theodore R. Eck, "Personal Liquid Savings in the Seventh Federal Reserve District" (unpublished Doctoral dissertation, Michigan State University, 1959), finds that the major factors influencing distribution of individual funds among various liquid assets are the relative interest rates and the availability of the assets in the specific area.

uncontrolled intermediaries. There are three major outlets for temporarily idle corporate balances. One is directly into open-market securities, primarily treasury bills and commercial paper. The second outlet finances government debt through government security dealers via repurchase agreements. The final outlet, and the only use of intermediaries, is commercial bank time certificates. Furthermore, the latter will be primarily at member banks, and therefore within the control of the Federal Reserve System.

To obtain some idea of the sizes of various factors, Table 1 lists the most important segments of the near-moneys. Postal savings accounts and credit unions have been omitted, but would make little difference because of their relatively small size. Time deposits have been separated into those held at member and at nonmember banks. The only indication of direct debt is U.S. government securities held outside of government trust funds, the Federal Reserve Banks, and commercial banks. The amount held by the intermediaries included would be available to the public if the intermediaries did not operate. The amount held by other financial institutions and by state and local governments can be treated as a proxy variable for other quite liquid direct debt.

TABLE 1.—Liquid assets, 1957 ($ billions).

Issuer	Amount	Pct.
Uncontrolled intermediaries:		
Savings and loan associations (share capital)	41.9	15.7
Time deposits, mutual savings banks	31.7	11.9
Time deposits, nonmember commercial banks	11.1	4.2
Total, uncontrolled intermediaries	84.7	31.8
Time deposits at member banks	45.3	17.0
U.S. government securities, public held outside banks	136.0	51.2
Totals	266.0	100.0

Source: Federal Reserve Bulletin, February, 1961.

While the above table does not include all liquid assets, it includes the most important near-moneys. Based on the percentages computed in Table 1, probably no more than one-third of the elasticity of liquidity preference can be attributed to the mutual thrift institutions and time deposits at nonmember banks, one-sixth to time deposits at member banks, and one-half to government securities. While much of the government debt included in the table is in the form of long-term issues, and therefore is less liquid than the other items included, the liquidity of government debt is to some extent controlled by households. Present policy is to issue savings bonds in any amount demanded, at the current interest rate. Hence the public could replace liquidity now held in claims on the mutuals with direct government debt with about the same liquidity, if the mutuals were unable to expand to meet the demand for liquid assets. With other liquid direct debt also available, the percentages should be taken as the maximum portion of the elasticity that can be attributed to the intermediaries. Using the arbitrary figure of 10 percent of the over-all elasticity attributed to speculative balances, we can assume that no more than 30 percent (one-third of the 90 percent attributed to precautionary balances) of the change in the demand for money resulting from interest rate changes can be attributed

to existence of the uncontrolled depository intermediaries, and another 15 percent to time deposits at member banks. Ability to substitute other liquid claims, particularly government securities, would reduce both of these figures. The greater importance of member bank deposits for corporate accounts would shift some of the effect from the other intermediaries. If speculative balances account for more than 10 percent of the existing elasticity, these portions would be smaller.

With these elasticity estimates, we can obtain estimates of the amount of shifting from money during 1956. This was a year of boom and inflation, during which the Federal Reserve System was trying to curb inflation. The money supply remained virtually constant, on a seasonally adjusted basis, at about $130 billion (demand deposits adjusted plus currency outside banks). During this year, the yield on treasury bills rose from 2.54 percent to 3.21 percent, or an increase of about 26 percent. Other interest rates, including the rate on commercial paper which Bronfenbrenner and Mayer used for their estimates of elasticity, had parallel movements. Using our elasticity estimate of 0.20, this indicates that the demand for money fell by about 5 percent, or by about $6.5 billion. The breakdown of liquid assets indicates that no more than $2 billion of this can be attributed to the uncontrolled

depository intermediaries, and another $1 billion to member bank time deposits. The remainder must be attributed to other factors, including other liquid assets and elasticity of speculative balances. Using an income velocity of four for active balances,[1] the uncontrolled intermediaries permitted spending to increase by at most $8 billion over the level that would have prevailed at the same interest rates and with the same money supply in their absence. This figure is about 2 percent of gross national product for 1956, and could account for two-thirds of inflation that occurred.[2]

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[1]This estimate can be obtained in two ways. Both Bronfenbrenner and Mayer, Econometrica, XXVII No. 4, and Tobin, Review of Economics and Statistics, XXIX No. 2, found that the maximum income velocity of all balances was slightly over four. Both used the maximum velocity as an estimate for the velocity of active balances. Alternatively, we can use the Bronfenbrenner and Mayer elasticity estimates. Using the same set of estimates from which we obtained the 0.20 elasticity for all balances, the elasticity of idle balances was approximately 1.00. Since idle balances presumably account for the entire elasticity, idle balances must be about one-fifth of total balances. Therefore, the average money supply during 1956 of $130 billion can be divided between active balances, $104 billion, and idle balances, $26 billion. Dividing 1956 gross national product, $414.7 billion, by $104 billion, we obtain an income velocity of active balances that is again slightly over four (4.0, rounded to two digits).

[2]Survey of Current Business, July, 1957, shows gross national product rose from $391.7 billion in 1955 to $414.7 billion in 1956. The implicit deflator rose from 121.3 to 124.9. Hence 1956 gross national product in 1955 prices was $402.7 billion. The remaining $12 billion was a result of rising prices.

We must remember, however, that all of our estimates have been selected so as to indicate the maximum impact of intermediaries. The elasticity estimate we used is twice the value of the most reliable estimate available, so that the effect probably should be reduced by one-half. We used an arbitrarily small estimate for the portion of the elasticity attributable to speculative balances. Our arguments given above (page 26) indicate that existence of near-moneys probably do not have much effect on the slope of liquidity preference in the range of normal interest rates, so that speculative balances could easily account for over half of the observed changes. Since availability of near-moneys probably reduces the elasticity of speculative balances, the effect on precautionary balances is offset. Since the large balances used for speculation are more likely to be transferred to treasury bills or commercial bank savings accounts than to other intermediaries, the required adjustment to our estimates may be negligible. Finally, the portion of the elasticity of precautionary balances used is the maximum that can be attributed to intermediaries. Probably well over half of the effect would be transferred to other forms of near-moneys, although this fraction would vary inversely with the portion of near-moneys covered by further controls. If in each case, the true value would reduce the impact of

intermediaries by one-half, the true effect would be only about one-eighth of our estimates. Thus we can reasonably say that the actual impact of the intermediaries is probably no more than one-fourth of the maximum indicated. A more reliable estimate of the increased spending permitted is on the order of one to two billion dollars, instead of the eight billion indicated by the maximum effect.

We can obtain further information about the effect of intermediaries on liquidity preference by examining the changes in the rate of growth of various intermediaries. If there is, in fact, a substantial amount of shifting from idle balances to near-moneys during tight money periods, and shifting back when interest rates fall, we would expect the rate of change of the near-moneys to vary in the opposite direction to demand deposits. On the other hand, if control over commercial banks provides an effective restraint on other intermediaries, the rates of change should move in roughly the same way. Table 2 shows the actual percentage changes for deposits at member commercial banks (demand and time), savings capital at savings and loan associations, deposits at mutual savings banks, and assets of life insurance companies.

We note that in 1953 and 1959, all growth rates declined from the previous year, while in 1954 and 1958, all rates

TABLE 2.—Rates of growth for financial intermediaries, 1951–1959 (percent change from previous year).

Year	Demand Deposits, Member Banks	Time Deposits, Member Banks	Savings Capital, S. & L. Assns.	Deposits, Mutual Savings Banks	Assets, Life Insurance Companies
1952	4.2	7.4	19.2	8.2	7.5
1953	-0.2	7.1	19.0	7.9	7.0
1954	3.5	7.8	19.3	8.0	7.6
1955	5.2	3.2	17.9	6.9	7.0
1956	1.3	4.5	15.5	6.5	6.2
1957	-1.0	10.7	12.8	5.5	5.5
1958	4.8	12.9	14.5	7.4	6.2
1959	1.2	3.3	13.7	2.8	5.6

Source: Federal Reserve Bulletin.

increased. In 1955 the growth rate for demand deposits increased, while the rest all declined. Finally, in 1956 and 1957, the growth rate for time deposits at member banks increased, while the rest declined. We find that one year, 1955, shows inverse movements. Four years, 1953, 1954, 1958, and 1959, show parallel movements for all items shown. In the remaining two years, 1955 and 1956, time deposits at member banks broke the pattern. This indicates that only time deposits at member banks—the only item of near-money that is directly under control of the Federal Reserve System—consistently behave in such a way as to counteract the effectiveness of monetary controls. We also note that the rate of change for life insurance companies is more stable than the rates for the other intermediaries. There is an apparent downward trend in the rate of growth, but a nearly constant amount of growth. This provides further justification for excluding the life insurance companies from our list of near-moneys in Table 1.

Summary

We have presented the hypotheses that financial intermediaries increase the liquidity of indirect debt and that they thereby increase the interest-elasticity of liquidity preference. We have presented arguments that support both propositions. The study

made by Selden provides statistical support for the first hypothesis. He indicates that individuals that are induced to shift from money to near-moneys by rising interest rates behave as though they consider the near-moneys to be virtually as liquid as the money (including bank time deposits, by his definition) that they surrendered.[1] We are safe in concluding that the intermediaries do, in fact, increase liquidity, since a large part of their portfolios is considerably less liquid than money.

We have attempted to obtain some indication of the actual effect of intermediaries on the interest-elasticity of liquidity preference. Based on the portion of near-moneys supplied, we concluded that the maximum effect is about one-fourth of the actual interest elasticity, or an increase in elasticity of about one-third from the level that would exist without them. Another one-eighth of the existing elasticity might be attributed to time deposits at member commercial banks, so that the intermediaries combined may account for at most one-third of the existing elasticity. Comparison of the rates of growth of claims on intermediaries indicates that our maximum impact of the uncontrolled intermediaries is overstated, while the effect of member bank

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[1] Journal of Political Economy, LXVII No. 1.

time deposits may possibly be understated. The changes in the rates of growth for savings and loan associations, mutual savings banks, and life insurance companies, are more consistent with the hypothesis that they are effectively restrained by monetary controls than with the hypothesis that they help to make these controls ineffective.

The conclusion that seems to be best supported by the evidence we have examined is that intermediaries shift the liquidity preference function, but do not affect the shape substantially. Because claims on intermediaries are virtually as liquid as money for some purposes, particularly for precautionary balances, many holders of idle balances will choose to hold these claims instead of money as long as they can obtain more than a nominal return. The slope of liquidity preference does not appear to increase greatly because of their existence, particularly since other liquid claims are available, so that substitution between money and near-moneys could exist in their absence.

CHAPTER II

FINANCIAL INTERMEDIARIES AND LOANABLE FUNDS

Introduction

We have indicated that intermediaries increase the liquidity of indirect debt, and that this increase in liquidity induces the public to hold their liquid assets in near-moneys instead of money. The holder now obtains a return, and with a given pattern of direct debt the supply of funds made available to deficit spending units is increased. The entire effect could be absorbed if the monetary authorities reduce the money supply sufficiently. Otherwise, the influence of intermediaries on the loanable funds markets can operate in three directions. In examining these effects, we will assume long enough time periods for all parties to adjust fully to changing conditions, and will eliminate the other factors affecting the functions under ceteris paribus.

The first influence is felt on interest rates. The initial effect constitutes simultaneously a decrease in the demand for money and an increase in the supply of loanable funds, both of

which require the rate of interest to fall. Since the supply of money is assumed to remain constant, equilibrium can be restored by increasing idle balances at lower interest rates (moving down the new liquidity preference function), and by increasing transactions balances (offsetting shifts in the demand for money induced by moving down the investment-demand schedule). The degree to which a change in the amount of loanable funds (or liquidity preference) will affect each side of the market will depend on the relative elasticities. A high elasticity of liquidity preference also implies a high elasticity of the supply of loanable funds, indicating that most of the shift would be absorbed through small changes in the interest rate and movements down the new functions. A low elasticity of liquidity preference implies low elasticity of loanable funds except to the extent that saving and consumption are affected, so that most of the shift must be absorbed through increasing transactions balances. A high interest-elasticity for investment (and consumption) implies that transactions balances will be quite responsive to interest rates.

The study by Bronfenbrenner and Mayer indicates that the liquidity preference function is not very elastic.[1] If investment

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[1] Econometrica, XXVII No. 4.

and consumption demand are fairly elastic, the effect will fall largely on the volume of spending, and hence transactions balances. If investment demand is also inelastic, the effect will be primarily a lower rate of interest without much change in the real variables. We will examine some of the information regarding the elasticity of investment below.

The second influence of intermediaries is on the terms on which funds are made available to deficit spending units. Because indirect debt is more liquid than direct debt, intermediaries can afford to accept debt that is less liquid than the public would choose to accept if held directly. Just as the increase in the volume of loanable funds will reduce interest rates so as to divide the effect between suppliers and demanders, the effect on liquidity will be divided. The public will probably be more liquid. Some of this effect will be absorbed by supplying more loanable funds. Finally, the liquidity of direct debt will probably be reduced because loans are made on longer term and in less marketable form than holders of intermediary claims would be willing to accept.

The third influence is on the direction of lending. This can consist of two parts. To the extent that intermediaries are restricted to particular types of loans, borrowers in markets

where intermediaries are permitted to operate will be favored. However, in most cases, any market in which any intermediary can operate is also served by other lenders who can and will shift into or out of that market as the market return dictates. Those intermediaries that are most restricted will simply preempt whatever portion of loans they can supply, while other lenders will supply the rest. There may be some changes in the pattern of interest rates resulting from restrictions imposed on intermediaries, but they are probably fairly small. These restrictions may have more influence on the relative growth rates for existing intermediaries—those intermediaries that are permitted to lend in the markets where demand for loans is greatest will grow most rapidly, because they can compete for funds more effectively than can other intermediaries. In addition, they may improve the allocation of resources applied to investment because they provide funds to investors who do not generate their own funds.[1] Since this part of the influence of intermediaries is not a central part of the problem we are examining, we shall pursue it no further.

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[1] See particularly Gurley and Shaw, Money . . ., pp 195–97.

In connection with the effect of intermediaries on loanable funds, there is also the question about whether they create loanable funds or merely influence the flow. In order to evaluate the impact of intermediaries on loanable funds, we must first examine the process of lending by the intermediaries. We will turn our attention to this aspect of their operations now.

The Lending Process

For commercial banks, excluding the time deposit department, loanable funds are supplied and money is created in the same step.[1] When a loan is made, or a security is purchased, a demand deposit is normally created, either at that or some other bank. For the mutual thrift institutions, and for the time deposit departments of commercial banks, two steps are involved. An individual exchanges money for a deposit. This increases obligations and reserves by the same amount, thereby providing reserves in excess of those required to cover liabilities. The excess amount will then be used to make a new loan—loanable

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[1] Gold purchases and transfers of government deposits between banks and the Federal Reserve Banks are exceptions to this. Federal Reserve open market operations may also be an exception, but in this context the Federal Reserve System may be regarded as part of the banking system.

funds are supplied. However, for individual operating units, this does not constitute a real difference. Regardless of the type of transfer made at the time of the loan, the individual unit expects to lose reserves in the amount of the loan (unless they have attached minimum balance requirements). The borrower obtains money, and will normally spend it in such a way that none of it, or only a negligible portion, will be left on deposit at the lending institution. Regardless of the type of institution, the individual unit maintains fractional reserves but does not engage in multiple expansion on the basis of reserves made available. Any attempt to do so would result in a shortage of reserves. The unit is enabled to lend because depositors provided the necessary funds, and because only a fraction of those funds need be held in reserves.

On the basis of the above arguments, Gurley and Shaw conclude that commercial banks and other intermediaries are equivalent. Because each unit maintains in reserve only a fraction of deposits, all engage in multiple expansion of credit.[1] However, there is a substantial difference. Regardless of the

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[1] American Economic Review, XLV No. 4. They extend this to households in Money . . ., p 297. See also Culbertson, American Economic Review, XLVIII No. 1, and reply by Gurley and Shaw, same issue, pp 132–38.

lender, or the nature of the loan, the ultimate recipient generally will hold the funds in the form of a demand deposit at some commercial bank. The reserves remain in the banking system. If one bank makes a loan, another bank obtains excess reserves, and the process is repeated until demand deposits and loanable funds have expanded by a multiple of the amount of the initial excess reserve. For the mutual thrift institutions, the process is curtailed after the first step. Demand deposits are transferred from the account of a mutual to some other account. The public normally continues to hold demand deposits, rather than mutual shares, and so the reserves leave the mutual system entirely.[1]

Some modification may be required, since the public does have options other than simply holding demand deposits. Currency may be withdrawn from the banks, thereby reducing the total amount of reserves available to the banking system. The volume of loans may also induce the Federal Reserve System to change the amount of reserves, with a corresponding multiple effect on bank expansion. The increase in the total value of assets

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[1]This difference is discussed in detail by Warren L. Smith, "Financial Intermediaries and Monetary Controls," Quarterly Journal of Economics, LXXIII No. 4, pp 533–53. See also Shelby, Journal of Finance, XIII No. 4.

resulting from the lending process may also induce the public to hold a larger amount of time deposits, thereby reducing the required reserves for commercial banks, or shares of mutuals. This will permit further expansion. We can say that, as a second approximation, commercial banks can expand credit by something less than the inverse of the effective reserve ratio, unless shifts of holdings to time deposits reduce required reserves by more than the amount of currency withdrawn. At the same time, the mutuals, as a group, can expand credit by something more than one minus the effective reserve ratio. This modification of the typical first approximation is small relative to the difference between $\frac{1}{r}$ and (1-r), when r is small. The difference that remains is a result of the fact that demand deposits are money—the major medium of exchange in our economy. This one factor gives banks enough extra leverage to induce the public to hold whatever volume of their obligations the banks choose to issue, within the limits imposed by restrictions on the total volume of bank reserves.

Banks are still limited, as are the mutuals, by the willingness of the public to hold their obligations at prevailing interest rates. Banks, like other intermediaries, must be willing to pay the price in terms of higher interest on their obligations (or

lower service charges), or lower interest received on assets, before they can expand. For an individual operating unit of any type of intermediary, decisions on scale of operation will be made after comparing the marginal cost of attracting more deposits with the marginal revenue. Decisions regarding the distribution of assets are made independently of decisions concerning scale, and the statistical evidence available indicates that the distribution of existing assets is independent of interest rates.[1] In the government security markets, even the largest banks can act much like perfect competitors—the effect on price is negligible. According to the February, 1961, Federal Reserve Bulletin, in November, 1960, all commercial banks held $61.8 billion of the total federal debt of $290.6 billion. The fifteen Central Reserve City banks in New York held $6.6 billion of this amount, or less than half a billion dollars on the average for the group containing many of the largest banks in the country. The largest banks probably hold no more than 1 percent of the total federal debt each, which gives a much smaller concentration than occurs in most major industries. Even allowing for the fact that part of the debt (less than $90 billion) is held by various government agencies, and for

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[1] See Appendix C, pp. 223–29.

greater activity in the market for holdings of the large banks, these statistics do not support the contention that banks can manipulate the market. Hence, any one unit can obtain the desired amount of reserves, or dispose of excess reserves, by selling or buying securities. Further, each unit will normally try to maintain cash reserves at the lowest possible level consistent with legal requirements and safety. The difference between banks and other intermediaries lies in the subsequent effect.

A transaction made by one mutual thrift institution normally will not affect the other mutuals, while a transaction by one bank normally will affect deposits and reserves at other banks. The mutuals can expand only through a deliberate decision by individual units to narrow the spread between the rates they pay and receive. Banks will expand without such a decision if the reserves are available, and cannot expand without these reserves. The mutuals individually and collectively determine the level of reserves they hold. Individual banks can determine the level of reserves held, but can do so collectively only by inducing the public to shift between currency and bank deposits or between demand and time deposits. This difference between banks and the mutuals could well change if we no longer

limited the amount of reserves that the banking system is required to hold and the total amount of reserve bank credit available to banks, but only at the cost of removing any control over the money supply and interest rates. Imposing similar reserve controls on the mutuals might make them somewhat more like banks.

Creation of Loanable Funds

Financial intermediaries must, by their very nature, lend to deficit spending units. They also probably influence the volume of loanable funds that is made available. Since most of the funds flowing through the nonbank interemediaries are generated from current saving, their influence will be felt primarily through the saving-investment process. An understanding of this effect is also necessary in appraising the effect of intermediaries on creation of loanable funds. Therefore, we now want to examine their relationship with the saving-investment process.

There are three possible relationships. First, intermediaries may simply influence the direction of flow of funds by acting as middlemen between savers and investors. To the extent that their influence is felt in this way, they may improve the allocation of funds, but do not affect either the level of the economy or

the mix of consumption and investment. Second, they may affect the amount of loanable funds by influencing saving. This will not affect the level of the economy, but will change the pattern of spending. Third, they may affect the volume of loanable funds made available with a given level of saving, either by creating loanable funds or by inducing savers to lend instead of hoarding. To the extent that this is accomplished, the level of the economy will be affected.

We must remember that public holdings of liquid assets increase only when intermediaries lend,[1] or when the government spends money raised by issuing new debt (or new money). However, the intermediaries can lend only if they can induce the public to hold their obligations—this being, normally, the only way they can obtain the resources necessary for lending. This leads Gurley and Shaw to state that no intermediary can create loanable funds. They merely create assets, such as demand deposits, which the public can choose to hold.[2] According to them, it is the decision to hold these assets that constitutes creation of

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[1]When deposits at the mutual thrift institutions increase, the public surrenders money in exchange for other liquid assets. See footnote on page 46 for the exception to this rule for the banking system.

[2]American Economic Review, XLV No. 4, p 521.

loanable funds. Regardless of the type of intermediary involved, once the decision to hold the obligations is made, most of the amount will automatically become loanable funds, assuming that the institutions are trying to maximize profit and the demand for loanable funds is reasonably normal (which it was not during the early 1930's). This, however, begs the question. The relevant question is, have individuals lent anything—are they supplying loanable funds—when they acquire obligations of intermediaries?

First, let us look at demand deposits. These deposits are, at the same time, debt of commercial banks and money. If banks do not create loanable funds, but merely induce others to supply such funds through them, then holding this form of money constitutes supply of loanable funds. An individual then lends to a bank, and supplies loanable funds indirectly to deficit spending units, when he holds a demand deposit for any reason. But since the holder has an asset that he can use as a medium of exchange, he does not consider this to be lending. He has supplied loanable funds only in the sense that he has accepted the debt of a bank. In the same sense, currency is the debt of the government or of the Federal Reserve System. Therefore, if an individual supplies loanable funds when he accepts a demand

deposit, he also supplies loanable funds when he accepts currency. This implies that supply of loanable funds is synonymous with accepting someone else's debt, regardless of the form of that debt.

From this we reach directly the Gurley and Shaw conclusion about the relationship between saving and loanable funds—that savings are identical with loanable funds.[1] Under any definition of the term, a substantial portion of savings will become loanable funds, or will be used to finance direct investment by the saver. The latter case can be regarded as simultaneous supply of and demand for loanable funds, and presents no problem. The question that arises concerns the analytical treatment of increases or decreases of idle money balances. Equilibrium money income must decrease if savings are flowing to increased hoards without a corresponding increase in the money supply, or increase if the money supply grows faster than hoards. However, Gurley and Shaw conclude that all savings, regardless of the form in which they are held, are loanable funds, and that creation of new deposits by banks does not constitute creation of loanable funds. They still recognize that hoarding can create an economic problem, but not in the form of changing supply of loanable funds.

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[1] See Culbertson, American Economic Review, XLVIII No. 1, and reply by Gurley and Shaw.

The problem that arises is one of changing demand for current output, but which is influenced by the method of financing. The investor needs two things in order to invest, both of which may be provided by the saver. First, he must find productive resources available. The saver automatically supplies this need by producing more than he consumes. Secondly, the investor needs some means of financing the purchase. It is here that the market for loanable funds becomes relevant. A bank can enable an investor to purchase investment goods when it lends a newly-created demand deposit, even though no one has saved. On the other hand, savers who hoard may release resources for new investment without making the funds available to finance the purchase of the resources thus released.[1] By making saving and the supply of loanable funds identical, Gurley and Shaw would prevent us from treating the resulting change in equilibrium in terms of the supply of loanable funds. It is not clear whether

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[1] If current savings flow into increased hoards, ex ante saving exceeds ex ante investment. The resources released by the savers are not used, and income must fall sufficiently to reduce ex ante saving to the level of investment. On the other hand, use of newly created money or funds obtained by reducing hoards to finance investment will permit ex ante investment to exceed ex ante saving, indicating that more resources are demanded. Income must rise sufficiently to bring forth sufficient ex ante saving to cover the investment—bringing also the possibility of inflation.

the effect of hoarding can be attributed to a demand for loanable funds, or to outside factors. In the first case, we obtain the same answer that we would by excluding savings flowing to hoards from the supply of loanable funds. In the latter case, the market for loanable funds ceases to be relevant, although Gurley and Shaw also claim to be rescuing the loanable funds market from the disuse which they attribute to the Keynesian liquidity preference model.[1]

In order to keep the market for loanable funds as a useful device, it is necessary to treat hoarding and changes in the supply of money as factors influencing either supply of or demand for loanable funds. The effects seem to be examined most clearly if we say that loanable funds are supplied when an individual surrenders money, or when goods are sold in exchange for the debt of an economic unit outside of the monetary system. By this definition, banks create loanable funds when they lend, but holders of demand deposits neither create nor supply loanable funds.

We must now look at the mutual thrift institutions, to see whether they create loanable funds, or merely channel them to lenders after funds are supplied by the public. The mutuals

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[1] American Economic Review, XLV No. 4, pp 523ff.

accept money, in the form of currency or demand deposits, in exchange for their own obligations. They in turn lend, supplying deficit spending units with money. They have created loanable funds only if they create money at some point. By my definition of money, the mutuals have not created money—they have absorbed a small fraction of the money provided by their depositors in reserves, and lent the rest.[1] The mutuals have induced the public to supply loanable funds indirectly by offering them assets that are more liquid than direct debt. The essential difference between commercial banks and the mutual thrift institutions is that, when a commercial bank lends, the reserves stay in the banking system, permitting multiple expansion on the basis of reserves made available to the system. The mutuals may engage in multiple expansion on the basis of reserves retained, but the retained reserves will be only a fraction of the original amount deposited. This difference is a result of the fact that demand deposits are used as a medium of exchange. The appropriate place to draw the line between creation of and channeling loanable funds seems to hinge on this difference. Banks can create loanable funds because they keep a fixed volume of reserves, and expand deposits

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[1] In this respect, time deposit departments of commercial banks are identical to the mutual thrift institutions.

in the process of lending until all reserves are absorbed by required reserves. Other intermediaries do not create loanable funds because they keep the required amount of reserves and lose the rest permanently when they lend.

The mutuals do cause the total supply of loanable funds to be larger than it would be in their absence, to the extent that they induce the public to accept their shares instead of money. To assist in determining the degree to which this occurs, we can obtain a liquidity (or credit) multiplier, assuming that the public will choose to maintain a nearly constant proportion between demand deposits and other intermediary claims. We find that two such multipliers have been published. Donald Shelby included demand deposits, time deposits, and intermediary claims.[1] Warren Smith omitted time deposits, but included holdings of currency.[2] Combining the two treatments, we get: $L = \frac{1 + c + s + t}{r_d + r_t t + c} R$, where L is the volume of credit and liquid assets issued; R, the volume of bank reserves; c, s, and t are the ratios of currency, intermediary claims, and time deposits, respectively, to demand deposits; and r_d and r_t are the reserve requirements for demand

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[1] Journal of Finance, XIII No. 4.

[2] Quarterly Journal of Economics, LXXIII No. 4.

and time deposits, respectively. We can get approximations of the effect, based on the distribution of actual holdings in recent years. The estimated ratios of the various assets to demand deposits used are based on rough averages of holdings at the end of 1957 and 1960. Table 3 shows the computation of the multiplier and the approximate effect of each component under two assumptions. The first computation is made on the basis of marginal ratios about equal to the average ratios, and the second computation, on the basis of marginal ratios about half the size of the average ratios.

The marginal ratios are probably smaller than the average ratios, under conditions relevant for monetary policy. The money supply would normally be increased through purchases of securities by the banking system. This will affect the total value of assets only to the extent that lower interest rates increase the price of securities still held by the public. With a sufficient lapse of time, real assets would also be increased to an extent because investment would be stimulated. However, the major change would be limited to interest rates and the mix of assets, in the direction of more money and fewer securities. One reason for holding near-moneys is the desire to diversify one's portfolio —a motive which is stronger and satisfied at a lower cost for a

TABLE 3.—Liquidity multiplier.

Parameter or Multiplier	Marginal Ratio Equal to Average Ratio	Marginal Ratio Half of Average Ratio
Parameters:		
c	0.25	0.12
s	0.8	0.4
t	0.4	0.2
r_d	0.15	0.15
r_t	0.05	0.05
Liquidity multipliers:		
Including all factors	5.8	6.1
Omitting time deposits	5.1	5.6
Omitting currency leakage	12.9	10.0
Omitting mutual shares	3.9	4.7

larger total portfolio, but which might be weaker with a relatively liquid portfolio resulting from expansionary monetary policy. Gurley and Shaw believe that this "diversification demand" is a major factor in the demand for intermediary claims, and that this will cause demand for such claims to increase more than in proportion with the increase in assets if the growth is not accompanied by an increase in the money supply.[1] The same reasoning would indicate that an expansionary monetary policy would weaken the desire to acquire additional claims on intermediaries. We may also observe some shifting between intermediary claims and other financial assets in response to lower interest rates. The return on intermediary claims will probably fall with other rates, making them less attractive as substitutes for money. At the same time, the return may fall by less than other rates, making intermediary claims more attractive as substitutes for direct debt. These arguments indicate that expansionary monetary policy may bring some increase in holdings of intermediary claims, but that the marginal ratio of such claims to demand deposits is probably smaller than the average ratio. Therefore, the somewhat greater than one-fifth of the total credit expansion resulting from changing bank

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[1] American Economic Review, XLV No. 4, p. 525.

reserves attributable to mutual shares if the marginal ratios are one-half of the average ratios ($4.7 \div 6 = .78$) probably is closer to the true value than the value of nearly one-third that can be expected if the marginal ratios are equal to the average ratios $3.9 \div 5.8 = .67$).

There is another factor to consider here. Some of the funds made available through the intermediaries probably would be made available directly to the borrowers if the intermediaries did not exist. To the extent that the public holds indirect instead of direct debt, the public is made more liquid, but the supply of loanable funds is not affected. The public can maintain the same liquidity as before by accepting intermediary claims for some combination of money and direct debt. The supply of loanable funds is increased only by the amount that would have been held in money, to achieve the same liquidity, plus any increase in the amount of earning assets held because less liquidity must be surrendered in order to obtain a return.

We find, then, that both commercial banks and other intermediaries engage in multiple expansion on the basis of reserves retained, but only commercial banks engage in multiple expansion on the basis of the initial amount of reserves provided. Nonbank intermediaries, like individual commercial banks, can lend only to

the extent that depositors provide the assets. The major difference between commercial banks and the other intermediaries is that the banking system normally retains the reserves lost by a single bank when it lends, while the reserves would normally be lost to the system of all nonbank intermediaries. However, the intermediaries do attract funds that might not become loanable funds in their absence. To the extent that this occurs, the liquidity (or credit) multiplier for a given change in bank reserves is larger than it would be without nonbank intermediaries.

We still have not disposed of the question regarding the relationship of intermediaries to the saving-investment process. We have discarded one extreme view, that savings are automatically loanable funds, when we discarded the view that banks do not create loanable funds. We can also state that commercial banks (excluding the time deposit department) do not influence the saving process directly. They do influence investment by supplying newly created demand deposits. This function of banks does help to equate planned saving to planned investment if the amount of money created by banks is equal to the amount flowing into hoards. If these amounts are not equal, the economy must adjust by changing output or prices. Holding a demand deposit does not imply a decision to save, although this is one way of increasing

money holdings. More frequently, it implies a decision to spend at a later date. On the other hand, holding a time deposit or an account with some nonbank intermediary does imply a decision to save, and follows from an act of saving.[1] This implies that nonbank intermediaries serve primarily to channel savings into the markets for loanable funds, and hence to investors or dissavers. This also implies, but is not sufficient to prove, that nonbank intermediaries need not be subject to the same type of controls as the banking system. Investment financed directly or indirectly by current saving is inflationary only to the extent that the resulting increases in liquidity and wealth affect consumption by more than productive capacity grows.

We must, however, consider an exception to this conclusion. As interest rates change, the inducement to hold near-moneys instead of money to satisfy liquidity preference changes. Rising interest rates will induce some holders of idle balances to substitute shares of a mutual thrift institution. This will enable the mutuals to supply loanable funds from a source other than current savings. As indicated in Chapter I, the individual's spending is probably not affected, or affected only slightly. At the same time,

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[1]The last three sentences are a restatement of a point made by Smith, Quarterly Journal of Economics, LXXIII No. 4.

banks are not influenced. The demand deposit is held, first, by an intermediary instead of an individual, and subsequently by some borrower, but the total is not changed. By increasing the interest-elasticity of the demand for money, intermediaries make it easier to increase spending by increasing velocity instead of increasing the quantity of money. Any attempt to control spending via the velocity of money is more likely to be successful if it includes some control, directly or indirectly, over the nonbank intermediaries. This particular aspect of the mutuals will be pursued further in Chapter IV.

Loanable Funds and Investment

The effect of intermediaries on the supply of loanable funds should have some influence on the level of economic activity. However, it can have this influence only through the market, and hence through investment. An increased supply of loanable funds should induce borrowers to spend more. However, lower interest rates resulting from the increased supply of loanable funds may also make liquidity more attractive—and the result may be primarily on liquidity if investment demand is sufficiently inelastic with respect to the rate of interest. The more favorable terms provided to borrowers as a result of increased liquidity may also encourage

more investment, but it may also go primarily to increase the liquidity of existing assets, or to permit more favorable terms for borrowers without having much effect on the amount borrowed and spent.

If the job of rationing the available supply of credit is accomplished entirely through the price system, we need to determine the degree of response of borrowers and lenders to the various attributes of credit instruments in order to evaluate the influence of intermediaries. However, if credit is rationed by some nonprice process, the answer may be different. If potential borrowers are prevented from obtaining funds because they are not available at prevailing terms, then an increase in the supply of loanable funds may bring virtually an equal increase in borrowing and spending. Under these circumstances, the rate of interest may be relatively unimportant—most borrowers are influenced only by the availability of funds, and not by interest rates. This implies that, if credit is rationed outside the price system, investment may be almost completely inelastic with respect to the rate of interest, and almost completely elastic with respect to the supply of loanable funds. Intermediaries could have even more effect on spending under these conditions than under a strict price system. The increase in the rate of interest that is

necessary to obtain more funds may have only a slight effect on spending, while the resulting increase in the volume of loanable funds can have a sizable impact.[1]

The next step is to evaluate the effect of intermediaries on the important variables under the assumption that all participants are in equilibrium. This will depend on the various elasticities involved, but not necessarily in any direct way. We have set up an extremely simple set of equations to obtain some idea of the effect. This model includes only variables directly within the financial system. Being a static model, it does not allow for any change in the volume of loanable funds to affect investment, and hence income and consumer behavior. The variables used are:

B = the volume of direct debt,

F = the volume of loanable funds,

I = the supply of intermediary claims, minus cash reserves of intermediaries,

L = liquidity,

M = money,

r = the rate of interest.

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[1] J. S. G. Wilson, "Credit Rationing and the Relevant Rate of Interest," Economica, N. S. XXI No. 81, pp. 21–31.

The subscripts, S and D, are used to designate supply and demand, respectively. Two parameters, a and b, are used to designate the degree to which intermediary claims and direct debt, respectively, substitute for money in satisfying the demand for liquidity. These are assumed to be constant, although b will in practice vary with the terms on the direct debt that is issued. The values are in the range $1 > a > b > 0$.

A number of simplifying assumptions are involved. They are:

1. The supply of money is absolutely fixed.

2. The public has simply a demand function for liquidity, which is independent of the distribution of liquidity (but not assets) among money, intermediary claims, and direct debt.

3. There is no explicit budget restraint on the volume of financial assets held by the public.

4. Money held as reserves by intermediaries contributes as much to liquidity as money held directly. Therefore, we can abstract from any shift of the fixed money supply between public holdings and intermediary reserves. The variable I, then, excludes reserves, and the whole amount becomes available to borrowers. A simpler, but less realistic, assumption to achieve the same result would be that intermediaries do not change the volume of reserves as the volume of outstanding claims changes.

5. The demand for liquidity consists of two components. Active balances will vary directly with the volume of loanable funds—in our system, when money is borrowed, the funds (or part of them) become active, without

affecting the level of production immediately. The second component, precautionary and speculative balances, will vary inversely with the interest rate.

6. The supply of loanable funds is identical with the sum of the demands for intermediary claims and direct debt.

7. The demand for loanable funds (and indirectly, investment) will vary inversely with the rate of interest.

8. The supply of intermediary claims varies directly with the demand for loanable funds.

9. To indicate some change, it is assumed that a new intermediary enters the system supplying a new amount, X, of intermediary claims.

From the assumptions listed, we obtain the five basic relationships:

$$L_S = M + aI_S + bB_S \qquad \text{where } 1 > a > b > 0$$

$$L_D = f(r, F) \qquad \text{where } \frac{\delta L_D}{\delta r} < 0, \frac{\delta L_D}{\delta F} > 0$$

$$F_S = I_D + B_D$$

$$F_D = f(r) \qquad \text{where } \frac{\delta F_D}{\delta r} < 0$$

$$I_S = f(F_D) \qquad \text{where } 1 > \frac{\delta I_S}{\delta F} > 0$$

Differentiating, we can obtain the basic relationships for changes. Since, in equilibrium, the supply of and demand for each of the variables must be equal, we can drop the subscripts except in the partial derivatives. Our system then becomes:

$$dL = adI + bdB$$

$$dL = \frac{\delta L_D}{\delta r}\, dr + \frac{\delta L_D}{\delta F}\, dF$$

$$dF = dI + dB$$

$$dF = \frac{\delta F_D}{\delta r}\, dr$$

$$dI = \frac{\delta I_S}{\delta F}\, dF + X$$

This gives us five equations in the five unknowns, dB, dF, dI, dL, and dr. Substituting, we can solve for each in terms of X, the parameters, and the partial derivatives. Since all of the solutions involve the same denominator, we will show the solution for dr, and show the remaining solutions in terms of dr. These are:

$$dr = \frac{(a - b)X}{\frac{\delta L_D}{\delta r} + \left(\frac{\delta L_D}{\delta R} - b\right)\frac{\delta F_D}{\delta r} - (a - b)\frac{\delta F_D}{\delta r}\frac{\delta I_S}{\delta F}}$$

$$dB = -\frac{\left(\frac{\delta L_D}{\delta F} - a\right)\frac{\delta F_D}{\delta r} + \frac{\delta L_D}{\delta r}}{a - b}\, dr$$

$$dF = \frac{\delta F_D}{\delta r}\, dr$$

$$dI = \frac{\frac{\delta L_D}{\delta r} + \left(\frac{\delta L_D}{\delta F} - b\right)\frac{\delta F_D}{\delta r}}{a - b}\, dr$$

$$dL = \left(\frac{\delta L_D}{\delta r} + \frac{\delta L_D}{\delta F}\frac{\delta F_D}{\delta r}\right)dr$$

We note that the numerator in dr is positive, by assumption about the values of a and b. The denominator contains three terms. The first is negative. The second is negative also if $\frac{\delta L_D}{\delta F}$ exceeds b, which is likely, since the former is probably on the order of one—an increase in the volume of borrowing will probably increase active balances by approximately the same amount. The third term is positive. Since two of the three components of the third term, (a - b) and $\frac{\delta I_S}{\delta F}$, are less than one, and considering particularly the dimensions of the first term, the whole denominator appears to be negative. Thus we can expect our autonomous increase in the supply of intermediary claims to cause the rate of interest to decline. The amount of decline will be large if:

1. Intermediary claims are quite liquid, particularly more liquid than direct debt.

2. Direct debt is relatively illiquid.

3. Liquidity preference is not very responsive to interest rates.

4. Active balances change only by a small portion of the change in loanable funds.

5. The supply of intermediary claims is quite responsive to the demand for loanable funds.

6. The effect of the response of the demand for loanable funds to the rate of interest appears in the denominator

with both positive and negative signs. The size of this factor will probably be less important than the other variables.

Next we note that dB and dI are similar, differing only in the substitution of b for a in dI, but with opposite signs. B will change in the same direction as r, while I will change in the opposite direction. Appearance of the quantity (a - b) in the denominator will cancel some of the effect of the difference in liquidity between intermediary claims and direct debt. The effects of the responsiveness of liquidity preference to both the rate of interest and to the volume of loanable funds will also cancel to a degree. The remaining effects are:

1. Both direct debt and intermediary claims will change more if the demand for loanable funds is quite responsive to the rate of interest.

2. There will be a greater decline in direct debt if intermediary claims are quite liquid.

3. There will be less increase in intermediary claims if direct debt is quite liquid.

The volume of loanable funds will, of course, increase if the rate of interest falls. The absolute amount of change will depend on the size of the change in the rate of interest and the responsiveness of the demand for loanable funds (and investment) to that change.

Liquidity will also increase if the rate of interest falls. The amount of change will be large if the responses of liquidity preference to both interest and loanable funds, and that of the demand for loanable funds to interest, are large. Both of the influences on the demand for liquidity have the opposite effect on the degree of change in the rate of interest, and so the net effect is uncertain.

In summary, we note that all of the partial derivatives will definitely influence the volume of loanable funds. The responsiveness of the demand for loanable funds to interest will have a relatively small effect on the rate of interest, but will be the dominant influence on the change in the amount of liquidity, and will also affect the distribution of liquidity.

The model as shown above assumes that the terms on direct debt issued remains constant. This, of course, will not necessarily be true. Rather, the increase in liquidity associated with the increased supply of intermediary claims will probably induce the public to be satisfied with less liquid direct debt, in exchange for the greater return. The debt acquired by the intermediaries may also be less liquid than that which would otherwise be held by the public. This will encourage borrowing, and at the same time discourage lending. The net effect should be to reduce the

amount by which the interest rate would fall. Both the smaller decline in the rate of interest and the decline in liquidity of direct debt would mean less increase in actual liquidity—the former by reducing demand, the latter by reducing supply. The net effect on the other variables would appear to be small. The change in interest rates and the change in the liquidity of direct debt will have offsetting effects on both the supply of and the demand for loanable funds. The distribution of public holdings between intermediary claims and direct debt is important only to the extent that it affects the volume of loanable funds and liquidity.

Summary

We can now state the general effects of financial intermediaries in qualitative terms. First, arguing from the law of large numbers and the behavior of individuals, we can conclude that intermediaries increase the liquidity of the debt held indirectly through intermediaries. In this respect, the mutual thrift institutions and the time deposit departments of commercial banks have the greatest effect, since they permit withdrawal on terms that make their obligations close substitutes for money. Much of this effect probably takes the form of a one-time shift in the

demand for money when intermediaries first exist, rather than causing a change in the shape of the function. The increase in liquidity, and the increased variety of earning assets offered the public, will tend to induce the public to accept earning assets—and hence supply loanable funds—instead of holding idle money balances. With a given money supply, this will tend to encourage investment and consumption—particularly consumption financed by installment credit. This can, of course, be offset by a contraction of the money supply. Perhaps more important is the potential created for changing the velocity of money in response to changing demand for credit, thereby partially defeating the purpose of monetary controls. The intermediaries make it easier to obtain a greater supply of loanable funds during tight money periods largely because they increase the interest-elasticity of liquidity preference—although our estimates in Chapter I indicate that the actual degree of effect here is fairly small. The net effect on spending will depend on institutional conditions in the credit markets, and on various responses to changing interest rates and terms. If the major restraint on borrowing (and on investment spending) is via the interest rate, the net effect will depend largely on the relative elasticities. Estimates cited previously indicate that liquidity preference is not very responsive, and thus

indicate that the net effect may be fairly small. However, if current spending is not very responsive, and particularly if the major restraint on investment is the availability rather than the cost of credit, we may still have enough of a leakage from monetary restraint to be worth considering.

CHAPTER III

DISCOUNTING AND BORROWING

Central Bank Lending

For any economic unit, assured access to credit will increase the unit's liquidity position and may serve to protect the value of assets. Liquidity is increased because borrowing can be used to cover any net outflow of money which exceeds the amount of cash available. The value of assets is protected because borrowing will permit an unexpected outflow to be met by a gradual, planned liquidation of assets. The market value of assets may be less if they must be sold quickly to meet an emergency need for cash then if the liquidation can be accomplished leisurely. This is particularly important for banks and the mutual thrift institutions, since they have little, if any, control over flows into and out of deposits, and they frequently make loan commitments that give borrowers effective control over the timing of some loans.

Two groups of intermediaries, members of the Federal Reserve banks and the Federal Home Loan Banks, have access to central bank credit. These are mainly commercial banks and savings and loan associations, although a few mutual savings banks are members of one system or the other.[1] While lending policies of the two systems differ, the effect on liquidity of their members is similar.

The Federal Reserve banks follow a lending policy that is not clearly defined in writing, but in practice is to make credit available to any member bank to meet any legitimate emergency, but only until the bank has time to adjust to changing conditions.[2] A member bank is given no specific assurance that it will be able to borrow whenever that becomes necessary, but statements of Federal Reserve officials indicate that no legitimate request

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[1]The Federal Reserve Bulletin, any issue, indicates that three mutual savings banks are members of the Federal Reserve Bank of Chicago. The Savings and Loan Fact Book, United States Savings and Loan League, 1959, indicates that twenty-five savings banks and two life insurance companies are members of the Home Loan Bank System.

[2]C. R. Whittlesey, "Credit Policy at the Discount Window," Quarterly Journal of Economics, LXXIII No. 2, pp 207–16. See also comment by Robert V. Roosa, p. 333, and reply by Whittlesey, p. 337, in the same volume. Some of this discussion is based also on an address by Robert Holland, vice-president of the Federal Reserve Bank of Chicago, at that bank's Institute on Central Banking Techniques, September, 1958.

would be denied. There is no stated upper limit on either the amount of loan that would be granted or the length of time that would be permitted before the loan must be repaid. The former may not be necessary, since most chartering authorities impose a limit on the amount banks may borrow. In practice, the amount that will be allowed is limited to the amount needed to cover an actual emergency, or some unexpected outflow of funds. An unexpectedly large volume of business loans appears to be accepted as a legitimate reason for borrowing—at least this was indicated by the verbal presentation at Chicago. The length of loan is effectively limited by making all loans of short maturity, usually one week or less, and bringing greater pressure for repayment with each request for renewal. An attempt is made to encourage members to avoid borrowing, except for short periods when the alternative is a shortage of reserves, so as to enforce (or create) a tradition that banks do not borrow. The discount window cannot be used by member banks as a source of capital within the limits of current practice, although the continuing volume of borrowing during tight money periods indicates that it provides a source of funds for the system as a whole, if not for individual banks.[1]

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[1]Actually, the whole process can be likened to a game of "button, button, who's short of reserves this week?"

What it does accomplish is to assure members that they will not be forced to engage in distress sale of assets to meet unexpected reserve shortages.

By contrast, the Federal Home Loan Bank lending policies are quite clearly defined and permit members to use borrowing as a source of capital. Each member has a regular line of credit which varies with a number of factors, but will not exceed 25 percent of share capital. This line of credit can be used without question or need for justification for either short-term or long-term borrowing. The short-term loans are similar in nature to the Federal Reserve bank loans, except for the feature that they can be renewed automatically within the limits of the line of credit. The long-term loans are designed to provide capital, since they are amortized over a ten-year period. This means that a member savings and loan association can borrow to cover about half of the amount needed to make new mortgage loans (assuming the typical length of mortgages is twenty years) and repay the loan from amortization payments on the mortgages. This permits member associations to retain sufficient cash and government securities to protect their liquidity positions, while expanding mortgage loans more rapidly than deposits are increasing. In addition, each member association has an emergency line of credit

amounting to 50 percent of share capital (less any portion of the regular line that has been used). This part of the Home Loan Bank lending policy differs from that of the Federal Reserve banks only in the assurance that the door will be open at any time and in rigid upper ceiling. The rigid ceiling does not appear to be very restrictive, since any association that faces an emergency that would require it to borrow anywhere near to 50 percent of share capital is probably in enough trouble that access to credit will only make the death of the association less painful.[1]

The effect of central bank credit on the liquidity of its members depends in part on the ability of the central bank to supply the credit needed when the emergency is general, rather than restricted to only one of a few members. There is no question about the ability of the Federal Reserve banks to meet a serious emergency. The only restriction on their ability to create the credit needed is the gold reserve requirement. Even this could be changed by Congress at any time. The only reservations that might be made about the ability of the Federal Reserve to furnish enough credit to meet even the most severe crisis would be

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[1]For a general discussion of F.H.L.B. lending policies, see McKinley, Journal of Finance, XII No. 3.

related to the willingness of Congress or the Board of Governors to act quickly enough.

The Federal Home Loan Banks are unique. They could be classified as nonmember commercial banks, as nonbank intermediaries, or as a mixture of the two with some characteristics shared only by the Federal Reserve banks. They cannot expand credit as freely as the Federal Reserve System. Instead, they must obtain the resources needed from the private economy through one of two means. One source is deposits of member associations. To the extent that this method is used, the Home Loan Banks act like nonmember commercial banks and mutual savings banks. They create assets that meet liquidity requirements for their members, and use most of the assets acquired thereby to make loans to members. They also obtain resources by selling bonds in the open market. To the extent that this method is used, they act like nonbank intermediaries. These normal sources for funds are not likely to provide the resources needed to meet a general liquidity crisis among savings and loan associations. Members are more likely to reduce than to increase their deposits during a crisis. The security markets also are likely to be flooded then with existing securities, so that new securities could be issued only with considerable difficulty. However, the Home Loan Banks could still

obtain the money they would need, since they have access to the Treasury for emergency borrowing. Thus, we can conclude that the two central banking systems will be able to meet credit needs of their members even in a general crisis.

In addition to influencing the liquidity of members, central bank credit can influence the total amount of loanable funds and liquid assets available. This is quite obvious for the Federal Reserve System. When a Federal Reserve bank lends to a member bank, bank reserves and lending ability are increased. Federal Reserve policies are designed to prevent borrowing from providing an automatic source for reserves whenever banks desire to make more loans than existing reserves will permit. For this reason, we can say that present discounting policies seem to delay, but not to offset completely, the effect of monetary controls. When the Federal Reserve reduces member bank reserves, or increases reserve requirements, members will first borrow, and then curtail credit in order to repay the loans. Indeed, a given volume of reserves may provide less credit if some is obtained by borrowing than otherwise. Banks that have borrowed will be under pressure from the Federal Reserve to curtail credit, if the Federal Reserve restrictions are at all effective. Other banks may be more reluctant to expand, even if

they have excess reserves, because they know that others are contracting and their own reserves may be reduced as a result. However, Federal Reserve policies may be less effective if banks borrow for profit. Current regulations will prevent any one bank from remaining in debt perpetually, but cannot prevent transfer of the indebtedness from bank to bank.

Federal Home Loan Bank credit acts partly to increase the volume of credit, but its greatest influence is on the direction rather than the amount.[1] Funds raised by issuing securities must be supplied elsewhere, and the securities must be sold in competition with other borrowers. Funds obtained via member association deposits do influence the amount of credit available. Like private intermediaries, the Home Loan Banks will retain a fraction of the amount as a cash reserve and lend the rest. Unlike the Federal Reserve banks, they try to maintain a loaned-up position at all times, adjusting largely by changing the amount of securities they sell. The only question remaining is whether they create loanable funds, in the manner of commercial banks, or influence the velocity of circulation, in the manner of the mutual thrift institutions. Our answer will depend on whether or not Home Loan

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[1] Ibid.

Bank deposits are money. We have a borderline case, following the definition of money we have used. Home Loan Bank deposits do not circulate as a medium of exchange in the same way that demand deposits are used. However, they are virtually perfect substitutes for money as far as member associations are concerned. Associations normally grant withdrawal requests, or make loans, by writing checks on a nearby commercial bank. They must maintain balances large enough to cover the typical daily business. The rest of their cash reserves can be left in interest-bearing time deposits at the Home Loan Bank. These deposits can be converted to demand deposits by a telephone call, and cash obtained almost immediately by writing a draft on the Home Loan Bank. This makes them the equivalent, or nearly so, of a medium of exchange for member associations. Since these deposits have the same relationship to demand deposits for member associations that time deposits have for individuals,[1] they should be classified as near-money. On this basis, we can say that the Home Loan Banks do not create loanable funds, but

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[1]The Home Loan Banks offer both demand and time deposits. The majority of their deposits are interest-bearing time deposits, on which notice can be, but normally is not, required.

induce member savings and loan associations to provide loanable funds at the expense of cash reserves.

Intermediaries that are not members of a central bank system may also be able to borrow. Most intermediaries maintain balances at correspondent commercial banks. Some of them—including nonmember commercial banks and savings and loan associations—are able to obtain short-term credit from their correspondents. However, this type of relationship will have much less effect on liquidity than does access to central bank credit. If the intermediary faces an emergency great enough that it can remain solvent only if it can borrow, the correspondent is likely to be unwilling to extend credit—the risk is too great. In a general liquidity crisis, the correspondent may well be unable to provide credit even if it is willing to do so.

Impact on Reserve Ratios

The depository-type intermediaries maintain reserves because they cannot afford to be caught in a position where they are unable to meet requests for withdrawals, and it is too expensive to meet day-to-day changes in deposits by adding to or selling from the portfolio. Except for the required reserves of member commercial banks, reserves will be adjusted primarily to

past account experience. From experience, plus knowledge of loan commitments, the manager can determine a probability distribution[1] for the net flows of cash into or out of the institution. He can then set an acceptable level of risk that reserves will be insufficient to cover these flows.[2] The probability distribution and the level of risk define the amount of reserves needed.

Ability to borrow will influence the volume of reserves primarily by changing the level of risk that the institutions are willing to assume. The risk level would presumably be selected by balancing the cost of being caught without enough reserves against the cost, in terms of interest lost, of maintaining the reserves. The cost of a shortage may take three forms. For member commercial banks, there is a penalty assessed for not maintaining the required level of reserves. This is probably the least drastic of the three. There may also be a cost in the form of a capital loss resulting from the necessity of liquidating part of the

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[1] It is unlikely that a bank manager actually has a specific distribution in mind, but generally he will have some idea about how likely certain events are to occur.

[2] See Patinkin, Money, Chapter VII, and Appendix 6 (by Argeh Dvoretsky) for a treatment of a similar problem for individuals. The process described fits banks and mutual thrift institutions, with one exception. No depository can reduce to zero the probability that balances will be insufficient unless it can eliminate any chance for a run.

portfolio quickly in order to meet withdrawals. Finally, if the institution is unable to liquidate securities or obtain cash from other sources rapidly enough to meet withdrawals, it may be forced to liquidate completely. The managers are likely to assign a very high value to the loss associated with failure of the institution. On the other side, runs occur rarely, and optimistic or inexperienced managers are likely to underestimate the probability of substantial withdrawals. The history of bank failures shows that bankers frequently have failed to provide adequate cash reserves. Both the tendency for conservatively managed institutions to survive crises that have forced less conservative institutions to close and regulations imposed by law and supervisory agencies seem to enforce a desire to maintain enough reserves to protect against failure in all except the most unlikely events.

Once the managers are assured that they can borrow to meet emergencies, the chance that they will be forced to close or to liquidate the portfolio under distressed conditions is substantially reduced. This would indicate that the effective reserve ratio would be reduced by providing an assured source of credit.

An attempt was made in the statistical study to determine whether borrowing, or willingness to rely on borrowing ability

as a source of liquidity, actually influences cash holdings. The results are largely negative. None of the regression studies revealed any significant relationship between cash holdings and the actual amount borrowed. This is not surprising, since an increase in actual amount borrowed means a reduction in borrowing ability, while cash will normally be increased in order to repay the loan when maturity approaches. This effect may well be canceled to a degree, since an increasing volume of borrowing, either at different times or between groups at the same time, may also indicate an increasing awareness of the importance of the ability to borrow.

A better check was made for member savings and loan associations at the Federal Home Loan Bank of Indianapolis. Since some associations (like some member banks) never exercise their borrowing privilege, we can obtain a basis for comparison. These associations that will not borrow can be expected to behave in a manner similar to those that do not have access to borrowed funds. For our purposes, associations were classified as borrowers if they had borrowed on any of the three annual report dates for which data were available. Unfortunately, the "nonborrower" classification includes three groups, only one of which should be included. We want, and get, those associations that will not

borrow under normal conditions. But we also get those that defer borrowing until just after the annual report date in order to publish a balance sheet showing no borrowing, and those "borrowers" that were fortunate enough not to need to borrow on any of the three dates. A contingency table was prepared, using the ratio of cash to share capital as the second variable. The deviation from the results that would be expected if there is no difference in cash holdings because of borrowing ability was in the direction expected, but it is not statistically significant. Further, the deviations that were observed could be explained on the basis of differences in size distribution of the two groups.[1] The wide spread in the cash ratios for "non-borrowers" probably reflects, in part, the anticipated low level for those associations that will borrow on occasion—especially those that reduce cash for the purpose of showing no borrowing on the published balance sheet. A better comparison could be made if data could be obtained for nonmember associations, thereby adding a third classification. The form in which data for member banks were made available does not lend itself to a comparison of this nature. A comparison for nonmember and member banks could not be made directly until the effect of the

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[1] See Table 67, p. 266, and further discussion on p. 188.

reserve requirements imposed on member banks could be eliminated.

Net Effect of the Discount Window

We are primarily interested in the impact of access to borrowing on the effectiveness of monetary controls. First, we can say that policies of the Federal Home Loan Banks will have little net effect. Even though no direct restraint is imposed on borrowing by members, the net result is primarily to influence the direction rather than the amount of credit available.[1] Since the Home Loan Banks must normally obtain the funds in the open market, they can ease restraint on mortgage credit only by acting to increase restraint elsewhere. The present policy could make monetary policy less effective than it would be otherwise if housing construction is more sensitive to credit conditions than investment financed through issues of new securities. Home Loan Bank lending policies make it possible for member associations to escape the restrictive effect of tight money by borrowing, thereby forcing the Home Loan Banks to issue more securities and tightening that market. It is possible that tightening credit in the

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[1] McKinley, Journal of Finance, XII No. 3.

mortgage field would cause a substantial reduction in construction, while a tightening of securing markets would act mainly to reduce hoanrds, with a minor impact on spending. Even this effect would matter only if it enables home buyers to escape the effect of credit rationing. In any case, the major ground on which the lending policies of the Home Loan Bank System should be judged is the social desirability of housing construction, and the encouragement given by the savings and loan system.

The Federal Reserve discount window could clearly weaken, and perhaps cripple, any effort to control the money supply and credit. If member banks were permitted to borrow as much as they wanted to, they might act to maximize profit. This would require them to borrow until the discount rate equals the net return on loans, subject to the restraint of any tradition against borrowing that would persist without official enforcement. Borrowing by banks, and hence the money supply, could then be restrained only by imposing a penalty rate.[1] Otherwise the discount window would work in the same manner as the postwar policy of stabilizing the prices of government securities—banks could obtain the reserves needed to cover any feasible amount of lending.

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[1] See Warren L. Smith, "The Discount Rate as a Control Weapon, Journal of Political Economy, LXVI No. 2, pp 171–77.

There remains the possibility that banks would not borrow in very large amounts, regardless of profitability. Riefler suggested that the major deterrent to member bank use of the discount window was the long-standing tradition that banks do not borrow.[1] Alhadeff re-examines the arguments and the data a generation later, and concludes that profit does influence borrowing. This is in part reached deductively, since the conditions that Riefler cites as causing the tradition against borrowing have largely been eliminated by existence of the Federal Reserve System. The main reason for avoiding borrowing, except in case of definite need, was that other bankers would conclude that you are not following sound practices, and therefore might refuse to lend just when you need it most. This may still have affected strongly the reactions of bankers when Riefler wrote in 1930, but most of today's bankers are accustomed to the freer lending policies of the Federal Reserve.[2] The available data indicate that need has continued to be a major factor determining member bank borrowing, including the period since that covered in Alhadeff's study.

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[1]Winfield W. Riefler, Money Rates and Market Rates in the United States (New York: Harper & Bros., 1930), Ch. II.

[2]David A. Alhadeff, Monopoly and Competition in Banking (Berkeley: University of California Press, 1954), Ch. IX. Note particularly his examination of borrowing data, p. 168.

The evidence is not sufficient to justify rejecting profit as a consideration. Federal Reserve policy pronouncements, however, seem to be designed to keep alive something of a tradition against borrowing, or at least against remaining in debt for long.[1]

There is also the possibility that profit considerations may be important even if banks borrow only from need. We indicated above that access to credit probably reduces the amount of excess reserves held by banks because the cost of being caught short of reserves is reduced. Variations in reserve balances can be treated as a random variable, with the bank simply accepting some degree of risk that it will be caught short of reserves. If the cost of borrowing affects the level of risk accepted by individual banks, then any common distribution of net changes in reserve balances among all banks will cause it also to affect the total amount of borrowings. Only a tradition that sound banks never borrow could prevent the cost of borrowing from having some influence on the level of reserves.

Our conclusion is that profit probably is a factor in member bank borrowing, but that present Federal Reserve policies are designed to prevent any individual bank from using the

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[1] Smith, Journal of Political Economy, LXVI No. 2.

discount window as a source of permanent funds. Once a bank borrows, regardless of the initial motive, it is also forced to repay the loan fairly quickly. This is usually accomplished by selling government securities from its portfolio, although lending might be curtailed or loans called. Sale of securities enables the selling bank to obtain reserves from some other bank, repay the loan, and thereby to reduce the total amount of reserves available to the banking system. It is possible that at least part of the resulting restraint on other banks will be cancelled by new borrowing, or that the reserves will come from some bank that already had more reserves than it wanted to keep. When restraint is initially imposed on bank reserves after a period of relative ease, the latter outlet is likely to provide reserves for banks that want to expand. However, the amount of such excess reserves will be limited, so that eventually the result must be restraint on bank lending or repeated borrowing by different banks. Repeated borrowing by different banks could conceivably still provide funds for continued lending. The next section will examine the possibility that this could actually occur under some conditions. However, the record of interest rates, bank loans, and member bank borrowing in recent years indicates that the Federal Reserve can impose some restraint.

Present lending policies probably do result in a lag between the time the Federal Reserve undertakes open market sales and the time that bank loans are affected. This additional lag may or may not be important, depending on how the banks react to changes in their reserve position. A bank facing withdrawals may obtain the reserves in three ways. First, the bank may simply absorb the loss from existing excess reserves. If excess reserves for the banking system are large enough for this to provide most of the funds required, the Federal Reserve is probably trying to absorb them to eliminate a potential expansion rather than to reduce credit, and the timing of the impact will not matter as much as it will when a reduction on credit is desired. Banks may also meet the withdrawals by restricting lending or selling securities immediately. In this case, there is little or no time lag introduced by the banking system. Finally, the banks may borrow in order to meet the shortage, acquiring the funds to repay the loans by selling securities at a later time.

Use of the discount window to meet withdrawals will introduce a time lag, with the length of the lag dependent on the average time between borrowing and repayment and the portion of any withdrawal that is covered by new borrowing. The average maturity of discount window borrowing probably is in the neighborhood

of the reserve reporting period (one or two weeks), but could be longer or shorter. Some banks might borrow just to cover the loss for one day, and sell securities the next day. On the other hand, some banks may stay in debt to the Federal Reserve continually for several months, through successive renewals of the loan. The average maturity could lie anywhere within this range, and is not necessarily the same at all times. The discount rate could influence the average maturity, since a rate that would make it profitable to borrow would also induce the borrowing bank to defer repayment as long as Federal Reserve policy permits, while a higher rate would provide an incentive to repay as quickly as possible.

The amount of lost reserves absorbed will depend partly on the reserve requirement. A fraction of the lost reserves will come from reduced required reserves, and the balance met by borrowing and/or selling securities. Therefore with each repayment, actual bank credit will be reduced by an amount at least equal to the previous balance times the reserve requirement. If the only amount absorbed each time is the amount by which required reserves are reduced, and restraint is imposed through open market sales, the portion repaid at the end of the t'th time period will be $r(1-r)^t$. The portion still covered by borrowing

would then be $(1-r)^{t-1}$. Weighting each time period by the amount repaid, we find that the average time lag from open market sales to the reduction of bank credit and deposits is given by $\frac{1-r}{r}$, with time measured in units equal to the average maturity of bank borrowing. If the average reserve requirement is 15 percent, the average time lag will be five and two-thirds such periods. If the average reserve requirement is 20 percent, or if banks absorb enough of the loss to raise the net repayment to that amount, the average time lag is four periods. With the 15 percent repayment, if the average maturity is a matter of one or two business days, we get a time lag of one or two weeks, which should not be crucial. If the average maturity is between one week and two weeks, use of the discount window will introduce a lag of about two months. This much lag may not be important by itself, but might provide a serious complication when added to the other time lags that would exist anyway. If the average maturity is measured in months, the time lag introduced in this way could be serious even in the absence of other time lags.

CHAPTER IV

THE MUTUALS AND MONETARY POLICY

Restraint on the Mutuals

The mutual thrift institutions are not subjected to the type of quantitative controls imposed on commercial banks. Since their obligations are good substitutes for money, they provide a possible means by which the public can avoid the effects of monetary policy on liquidity and availability of loanable funds. The question that must be answered is: Are these intermediaries sufficiently affected by monetary conditions that an effective restraint can be imposed on liquidity and credit simply by controlling the quantity of money? The answer appears to be that they are subject to some restraint. The information that we have does not justify an absolute conclusion about the degree of restraint.

The only control now imposed on the mutuals is the willingness of individuals to hold obligations of these institutions in preference to other assets that are available. This can be viewed from the other side as restriction on the ability of the

mutuals to expand credit imposed by limitations on their ability and willingness to pay enough interest on their obligations to attract the funds. In Chapter II, we developed a credit multiplier on the assumption that the public chooses to maintain a given ratio between demand deposits and mutual claims.[1] As stated there, the assumption of a constant proportion leads to the conclusion that fairly effective restraint is imposed on credit simply by controlling bank reserves, but with a larger coefficient for multiple expansion of credit based on bank reserves. The marginal effect on the expansion of credit may be slight, since existence of any uncontrolled near-money (including government savings bonds) will give the public a means of obtaining substantial liquidity with some interest return.

However, our assumption of fixed proportions will not always hold. Control over the money supply implies also control over interest rates. Since the market value of claims with a fixed rate of return will be reduced by an increase in the rate of interest, market value of these assets will be affected by monetary policy. To some extent, the demand for money or liquid assets is related to the total value of all assets held.

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[1] See p. 59 ff.

If the value of other assets is not changed, this implies that a rise in the rate of interest will reduce the demand for money, even if the demand for money is not directly affected by interest. Some offsetting effect may occur because the change in market value also changes liquidity. The most liquid assets, including money and mutual claims, are of fixed dollar value or of short maturity, and so will not be affected. However, those who rely on long-term bonds for liquidity may be induced to increase holdings of money when interest rates rise.

Perhaps more important, changes in the rate of interest also change the ability of the mutuals to attract funds by increasing dividend rates. Rates they charge on loans will change in the same direction as other rates. In addition, they may be enabled to shift some of their portfolios from government securities to relatively more profitable loans, since tight money will arise from an increase in the demand for loans, which commercial banks cannot supply. Both factors will make it possible for mutuals to increase dividend rates, while the former provides an incentive to do so. With a higher rate of return on near-moneys, and a constant (zero) rate of return on money, we can expect some individuals to shift from demand deposits to shares of mutuals. They are willing to take more risk that they will be forced to take the

bother of converting shares into money in order to meet current payments because the compensation is greater.[1] Such shifts do not affect the banking system, since the intermediaries or their debtors normally continue to hold demand deposits. The net effect is to provide some leakage from monetary controls, thereby requiring a larger change in bank reserves to achieve a given change in spending.[2]

This indicates that the degree of leakage is greater than would occur with a constant ratio between holdings of money and near-moneys. The data presented in Table 2, page 38, confirm this, but also indicate a degree of restraint is obtained. Data on bank debits can give us some information about active balances. The figures are shown in Table 4.

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[1] See James W. Angell, "The Monetary Standard: Objectives and Limitations," American Economic Review, XLVIII No. 2, pp 76–87; George Garvey, "Structural Aspects of Monetary Velocity," Quarterly Journal of Economics, LXXIII No. 3, pp 429–47; John G. Gurley, "Liquidity and Financial Institutions in the Postwar Economy," U.S., Congress, Joint Economic Committee, Study of Employment, Growth, and Price Levels, Jan. 25, 1960, Study Paper No. 14; Morishima, Econometrica, XX No. 2; Smith, Quarterly Journal of Economics, LXXIII No. 4; Leonard W. Weiss, "A Note on Time Deposit Interest Rates," Journal of Finance, XIII No. 1, pp 96–102; and Tobin, Review of Economics and Statistics, XXIX No. 2.

[2] See Aschheim, Journal of Political Economy, LXVII No. 1; Gurley and Shaw, Money . . ., p. 240; and Nicholas Kaldor, "The Radcliffe Report," Review of Economics and Statistics, XLII No. 1, pp 14–19.

TABLE 4.—Turnover of bank deposits.

Year	Bank Debits to Demand Deposits[a]		Percent Change in Demand Deposits, Member Banks[b]
	Amount ($ billion)	Percent Increase	
1953	1759		
1954	1887	6.7	3.5
1955	2044	8.3	5.2
1956	2201	7.7	1.3
1957	2357	7.1	-1.0
1958	2440	3.5	4.8
1959	2679	9.8	1.2
1960	2839	6.0	-1.4

Source: Federal Reserve Bulletin.

[a]All centers, excluding interbank and U.S. government deposits.

[b]From Table 2, with 1960 added.

Some additional information may be obtained by examining deviations from a trend line. Such trends were fitted for member bank demand deposits, bank debits, member bank time deposits, mutual savings bank deposits, savings and loan associations share capital, and assets of life insurance companies. In each case, a linear least-squares trend line was fitted. When the data indicated that the amount of growth was increasing on the average, a logarithmic (constant growth rate) trend line was fitted. When the results indicated that the rate of growth was declining, the average of the two trends was computed. The line with the smallest average deviation was used in each case. For life insurance companies and savings and loan associations, closer fits could have been obtained by using logarithmic trends, but with a lower rate of growth after 1955 or 1956 than before. The results are shown in Table 5.

There are only a few places where the data show significant results. We note that in every case the direction of the deviation of bank debits from the trend is the same as for demand deposits in the previous year. This does not indicate a year lag, since the deposit figures are for the end of the year, while debit figures are totals for the year. We also note that the direction of movement for member bank time deposits was

TABLE 5.—Deviations from trend.[a]

Year	Demand Deposits[b]	Bank Debits[b] ($ trillion)	Time Deposits[c]	Mutual Savings Banks[b]	Savings & Loan Assns.[d]	Life Insurance Assets[b]
1951	-1,270	e	+ 228	- 97	+1,048	+745
1952	+ 600	e	+ 338	-190	+ 192	+108
1953	-1,822	+19	+ 342	-143	- 321	-469
1954	- 465	- 6	+ 615	+ 53	- 234	-250
1955	+2,761	- 2	- 819	+117	- 5	- 38
1956	+1,994	+ 2	-1,911	+194	- 2	-193
1957	-1,311	+ 5	- 505	+ 84	- 640	-629
1958	+1,758	-65	+2,020	+665	- 438	+ 93
1959	+ 799	+20	+ 230	-162	- 256	+243
1960	-3,045	+27	+ 564	-557	+ 324	+576
Correlations with Demand Deposits						
No lag		-.54	-.26	+.69	-.21	-.18
Deposits lagged . .		+.71	-.67	-.20	-.21	-.10

[a]Based on end-of-year data from Federal Reserve Bulletin. All data in $ million except for bank debits, in $ trillion.

[b]Form of trend, linear least squares.

[c]Form of trend, logarithmic least squares.

[d]Form of trend, average of the above two.

[e]Not computed.

opposite to the movement of demand deposits for the previous year in every case except 1953. From linear correlations, we find that reasonably large positive correlations are obtained for bank debits with deposits of the previous year, and for mutual savings bank deposits with demand deposits for the same year. A large negative correlation was found for member bank time deposits with demand deposits for the previous year. Correlations for savings and loan associations and life insurance companies were small enough to indicate that they are not directly affected in either direction. The negative correlation for bank debits with demand deposits of the same year apparently indicates that the Federal Reserve follows consistently a policy of tightening bank reserves when business activity is rising, while the lagged relationship indicates that this subsequently causes restraint on activity. The behavior of deposits at mutual savings banks also indicates some re-enforcement of the impact on demand deposits. We may also point out that mutual savings banks, savings and loan associations, and life insurance companies moved in the same direction as demand deposits, relative to trend, more frequently than they moved in the opposite direction. However, for the latter two the correlation was still negative.

There are two pieces of evidence that point to possible causes of weakness for monetary policy. One is the negative correlation between demand and time deposits. However, the impact on time deposits follows only after a one-year lag, and could easily be a spurious correlation arising from cyclical patterns. The other indication of weakness is the high rate of growth of some nonbank financial institutions, particularly savings and loan associations, during this period. The growth that has occurred must be attributed to existence of higher interest than on other near-moneys and vigorous advertising campaigns. There are two elements to consider, one of which is not caused by monetary policy actions. The concentration of savings and loan funds in the mortgage market, coupled with high demand for residential housing and increasing use of mortgage credit, and particularly conventional mortgages in place of those insured by federal agencies, would have caused some of this growth regardless of other monetary conditions. Under the same conditions, growing public familiarity with savings and loan associations, coupled with advertising, would normally have attracted funds without interest rate differentials.[1] On the other hand, the restraint

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[1]Theodore R. Eck, "Personal Liquid Savings in the Seventh Federal Reserve District" (unpublished Doctoral dissertation,

imposed on commercial bank ability to compete for mortgages and for savings accounts by Federal Reserve policy actions probably helped. The differential on the return available from savings and loan shares and other near-moneys has probably been somewhat larger than it would have been with lower interest rates and easier bank reserves. At the same time, the high and rising level of interest rates may have aided the learning process mentioned above, increasing the flow of funds into savings and loan associations. This, coupled with the evidence from Table 5, indicates that savings and loan associations, along with other intermediaries, do not create difficulties for monetary controls at the time, but might make counter-cyclical monetary policy more and more difficult through time, and could reduce the effectiveness of a policy designed to curb inflation on a long-run basis.

The evidence available is most consistent with the hypothesis that the nonbank financial intermediaries are neutral with respect to counter-cyclical monetary policy. They apparently are not affected in such a way as to re-enforce the impact of policy changes on banks. However, they also apparently do not react

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Michigan State University, 1959), shows that advertising expenditures provide an effective alternative to increased interest or dividend rates as a method of attracting accounts.

so as to cancel the impact on banks. Most of the effect on the ability of banks to lend and to expand deposits remains. Monetary restraint can still be effective if it is carried far enough. If we are concerned only with the cyclical effect, and not the long-run impact, our evidence tends to support the conclusion that control over the mutuals is not essential.[1] We may also note that if the mutuals need not be controlled, then the time deposit departments of commercial banks also need not be controlled. The effect of time deposits is the same as that of mutual shares. On the other hand, if the Federal Reserve is unwilling or unable to carry restraint on bank reserves far enough to be fully effective, or if monetary policy is to be used to fight long-run inflationary pressures, then any added degree of control may be desirable.

Monetary control must achieve most of its effect by preventing some deficit spending units from obtaining financing during

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[1]This conclusion is reached by Aschheim, Journal of Political Economy, LXVII No. 1; the British Radcliffe Report (see Kaldor, Review of Economics and Statistics, XLII No. 1); McKinley, Journal of Finance, XII No. 3; and Smith, Quarterly Journal of Economics, LXXIII No. 4. The opposite conclusion is reached by John G. Gurley, "Financial Institutions in the Savings-Investment Process," Proceedings of the 1959 Conference on Savings and Residential Financing (Chicago: The United States Savings and Loan League, 1959), pp 12–28; and Charles F. Heywood, "A Comment on 'the Federal Home Loan Bank System and the Control of Credit,'" Journal of Finance, XIII No. 4, pp 542–44.

tight money periods that would be obtained if money were easy. It makes little difference so far as effectiveness is concerned whether this is achieved by pricing some borrowers out of the market by forcing interest rates to rise, or by causing lenders to refuse more requests. In either case, the initial impact must fall on the ability or the willingness of financial institutions to lend. Initially, of course, Federal Reserve actions affect the ability of commercial banks to lend by changing their reserve position. Indirectly, other lenders will also feel the effect. First, any lender that continues to grant loan requests during a period of expansion and inflation (when money normally will be tight) will find his portfolio becomes less liquid, and probably riskier, unless this is accompanied by a sufficiently large increase in total assets to maintain the same mix of assets in the portfolio. A contraction, with easy money, will reverse this effect. The liquidity position may be further impaired during tight money because rising interest rates will reduce the market value of long-term securities. This will generally affect most the non-bank intermediaries, since they typically rely on long-term government securities for secondary reserves, while commercial banks are more likely to hold shorter maturities. The impact on secondary reserves may cause some lenders to be less willing

to lend, perhaps increasing cash reserves to compensate for the loss of liquidity in secondary reserves. Finally, lenders can finance expansion only by obtaining more funds or by disposing of secondary reserves.

Ultimately, then, tight money will restrict the demand for current output unless the public is somehow induced to supply more loanable funds out of idle money balances, or possibly by increasing the velocity of active balances. If the public is induced to supply more funds out of increased saving, we have no problem—the impact simply falls on consumption instead of investment, or on consumption by households that are saving instead of those that are dissaving. The leakage can take three forms, with intermediaries directly responsible for only one. First, the public may accept more private debt. In this case, higher interest rates must cause the public to accept less liquidity—liquidity preference must be sufficiently interest-elastic for rising interest rates to bring new funds into the market without substantially reducing the demand for funds. Secondly, the public may be induced to buy government securities that have served as secondary reserves for financial institutions. This will normally have less effect on liquidity, but will enable the financial institutions to expand credit. Finally, the public may be induced to hold more

obligations of nonbank intermediaries, thereby increasing the availability of credit. Control over nonbank intermediaries, to be effective, must reduce the amount of leakage through the third outlet, without transferring the funds to one of the first two outlets.

In Chapter I it was argued that financial intermediaries do increase the interest-elasticity of liquidity preference. Because they provide assets that the public finds to be quite liquid, they make it easier for the public to transfer idle money balances to a form that makes the funds available to deficit spending units. Any form of control over these intermediaries would reduce either the possibility or the profitability (to the intermediaries) of inducing such transfers. If the mutuals, in particular, could be prevented from expanding, or from raising dividend rates so as to attract funds, this one outlet could be blocked up to some extent. The difficulty of increasing the effectiveness of monetary policy by this method is that some of the leakage might occur through other methods.

The problem of the effectiveness of controls imposed only on banks is a result of the existence of other close alternatives. Commercial banks are a logical target for controls partly because of their size. More important, they are controlled because

demand deposits are important, tradition, and the alternatives are not perfect substitutes. Currency can be substituted, of course, but bank reserves will then be reduced, so that controls are not made less effective. Near-moneys can be substituted, and this is the cause of the leakage we are examining. However, a great deal of the substitution of near-moneys for idle balances that can be expected will probably occur at fairly low interest rates. The evidence cited in Chapter I indicates that liquidity preference is not very elastic, so that further shifts can not be induced very easily. As soon as near-moneys are dealt with, the picture changes. The near-moneys provide very close substitutes for each other. Selecting one, or any group. of these assets for inclusion within the realm of monetary controls might leave a substantial portion of the leakage unaffected. Thus inclusion of commercial bank savings deposits within the control mechanism appears to be less effective than it would be in the absence of the mutuals. Under present circumstances, if present controls prevent commercial banks from inducing the public to supply more loanable funds during tight money periods, this simply makes it easier for the mutual thrift institutions to attract these funds. The effect falls more on the relative rates of growth than on the volume of funds made available. Restraint on commercial bank

reserves (and interest rates) permits other intermediaries to attract the funds more easily than they otherwise could. Even if all of the mutuals would be covered by effective controls, we would still have one obvious outlet available—government savings bonds. Failure to subject savings bonds to the same type of control would leave ample means for the public to obtain the desired liquidity, simply by accepting these bonds instead of mutual shares. The funds would no longer be channeled through intermediaries, but would instead reach borrowers indirectly through the reduced treasury demand for funds in other markets. Effective control is obtained through the treasury's refusal to raise the interest rate on savings bonds when other interest rates rise. This would not prevent a shift from idle balances to near-money from occurring, but it would remove the inducement for such shifts. The one remaining incentive for shifts would be that the public could not otherwise acquire the desired volume of liquid assets.

Some leakage would still occur even if the mutuals were controlled, and interest on savings bonds were stabilized, caused by rising market interest rates. The public could still acquire marketable government securities, primarily treasury bills, and such other forms as repurchase agreements with government bond

houses and commercial paper. These outlets cause less concern about the effectiveness of controls over the mutuals than do savings bonds, since the normal unit of trading is substantially larger. Some of the funds that are now provided through the mutuals might move into treasury bills, but the two markets are sufficiently separated that control over the mutuals could still be effective. We would simply not prevent the leakage that now occurs through our first two outlets if we try to stop the third.

A comment on the impact of the Federal Home Loan Banks on credit restrictions seems appropriate at this point. As stated above, they function in much the same way as nonmember commercial banks, except that they hold only deposits for member associations. Because they pay interest on funds that are available on demand, they provide members with a source of income on assets that remain part of cash reserves. Since they maintain a loaned-up position at all times, they effectively insure that any funds deposited will become loanable funds (except for the amount held in reserves), either directly through loans to other members or indirectly through a reduction in Home Loan Bank security issues. They will also influence member association holdings of other reserves in the same way that the associations influence holdings of money by the public. Like the associations, they hold

cash reserves in the form of demand deposits at commercial banks, and so constitute another step between Federal Reserve credit and the final market. They provide another source for a reduction in the degree of effectiveness of monetary policy.

Competition for Savings Accounts

Much of the above material, and much that follows, relates to the potential effect on credit of shifts of public holdings from one form to another. We are particularly interested in the effects of shifts between commercial banks and the mutual thrift institutions. To obtain a better picture of the effect, we will indicate the actual amount of change in credit of various possible shifts, in terms of effective reserve ratios. Then we will examine the competitive position of the mutuals relative to commercial banks, particularly considering the differential effect as monetary conditions change.

Of the possible shifts of public holdings, the one with the greatest effect—and the one that has been given most attention above—is that from idle demand deposits to mutual shares. If X dollars of individual holdings are shifted in this way, liquidity and credit will expand by $(1 - r_s)X$ where r_s is the effective reserve ratio for the mutuals. Since commercial bank time deposits

are quite similar to share accounts, we can also expect some shifting from demand deposits to time deposits. This will reduce commercial bank required reserves by a factor $(r_d - r_t)$, where r_d is the reserve ratio for demand deposits, and r_t is the reserve ratio for time deposits. The resulting improvement in the reserve position of banks will bring an expansion in bank credit by a factor of $1/r_d$. The net effect on liquidity and credit is $(1 - \frac{r_t}{r_d})X$, which will normally be less than the expansion factor for shifts to shares of the mutuals. We may also observe some shifts between time deposits and mutual shares. This will enable the mutuals to expand credit in the same way as a shift from demand deposits, but will affect commercial banks in the same way as a shift from time to demand deposits. Credit by the mutuals will expand, while credit by commercial banks will contract. The net effect is $(\frac{r_t}{r_d} - r_s)X$, which will be positive unless the reserve ratio for time deposits is substantially less than that for mutual shares.[1]

All of the above is based on the assumption that the Federal Reserve System will not react to any of the shifts by changing member bank reserves. This will not necessarily be the

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[1] See Smith, Quarterly Journal of Economics, LXXIII No. 4, Table 1, and Shelby, Journal of Finance, XIII No. 4.

case. If the Federal Reserve attempts to maintain a given level of reserves, the analysis given above will hold. If the Federal Reserve attempts to maintain a given level of demand deposits, shifts from demand deposits to mutual shares will have the expansionary effect indicated above, the multiplier for shifts from demand to time deposits will be increased by one, while the multiplier for shifts from time deposits to mutual shares will be reduced by one, so that such shifts would become contractionary rather than expansionary. If the Federal Reserve looks at the reserve position of member banks, the expansionary effect of shifts from time deposits to mutual shares will be increased, and that for shifts from demand to time deposits will be reduced.

The competitive position of commercial banks relative to the mutuals for savings accounts is likely to be changed during periods of tight money. This is partly a result of the ceiling imposed on time deposit interest rates for member banks. Once this interest ceiling is reached, banks can no longer compete for savings accounts on a price basis. The mutuals are also subject to some restraint on dividend rates, but in most cases this amounts to a minimum differential between average rate of return on the portfolio and the dividend rate. This means that the ceiling on dividend rates continues to rise as long as the money

supply is restricted, so that the mutuals can continue to use price competition to attract new funds.

There is some question about the profitability for banks of competing vigorously for time deposits. Banks may have permitted the mutuals to increase savings accounts at their expense because it would have been unprofitable for them to increase interest rates paid on such accounts.[1] Carson justifies the degree of competition from banks that we have experienced only on the basis of restrictions on mortgages (which are tied to time deposits) and fear of or actual competition from other banks. On this basis, the ceiling imposed on commercial bank time deposit rates becomes a device to protect bank profits by forcing them to act as though they are in collusion, even though it may not have prevented competition from reducing bank profits during 1957.[2] There is some doubt about some of the statistical methods used, but the argument is probably true. Competition for savings accounts is particularly likely to be carried past the point of

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[1] See David A. and Charlotte P. Alhadeff, "A Note on Bank Earnings and Savings Deposit Rate Policy," Journal of Finance, XIV No. 3, pp 403–11; Aschheim, Journal of Political Economy, LXVII No. 1; Deane Carson, "Bank Earnings and the Competition for Savings Deposits," Journal of Political Economy, LXVII No. 6, pp 580–88; and Smith, ibid.

[2] This is the conclusion reached by the Alhadeffs.

maximum profits if Baumol's conclusion that most business firms try to maximize sales, provided a minimum acceptable level of profits is achieved,[1] applies to commercial banks.

The ceiling imposed on interest rates for member bank time deposits will affect bank behavior only when other interest rates are high enough that banks would otherwise choose to pay higher rates. Such levels will be reached, if at all, during tight money periods. Once interest rates reach this level, member banks are prevented from inducing transfers from demand deposits to time deposits, and from countering the inducement offered by the mutuals, by raising their own interest rates. Therefore, we would expect that most of the leakage from monetary policy resulting from existence of near-moneys would arise from the operation of nonbank intermediaries, rather than commercial bank time deposits.

Evaluation of Intermediaries and Monetary Controls

The effectiveness of monetary policy as a method of controlling the economy has been disputed on several grounds, of which the importance of nonbank intermediaries is one. We will

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[1] William J. Baumol, "On the Theory of Oligopoly," Economica, N. S. XXV No. 99, pp 187–98.

discuss first the impact of intermediaries and then the impact of central bank lending.

Financial intermediaries apparently reduce the impact of any given action designed to influence the money supply because they increase the interest-elasticity of the demand for money. Because they exist, a given change in the money supply will have less effect on spending and more effect on velocity than would occur in their absence.[1] The fact remains that if demand for money is not perfectly elastic with respect to the rate of interest, and the demand for current output is not completely inelastic with respect to the rate of interest and the availability of credit, the monetary authority can achieve the desired impact on spending simply by carrying the restriction or expansion of bank reserves far enough.[2] It is even argued, by Ritter, that the changes in velocity are desirable because they help to avoid a sudden financial crisis.

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[1] See Angell, American Economic Review, XLVIII No. 2; Lydall, Review of Economics and Statistics, XL No. 1; Smith, Quarterly Journal of Economics, LXXIII No. 4; and Thomas Wilson, "The Rate of Interest and Monetary Policy," Oxford Economic Papers, N. S. IX No. 3, pp 235–60.

[2] See Lawrence S. Ritter, "Income Velocity and Anti-Inflationary Monetary Policy," American Economic Review, XLIX No. 1, pp 120–29.

There remains the possibility that, with investment demand fairly inelastic, presence of the mutual thrift institutions will increase the amount of restriction on the money supply required to prevent inflation beyond the limits of action that the central bank is willing to take. Particularly if it is felt that restriction on the banking system past a certain point could create a dangerous situation, the Federal Reserve may limit its actions to a degree that would leave them only partially effective. If this occurs, monetary controls would be relegated to a minor role in the control of the economy. Intermediaries then would not be the sole cause of the difficulty, but rather would complicate a situation that would exist to a degree in their absence. At the same time, the intermediaries would be the element that would be most susceptible to control. Structural elements that make spending fairly unresponsive to interest rates, and create dangers if bank reserves are restricted sufficiently to prevent inflation, are not readily controlled. Credit expansion by the mutuals could be controlled.

The degree of effectiveness of monetary policy will depend on the elasticities of current demand and of liquidity preference with respect to the rate of interest. The effect of intermediaries will, in turn, depend on the degree to which they affect the

elasticity of liquidity preference. Tobin gives us a framework with which to evaluate monetary and fiscal policy on the basis of elasticities, in terms of static theory.[1] If liquidity preference is completely inelastic, which implies that demand for current output has some negative elasticity, monetary policy will be completely effective—we have the quantity theory case of constant velocity of money. At the other extreme, if liquidity preference is perfectly elastic or if the demand for current output is completely inelastic, monetary policy will have no effect. (Tobin states that both investment and saving must have zero elasticity in the latter case. However, if both have the same slope at a given interest rate, there will be no net effect on aggregate demand.) In the intermediate cases, which can be assumed to be most likely simply because the two mentioned above represent limiting cases, part of the effect of monetary policy will fall on current demand, and part on liquidity preference. As a practical matter, the value of monetary policy depends on the relative degree of impact, and the desirability of controlling intermediaries

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[1] Review of Economics and Statistics, XXIX No. 2. He shows that fiscal policy is effective to the extent that monetary policy is ineffective.

depends on the degree to which the elasticity of liquidity preference could be reduced in the process.

Evidence concerning the elasticities is inconclusive, but several people have concluded that most of the impact of changes in the money supply will be on velocity.[1] Implicitly, this conclusion depends on the belief that liquidity preference has a fairly large elasticity, or that both investment demand and consumption have fairly small elasticities. In both respects, the grounds for pessimism can be questioned. Tobin shows that idle balances seem to vary inversely with the interest rate.[2] Later, and more sophisticated, estimates indicate that liquidity preference is less elastic than a simple regression equation might indicate. Milton Friedman finds that the rate of interest is much less important as a determinant of the demand for money than permanent income and cyclical changes in expectations.[3] Bronfenbrenner and Mayer obtained estimates of the interest-elasticity of all money balances

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[1] See Aschheim, Journal of Political Economy, LXVII No. 1; Kaldor, Review of Economics and Statistics, XLII No. 1; H. B. Rose, "Monetary Policy and the Capital Market, 1955–56," Economic Journal, LXVII No. 267, pp 397–414; and Warren L. Smith, "On the Effectiveness of Monetary Policy," American Economic Review, XLVI No. 4, pp 588–606.

[2] Review of Economics and Statistics, XXIX No. 2.

[3] Journal of Political Economy, LXVII No. 4.

ranging from -0.09 to -0.22, depending on the form of equation that is fitted.[1] Over-all, the evidence indicates that some elasticity exists, but probably not to a sufficient degree to make monetary policy ineffective. The arguments presented in Chapter I indicate that existence of uncontrolled financial intermediaries makes this elasticity greater than it would be in their absence, but that the actual effect is fairly small. Our arguments given above (pages 28ff.) indicate that no more than 30 percent of this elasticity can be attributed to the combined operation of the uncontrolled intermediaries. Taking into account the alternatives that would be available even in the absence of all these institutions, they are probably the cause of about 5 to 10 percent of the actual elasticity of liquidity preference.

Several empirical studies have indicated that investment demand is not very responsive to changes in credit conditions.[2] However, White disputes the validity of the empirical studies, on the grounds that they were biased in such a way as to understate

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[1] Econometrica, XXVII No. 4.

[2] See the sources cited in William H. White, "Interest Elasticity of Investment Demand—The Case from Business Attitude Surveys Re-examined," American Economic Review, XLVI No. 4, pp. 565–87.

importance of interest rates.[1] He indicates, in particular, that the companies that are most likely to be responsive were given too little weight in arriving at the conclusions. Conditions prevailing at the time and the availability of credit are factors that were given more stress in business responses. The response of businessmen, and the importance of risk in most investment, argue in favor of the assumption that investment demand is fairly inelastic with respect to the rate of interest. On the other hand, White has shown that the studies based on questionnaires are not particularly reliable. It would be futile to compare the actual volume of business borrowing with interest rates, since investment demand is a major factor determining interest rates. The evidence indicates that interest rates are less important than changes in expectations in causing changes in investment, perhaps because interest rates are less variable, but that there is some effect. We are forced to the unsatisfactory conclusion that the evidence justifies rejection of the extreme views that investment is not responsive to changes in the rate of interest and that it is so responsive that the elasticity of liquidity preference is unimportant, without permitting us to

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[1] Ibid.

support a position that one part of the middle ground is more likely than another.

Many of the arguments concerning the response of spending to credit conditions largely ignore consumption demand. There are good grounds for thinking that many consumers are not very responsive to interest rates. In this case, the substitution effect and the income effect of changes in interest rates work in opposite directions for those consumers that are accumulating assets, although they work in the same direction for those that are in debt. However, Donald Bear concludes that consumption must have a negative elasticity with respect to the interest rate.[1] Using indifference curves for time preference, he shows that the shape of the indifference map required to yield a zero or positive elasticity is, at best, unlikely to occur. This indicates that the effect of monetary policy on consumption will be favorable. Households will also be influenced to some extent by the availability of credit.

One of the difficulties in obtaining accurate estimates of the various elasticities is that expectations influence each of the

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[1] Donald V. T. Bear, "The Relationship of Saving to the Rate of Interest, Real Income, and Expected Future Prices," Review of Economics and Statistics, XLIII No. 1, pp. 27–36.

variables. Expectations also seem to correlate with interest rates in such a way as to make monetary policy appear to be less effective than it actually is. Generally, interest rates rise during prosperous periods and fall during less prosperous periods. At the same time, expectations will generally be more optimistic during prosperous periods than otherwise. The result is that simple relationships understate the effect of interest on investment and consumption, and overstate the effect on liquidity preference. During boom times, optimistic expectations will encourage investment and consumption, but the rise in interest rates will reduce spending to a degree. At the same time, both optimistic expectations and high interest rates will discourage holding idle balances. The Tobin liquidity function, then, includes both the effect of interest and the effect of expectations.[1] On the other hand, Friedman has specifically included cyclical influences in his study, thereby including the effect of expectations.[2] Bronfenbrenner and Mayer have not specifically included expectations, and hence overstate the elasticity unless one of their other variables correlates with expectations.[3]

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[1] Review of Economics and Statistics, XXIX No. 2.

[2] Journal of Political Economy, LXVII No. 4.

[3] Econometrica, XXVII No. 4.

The effect of monetary policy on investment demand may be further understated by the response of businessmen to interest rates. In a sample of British manufacturing firms, Lydall found that many firms were affected primarily by the anticipated impact of tight money on their customers.[1] Fourteen percent of the small firms responding, and 21 percent of the medium-sized firms, said that they reduced investment plans during the 1955–56 credit squeeze for this reason. In addition, much of the effect is felt through changes in the availability of credit.[2] To the extent that the actual volume of credit granted depends more on the willingness of financial institutions to lend than on the desire of business to borrow, the rate of interest is important only as an indication of underlying credit conditions. Responses to some of the business attitude surveys cited by White tend to confirm the importance of the availability of credit.[3] Many firms replied that they were not influenced, or influenced only slightly, by

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[1] H. F. Lydall, "The Credit Squeeze on Small and Medium Sized Manufacturing Firms," Economic Journal, LXVII No. 267, pp 415–31. His sample excluded all firms with more than 500 employees, or with publicly-listed stock.

[2] Kaldor, Review of Economics and Statistics, XLII No. 1; Rosa, Money, Trade, and Economic Growth; and Scott, Review of Economic Studies, XXV (1) No. 66.

[3] See White, American Economic Review, XLVI No. 4.

interest rates, but that spending plans had been affected by difficulty in obtaining financing. Lydall's study also indicated that availability of credit was an important factor, although the form of his question makes it difficult to separate the effect of availability from that of interest rates.[1] The one question here is whether the difficulty firms had in obtaining credit was a result of monetary conditions or a result of unfavorable appraisals by the lenders of the outlook for the project under consideration. To the extent that it was the former rather than the latter, investment demand is responsive to monetary policy even if the rate of interest as such as little influence. Restraint on bank reserves will reduce the lending ability of commercial banks. At the same time, rising interest rates on government securities will reduce the liquidity of other lenders, particularly those intermediaries with large portfolios of long-term securities. This will impose restraint on other forms of lending, and will also make it more difficult to raise money by issuing new securities. We may note that reliance on statistical estimates based on actual investment instead of questionnaires would include the effect of availability of credit, since interest rates will normally reflect market

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[1] Lydall, Economic Journal, LXVII No. 267.

conditions. However, such estimates would be handicapped by the difficulty described in the preceding paragraph.

Reliance on changes in the availability of credit instead of changes in investment (and consumption) induced by changes in interest rates increases the effectiveness of monetary policy, but it also increases the effect of leakages through transfers of idle balances to near-moneys. Restriction of demand through refusal to lend implies that many borrowers are in a disequilibrium position. They would like to borrow more at the prevailing rate of interest, but are prevented from doing so because the bank won't lend. This implies that we are not depending fully on the price system to ration credit, and as a result, investment demand is quite elastic with respect to the supply of loanable funds. Nonbank intermediaries can attract funds by raising the rate of return they offer, but in a pure price system they can lend only by reducing their lending rate. The fact that some borrowers have simply been refused loans instead of being priced out of the market removes the latter restriction on the ability of intermediaries to expand credit. They can induce the public to supply more loanable funds by raising the rate they pay on their own obligations and increase the rates they charge enough to compensate for this, regardless of the interest-elasticities of liquidity

preference and investment demand, providing only that the former is not zero. This indicates that the existence of the mutual thrift institutions creates more difficulty for the Federal Reserve than examination of the interest-elasticities alone would indicate.

Access to central bank credit could prevent monetary controls from being effective. It does not appear that current practices in our two central bank systems actually have this effect. The Federal Home Loan Banks should be considered to be neutral in this respect, since the credit they grant must come from the general money market.[1] They ease conditions in one market only by tightening conditions in another market. If this weakens the effectiveness of monetary controls, it does so because investment demand in general is less interest-elastic than is the market for residential housing.

The Federal Reserve discount window could provide a source for reserves in sufficient quantity that other weapons of monetary policy would become virtually useless. This would be true if lending policies permitted the banking system to maintain enough borrowing to permit them to grant whatever credit is demanded, even if regulations require each loan to be repaid

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[1] McKinley, Journal of Finance, XII No. 3.

quickly. The borrowing would be passed from bank to bank, but the banking system could lend virtually without limit. This might require a continually increasing volume of borrowing, but it could still cripple monetary controls.

Among the conditions that must prevail in order for the discount window to weaken monetary controls substantially is for the demand for loans to have an important influence on the volume of member bank borrowing. An effective tradition against borrowing by banks could prevent this from occurring directly, despite the influence of profit considerations.[1] However, two elements in our present system seem to weaken the tradition against borrowing. One is that existence of the Federal Reserve System, created partially to serve as a lender to commercial banks, removes the basic reason that Riefler gives for the tradition against borrowing.[2] The other is that rising interest rates may induce individual banks to accept more risk that a need to borrow will arise by reducing their normal cushion of excess reserves, or to borrow to meet shortages rather than to sell securities immediately. Either reaction would cause the volume of borrowing for

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[1] Riefler, Money Rates . . ., Ch. II.

[2] Alhadeff, Monopoly . . ., pp 156 ff.

the banking system as a whole to rise. The leakage could still occur. On the other hand, the Federal Reserve discount policy now seems to be designed to enforce the same sort of restraint on bank borrowing that Riefler earlier attributed to the tradition against borrowing—the fact that a bank has borrowed imposes a restraint because the loan must be repaid shortly, regardless of the effect on the bank's profit.[1]

On balance, the present Federal Reserve policy seems to prevent the discount window from crippling monetary controls. Rather, the use of the discount window seems to delay rather than cancel the impact of other policy tools. The effect of the discount window on timing is discussed above, pages 96–99. The net effect is to make it easier for banks to absorb the impact of open market operations by selling government securities instead of by curtailing loans, and to delay the timing of impact. As long as the central bank considers granting of unexpected new loans to be an acceptable reason for a bank to borrow,[2] the discount window also makes it easier for banks to finance new

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[1] Whittlesey, Quarterly Journal of Economics, LXXIII No. 2.

[2] An address by Robert Holland at the Federal Reserve Bank of Chicago's Institute on Central Banking Techniques, September, 1958, indicates that at least the Chicago Federal Reserve Bank follows this type of policy.

business loans by reducing their holdings of government securities, even though this may be accompanied by some reduction in demand deposits. The net effect of this factor depends largely on the willingness of the public to buy the securities the banks are trying to sell, which will depend on the same factors that affect the ability of the mutuals to attract funds.[1] Access to Federal Reserve credit, given the existing policy at the discount window, appears to delay the impact of monetary policy, but may not be a serious factor.[2]

Present lending policies of the Federal Reserve System may aid monetary policy by enabling the system to move farther and more rapidly than it would if banks did not have this source of reserves. Any action that the Federal Reserve can take to tighten member bank reserves is likely to leave some banks with a serious shortage of reserves even when the system as a whole has excess reserves. If these banks could cover the shortage only by curtailing credit immediately, a fairly mild restriction

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[1] Stephen W. Rousseas, "Velocity Changes and the Effectiveness of Monetary Policy, 1951–57," Review of Economics and Statistics, XLII No. 1, pp 27–36, discusses the willingness of the public to buy securities.

[2] See Thomas Wilson, Oxford Economic Papers, N. S. IX No. 3, for a discussion of this factor in Great Britain.

might create a crisis in some places. The crisis might even spread throughout the economy under some circumstances. Financial panic probably heads the list of things the Federal Reserve System wants to avoid, hence any action that might produce even a local disturbance is likely to be taken with extreme caution. Access to the discount window gives the banks that are hit hardest by the initial impact a chance to adjust to the change in conditions without facing a crisis, and thereby removes one deterrent to vigorous action on the part of the Federal Reserve.

The net effect of the discount window depends largely on whether banks are able, on the whole, to control the amount borrowed, and on the degree to which ability to borrow temporarily increases the ability of banks to dispose of securities. The discussion by Whittlesey indicates that we do not have to be overly concerned on the first ground.[1] The sale of securities has an impact similar to that of the intermediaries, and the leverage provided by the additional time made available through use of the discount window probably has only a minor effect. The sales could be made anyway, and the delay simply makes this somewhat easier to accomplish. We can only speculate about the degree to which

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[1] Quarterly Journal of Economics, LXXIII No. 2.

policy actions are taken more vigorously than they would be without the shelter that the discount window provides to individual banks. Probably no one outside the Federal Reserve System, and perhaps no one inside the system, knows how much of a consideration this is.

The problem of timing remains a handicap, but not entirely because of the discount window. There is substantial evidence to the effect that the impact of monetary policy is felt over a period of time, with an average delay measured in months.[1] The operation of the discount window is not responsible for most of the time lag, but does increase it. Even if the discount window does permit the Federal Reserve to reverse itself more quickly, the added delay decreases the ability of the system to determine the proper action to take at any time. While the discounting policy does not create this difficulty, and probably is responsible for only a small part, it does increase the difficulty. Given the delay that would exist in any case, an added delay of another month or so on the average could be important.

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[1]Thomas Mayer, "The Inflexibility of Monetary Policy," Review of Economics and Statistics, XL No. 4, pp 358–74, estimates the time lag under various assumptions. Kaldor, Review of Economics and Statistics, XLII No. 1, also mentions the problem of timing in more general terms.

Conclusion

It has not been established that the existence of financial intermediaries in general, and the mutual thrift institutions in particular, makes monetary policy an ineffective method of control over the economy. The best estimates found about the interest-elasticity of liquidity preference indicate that it is less elastic than a simple relationship would indicate, or than the most pessimistic observers seem to believe. The fairly crude test that was made concerning the contribution of the mutuals to the elasticity indicate that they probably increase that elasticity, but only slightly, at least in absolute terms. On the other side of the market, arguments have been found that indicate that the demand for current output is influenced more by interest rates and credit conditions than some studies have indicated.

Looking at the other side of the arguments, it also has not been established that some form of control over the nonbank intermediaries, and particularly the mutuals, would not be helpful. First, it has been indicated that the mutuals probably do increase the interest-elasticity of liquidity preference, and thereby reduce the effectiveness of monetary policy. At best, the arguments and tests used indicate that the effect is less than some pessimistic

appraisals claim. It is quite possible that institutional factors limit the degree of restraint that can or will be imposed on bank reserves. If the present system is limited in this way, then any change in the amount of leakage is important. Any improvement in our controls, however slight, that can be achieved by restricting the mutuals would be desirable.

The ability of intermediaries to borrow does not appear to have a decisive affect. Lending policies of the Federal Home Loan Banks seem to have little net effect, although it might be necessary to re-examine this conclusion if general controls would be imposed on the savings and loan associations. The best evidence available indicates that the Federal Reserve discount window does not provide member banks with a means of offsetting the impact of monetary policy, although it probably delays the impact.

CHAPTER V

FACTORS INFLUENCING CASH RESERVES

Introduction

The ability of any intermediary to expand credit depends on the effective reserve ratio for that intermediary. Most literature for the banking system seems to assume, at least in numerical examples, that the required and effective reserve ratios are the same. We all know that the latter is somewhat higher, but have little precise information in this respect for banks, and even less for the mutual thrift institutions. A statistical study of cash assets for member banks and savings and loan associations was made in an attempt to obtain more information about the effective reserve ratios. This chapter will discuss some of the factors which may influence cash holdings. The statistical results are presented in Chapter VI.

Cash assets are an essential, although small, part of assets held by all financial intermediaries. This is particularly true for the intermediaries included in this study. A large

portion of their liabilities are payable on demand.[1] Therefore, each intermediary involved must have enough cash available to meet any new outflow that is likely to occur, and in such forms that the creditors are likely to want.

There are a number of factors that can influence the holdings of cash assets by financial intermediaries.[2] Some of them will help to explain changes in holdings over time for a single institution or a group of institutions. Others will be important in explaining differences between holdings of different institutions at the same time. Even if all of the relevant factors could be evaluated, some random variations would occur. Adjustment to changing conditions takes time, and some changes can be neither controlled nor forecast with sufficient accuracy to permit the adjustments to occur immediately.

Assets Serving as Cash

The major items of cash for commercial banks are reserve accounts at the Federal Reserve banks and currency. Properly

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[1] Only commercial bank demand deposits must be paid on demand. In the other cases, notice can be required, but this option is almost never exercised.

[2] George Horwich, "Elements of Timing and Response in the Balance Sheet of Banking, 1953–55," Journal of Finance, XII No. 2, pp 238–55, discusses some of them for commercial banks.

speaking, cash assets for commercial banks as a group are limited to those two items. However, many banks rely heavily on correspondent balances at other banks. From the viewpoint of an individual bank, these balances serve the same purpose as currency and reserve bank balances in excess of legal requirements, and also may be necessary in order to obtain access to services of the larger bank. The two forms of excess reserves can be used interchangeably as conditions dictate. As long as the major requirements for cash arise from transfers of accounts between banks, correspondent balances will meet the needs as well as any other asset. However, they cannot be used to meet net withdrawals from the banking system. Only currency can meet a net withdrawal to currency, although reserve bank balances can be converted to currency with little delay.

All mutual thrift institutions can, in general, be treated as one type with regard to cash assets, since all of them rely primarily on demand deposits and currency as the major types of cash. They also compete among themselves and with commercial bank savings departments for accounts. However, the Federal Home Loan Bank System provides a complication in the case of savings and loan associations. Member associations use deposits at the Home Loan Banks as an additional form of cash.

The Home Loan Banks in turn maintain reserves primarily in the form of demand deposits. Like commercial bank correspondent balances, these accounts are fully adequate to meet transfers between associations, although such transfers are less likely to occur in the case of savings and loan associations than in the case of commercial banks. Both Home Loan Bank accounts and correspondent balances constitute an additional step in the credit pyramid, since only the reserves held against these balances provide net liquidity for the institutions concerned, taken as a group rather than as individuals.

Account Experience and Cash Holdings

The size of account liabilities is a major factor both in changes over time and in differences between institutions. All legal reserve requirements are stated as a percent of accounts, and the cash holdings other than those legally required are probably subject to the same type of influence. However, the data confirm the theoretical expectation that actual cash holdings are not a constant percent of account liabilities, but increase less than proportionately with size. Flows become more predictable as the institution grows.[1] For member banks, there is

[1]For the initial work on the relationship between size and reserves, see F. Y. Edgeworth, "The Mathematical Theory of

a clear negative correlation between the amount of deposits and the ratio of free cash to deposits. For savings and loan associations, the relationship is similar except that small associations are more likely to have either extremely large of extremely small cash holdings relative to share capital. The tendency toward high ratios for the small associations is the relationship we expect to prevail. The tendency toward low ratios, and also some of the high ratios, reflects the greater chance that special circumstances, such as unexpected events, small (or large) withdrawal rates and balance sheet "dressing," will have a noticeable effect on the cash ratio.

Past experience regarding the velocity of accounts may be the most important single variable explaining differences among institutions. The institutions that have experienced considerable variation in the amount of net flows, and perhaps also a high average rate of turnover of accounts, will be expected to maintain a larger amount of cash than other institutions that are

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Banking," Journal of the Royal Statistical Society, LI, 1888 pp 113–27. More recent contributions have been made by Baumol, Quarterly Journal of Economics, LXVI No. 4; and T. M. Whitin and M. H. Preston, "Random Variations, Risk, and Returns to Scale," Quarterly Journal of Economics, LXVIII No. 4, pp 603–12. The treatment for individuals in Patinkin, Money, Chapter VII, also applies to intermediaries.

similar in other respects. Both reduce the predictability of net flows, and therefore increase the minimum amount of cash required to protect liquidity. This factor may also be important in explaining changes over time, but fluctuations over time are smaller than the differences between individual institutions. It also seems likely that the periods when turnover is highest—times of general prosperity—are also times when demand for loans and the psychology of prosperity would tend to reduce cash holdings. Variability of accoungs has not been included in the statistical study because the data are not readily available. Its influence will appear in the statistical results if there is any correlation between turnover and any of the variables included in the study. The type of business or individual holding the accounts will influence turnover, and will in turn be affected by location. The larger institutions are more likely to have account holders of many different types, so that some of the fluctuations will cancel.

Legal Requirements

Reserve requirements established by law or a regulatory agency, together with the attitudes of supervisory agencies, will necessarily influence decisions to maintain cash holdings. To the

extent that legal requirements and supervision are applied equally to all operating units and are stable over time, they will have no effect on the statistical study. Since all member associations in a single district are subject to the same supervision, and laws for the states covered do not differ enough to produce substantial differences for member associations, we are justified in ignoring this factor in evaluating the savings and loan association data except as a possible explanation for differences in the results obtained for the two Home Loan Bank districts. Associations in the Chicago district are more likely to have low liquidity ratios than those in the Indianapolis district. The data are insufficient to separate the effect of regulatory policy from the other factors studied, so no firm conclusions can be drawn on this score. One possible explanation of the differences observed is that the Indianapolis Home Loan Bank and the supervisory authorities in Indiana and Michigan encourage more liquidity than do supervisory authorities in other areas. Differences in requirements are quite important for the commercial bank study, since there are substantial differences in legal requirements depending on the reserve classification, and these requirements are changed as part of Federal Reserve monetary policy.

Differences between state regulations are of minor importance for member banks, since Federal Reserve requirements call for more cash than most state regulations. For savings and loan associations, as for commercial banks, the most important difference between states in the area covered is in restrictions on branch operations. The effect on attitudes of examiners is not easy to determine, and differences between states in this respect could have some effect on savings and loan associations. Except for possible differences in examiners' attitudes, legal requirements do not appear to be particularly effective for savings and loan associations. The liquidity requirements can be satisfied by holding government securities as well as cash, and a substantial proportion of the associations hold more than enough securities to satisfy the requirement. The Home Loan Bank of Indianapolis does suggest that its members maintain cash assets sufficient to cover a certain number of months of average gross withdrawals, and may reduce the regular line of credit if this advice is not followed. This has the effect of re-enforcing the influence of past account activity on cash assets, and may account in part for the relatively liquid position of associations in its territory.

For commercial banks, the most plausible relationship is that the ratio of cash assets to deposits will rise by less than the required reserve ratio, or alternatively that unencumbered cash assets will decline somewhat relative to deposits, as the legally required reserve ratio increases. This is expected for two reasons. First, if the bank faces withdrawals, part of the required reserve will automatically be released. Second, the reserves can always be drawn below the required amount to meet unexpectedly large withdrawals or other outflows, and this can be done within limits without penalty other than a requirement to make up the shortage by holding excess reserves in the next period. When such shortages will occur only occasionally, paying the penalty will be less expensive than maintaining enough reserves at all times to prevent the penalty from being incurred at any time. It appears that this reliance on required reserves operates particularly during tight money periods. It may be limited to some banks, particularly those banks that are willing to borrow. This factor will account for a large part of the observed relationship between casn and deposits—particularly since most of the largest banks and few of the smallest ones are in the city reserve classes.

Government Securities

An intermediary with substantial liquidity available from sources other than cash is likely to need less cash. While most assets held by financial institutions provide some liquidity, the degree of liquidity will differ substantially.

The primary substitute source of liquidity is government securities, particularly those with short maturity. Some additional liquidity can be obtained from short maturities on loans, including amortization payments on mortgages, but this factor can be overstressed, particularly for commercial banks, since many short-term loans are more or less automatically renewable at the option of the borrower, and default is most likely to occur at times when economic stresses would be most likely to cause net withdrawals or to make liquidity more desirable. Bankers' acceptances and call loans carry no such renewal obligation, and so should be considered in the same class as treasury bills. The degree to which government securities are used as an alternative source of liquidity may be understated statistically, since these securities are also the residual investment, the earning asset that can always be acquired if requests for new loans

fall short of cash inflows.[1] For this reason, holdings of government securities are expected to be more important in explaining differences between individual institutions than in explaining changes over time. However, if various interest rates do not change in about the same way, it may become profitable to maintain the same liquidity by shifting from government securities to a mixture of loans and cash, or vice versa.

The data used in this study indicate that for all except the smallest savings and loan associations, and for most banks, government securities are used as a substitute for cash. The conclusions are given in more detail in Chapter VI. Except for the amount that legal requirements (for banks) and prudent practices require to be held in cash, an intermediary can maintain the desired degree of liquidity either in cash or in marketable securities. The statistical effect is weaker for member banks than for savings and loan associations, but this may be a result of the strong negative correlation between size and liquidity. Both ratios decrease as the size of bank increases, and the effect of

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[1] O'Leary, American Economic Review, XLIV No. 2, discusses the role of government securities in life insurance company portfolios. The same reasoning applies to other intermediaries, but to a lesser extent. See also Ira O. Scott, Jr., "The Changing Significance of Treasury Obligations in Commercial Bank Portfolios," Journal of Finance, XII No. 2, pp 213–22.

size on liquidity apparently swamps the substitution effect. The multiple regression failed to show any statistically significant results, although this method should isolate the effects of different variables to the extent that the relationships are linear. The contingency tables cannot separate the effects of different variables, since they can be compared only in pairs.

Since government securities are a residual investment, the statistical results probably understate the importance of securities as a substitute form of liquidity. If the demand for loans falls, or fails to increase as rapidly as lending ability, the surplus funds will normally be used to purchase government securities. The effect on liquidity is secondary to profit considerations as long as the liquidity derived from such investments is in excess of the minimum that is considered to be necessary. This introduces a bias into our attempt to determine a simple relationship, since we have looked only at one side of a relationship where cause works in both directions. It has been assumed, and fairly well confirmed, that large holdings of government securities will create liquidity and therefore cause cash holdings to decline. On the other hand, cash holdings in excess of those needed would generally cause the bank (or savings and loan association) to acquire more government securities in order to obtain some income.

The first relationship would cause a negative correlation between cash and government securities. If the institutions affected tend to retain some excess cash reserves in response to relatively easy reserve conditions (with low interest rates), and shave reserves when credit is tight, the latter will cause a positive correlation. The two effects should then cancel each other to a degree in the statistical results, particularly in the time series. The comparison of individual units at the same time will be less affected, but some reduction in the statistical substitution effect can be expected if changing monetary conditions affect different units differently. Since we observe some statistical evidence of substitution despite this weakness, we can conclude that substitution does occur.

The possible connection between time deposits and liquidity helps to cloud the picture for banks. As time deposits increase relative to demand deposits, cash in excess of required reserves decreases. Since required reserves are lower for time deposits, the ratio of cash to deposits is considerably smaller for banks with relatively large time deposits. At the same time, the ratio of government securities to deposits is higher for banks with more time deposits. Evidence regarding the total of cash and government securities is inconclusive. The clearest picture for these

relationships is seen in Tables 45 and 46, pages 250–51. Also see Tables 31–36, pages 240–43, and 40–42, pages 246–47.

Borrowing Ability

The expected relationship between ability to borrow and cash reserves is discussed in detail in Chapter III. We would expect those institutions that are able and willing to borrow to hold less cash than nonborrowers. For borrowers, cash should increase with the amount borrowed, since the loan must be repaid from cash reserves. Statistical difficulties prevented us from making a completely satisfactory test of the relationship. The one test made for member associations in the Indianapolis district was not statistically significant, but did indicate that borrowers probably hold somewhat less cash than nonborrowers.

Location

The location of the institution may influence cash holdings. To some extent, this will be a result of the type of business and its effect on turnover of accounts. Particularly for commercial banks, the amount of vault cash held may depend to some extent on the distance from the Federal Reserve Bank, or rather the time it takes to obtain currency from the Federal Reserve, since

such holdings will in general be adjusted to past experiences of net payments in currency during the period in which the supply cannot be replenished. Now that vault cash counts as part of legal reserves, this is more likely to affect the form in which cash reserves are held than the amount. The mutuals are not likely to be affected by location, since most of them rely on correspondent commercial banks in the same area. This eliminates any effect of distance from the source of currency. Institutions in industrial and residential areas are likely to have substantial outflows of currency through pay-check-cashing services, although this may affect primarily the distribution of cash between currency and reserve balances. This factor will tend to increase vault cash held by branch banking systems, and to reduce vault cash held by institutions in areas such as Chicago where currency exchanges are common.

The data for member banks in the seventh reserve district reveal a positive correlation between the ratio of free cash to deposits and distance from the Federal Reserve bank (Chicago or Detroit), but no significant variation in the ratio of currency to free cash. The correlation between cash and distance may reflect differences in type of business for different states, with the effect correlating with distance. Indiana and Iowa banks have

higher ratios of free cash to deposits, while the Michigan banks have low ratios. For Iowa and Michigan, this relationship is about what would be expected on the basis of the relationship with size of banks. This result undoubtedly reflects the greater importance of agriculture in Iowa and Indiana, and the greater importance of industry and branch banking in Michigan. It would be desirable to check the relationship with turnover of accounts, but the data were not available.

Another factor reflecting the type of business is the importance of time deposits. There is a clear negative correlation between the ratio of free cash to deposits and the ratio of time deposits to demand deposits, reflecting the lower rate of activity in these accounts. There is also a positive correlation between the ratio of currency to free cash and the time deposit ratio, which probably indicates that banks with more time deposits also do a great deal of check-cashing business. Banks in residential areas are likely to attract savings accounts and to be called upon to cash payroll checks more frequently than business district banks.

For commercial banks, the ratio of currency to deposits shows much less variation than the other ratios used. The areas with large amounts of currency seem to be those in areas where

savings and loan associations are relatively scarce, while the areas with less currency generally have less branch banking, and more savings and loan associations and currency exchanges. These results indicate that vault cash holdings of commercial banks are generally a constant percent of deposits, but with departures reflecting the amount of check-cashing business.

Differences in management can influence cash holdings, although such differences are hard to isolate. There may be some correlation with size, since managers of small banks are less likely to manage cash holdings closely than are managers of large banks. This is as much a result of lack of incentive as of differences between managers. The bank must have a fairly large amount of free cash to be managed before close control will add enough return to pay the cost involved. Managers of large banks are also more likely to anticipate future changes and adjust to them before rather than after the fact, perhaps reducing the certainty with which their actions can be predicted because of the possibility of mistakes and because of variations in timing. This may explain the negative correlation between the average size of bank and the multiple correlation coefficients obtained in the time series for member commercial banks.

Economic and Monetary Conditions

Business conditions probably have some impact on cash holdings. During boom times, the demand for loans is high. This produces pressure on managers of financial institutions to reduce liquidity, either in cash or government securities, as a means of making new loans. At the same time, prosperous conditions may make business loans seem less risky and substantial net withdrawals seem less likely to occur. As long as other banks are expanding, some inflows would be expected. The generally optimistic psychology during prosperity makes failure of loan customers seem less likely, and may also reduce the managers' expectation of runs on the bank. Both factors will tend to reduce the desired ratio of cash to account liabilities. This effect will not be uniform throughout the economy. Large banks are, in general, more sophisticated than the smaller institutions, and more likely to plan on the basis of anticipated future changes. Varying conditions in various areas will produce different degrees of pressure. However, sales of government securities by institutions in the more rapidly expanding areas will transmit the effect throughout the economy. Accounts and assets will be reduced as customers are induced to buy government securities at

lower prices, and the value of portfolio securities will also be affected.

The cost of maintaining liquidity, either in the form of interest on possible loans that are not made or the interest paid on borrowed money, could influence cash holdings. Failure of the bank time series to show a significant relationship may stem from any of several possible conditions. It is likely that the combination of changes in patterns of interest rates and increasing demand for loans, which are generally more profitable than securities, may induce a shift from liquidity held in the form of government securities to cash, so that the entire reduction of liquidity falls on holdings of securities. However, the necessity of showing a loss on sale of securities may deter financial institutions from shifting to loans even though loans will be more profitable. The substantial reduction of bank portfolios of government securities during recent tight-money periods indicates that this sort of shift does occur.

A second possible explanation is that the actions that are most consistent with profit maximization and prudence may be independent of interest rates, at least within the range experienced during the period covered by this study. The extremely large volume of excess reserves held by banks during the 1930's

indicates that this explanation may account for part of the observed lack of correlation. It may take unusually low interest rates, such as prevailed during most of the 1930's, to have much effect on bank behavior. However, it is impossible to determine how much of the excess reserves held during the depression were a result of the low interest rates prevailing then, and how much was a result of the abnormal experiences of 1929–1933.

A third explanation is that bank managers may not consider interest rates when they determine the distribution of assets between cash and earning assets. This explanation will apply if bank managers believe that the effect on profits will not be enough to compensate for the reduced liquidity.

The available evidence indicates that the various operational factors influencing the need for liquidity are strong enough that changes in the cost of maintaining liquidity within the range of recent experience do not justify substantial changes in liquidity. The evidence also indicates that rising interest rates during tight-money periods cause some reduction in liquidity, but this takes the form of reduced holdings of government securities instead of reduced holdings of cash. The desire to avoid taking capital losses on government securities, and thereby reducing capital accounts and possibly reflecting adversely on the soundness of the bank

management, may cause some of the stress on maintaining liquidity. The "lock-in" effect on security holdings will be minor for treasury bills, and becomes gradually weaker as existing securities approach maturity.

Seasonal Factors

Holdings of cash assets are subject to seasonal changes. In general, when a seasonal outflow is anticipated, cash assets will be increased, frequently by less than the expected loss. A reverse pattern can be observed at times of seasonal inflows. This effect will be more noticeable if, as is true of savings and loan associations in the Indianapolis Home Loan Bank district, peaks in inflows in accounts and peaks in demand for loans come at different times. The seasonal pattern should be less marked for commercial banks, since the Federal Reserve uses open market operations in part for the purpose of offsetting their effect on bank reserves. The time series data in this study have not been adjusted for seasonal variations. If such an adjustment were made, it would have to be done for the independent variables as well as for the dependent variable. The seasonal factor is reduced in the bank comparison, since the data used are averages

from four dates, but is definitely present in the savings and loan study, since all data are year-end figures.

Annual report figures may reflect a special type of seasonal influence in the form of "window-dressing" on the balance sheet. Managers may want to appear more liquid, and therefore increase cash holdings. If this is accomplished by reducing other assets, the net effect on the balance sheet is favorable, but borrowing for this purpose will also reflect adversely on the institution's position. To anyone who is convinced that frequent borrowing is not consistent with sound banking practices, the appearance of borrowing on the published balance sheet will more than offset the resulting increase in liquidity. It is virtually impossible to separate this factor from other seasonal influences. For banks, the usual inflow of currency and repayment of inventory loans after Christmas would cause an increase in cash holdings. For savings and loan associations, cash balances must be built up at the end of the year in anticipation of dividend payments and subsequent heavy withdrawals occurring at this time for most associations.

CHAPTER VI

STATISTICAL STUDY OF CASH ASSETS

Introduction

The statistical study was made in an attempt to test the importance of some of the variables discussed above as factors influencing cash holdings for commercial banks and savings and loan associations. This was done first by fitting a least squares regression equation to the data and calculating standard errors of coefficients. For much of the data, contingency tables were also constructed, using the χ^2 test for independence to show the connection between pairs of variables. From these statistics, we want to answer the questions:

1. Is the correlation large enough to indicate the independent variable has a significant effect on cash assets, taken by itself?

2. Is the multiple regression coefficient significantly different from zero? We have accepted the hypothesis of independence when the significance level is below .01 and rejected it when the level is above .10. Significance levels between these two levels are treated as borderline cases.

3. If the answer to the second question is yes, is the sign of the coefficient in accordance with the presumed direction of impact?

4. If the answers to questions two and three are affirmative, can we place close enough confidence limits on the coefficient to provide better information about the degree of impact?

5. Is the multiple correlation coefficient large enough to indicate that we have isolated the most important independent variables?

6. If any of the results are inconsistent, either with themselves or with the expected relationships, can we discover reasons?

7. Do the contingency tables reveal information not provided by the regression equations, particularly nonlinear relationships?

With the exception of the time series for commercial banks, all of the data used in this study are for institutions located within the seventh Federal Reserve district or in the Indianapolis and Chicago Home Loan Bank districts. The seventh Federal Reserve district includes northern Illinois and Indiana, lower Michigan, southern Wisconsin, and all of Iowa except the Council Bluffs area. The Indianapolis Home Loan Bank district includes Indiana and Michigan, while the Chicago district includes Illinois and Wisconsin.

Data for mutual savings banks have not been studied because they are of relatively minor importance in this area. Some

imprecise conclusions about mutual savings banks might be made to the extent that similarities appear between commercial banks and savings and loan associations, since they appear to fall between these two categories in most respects. The only characteristic that the mutual savings banks do not share with one group or the other is the absence of any central bank arrangement. Mutual savings banks are free to join either the Federal Reserve or the Home Loan Bank system, but only a few have done so. Only three are members of the Federal Reserve System, and all are located in the seventh district. Twenty-five savings banks were members of the Home Loan Bank System at the end of 1958.

A projected study of credit unions in the seventh Federal Reserve district was dropped because of the wide variation in the cash holdings of individual unions at different times. An examination of annual report data for five years reveals that a variation in the ratio of cash assets to share capital of over ten percentage points for a single credit union is almost the rule, and much larger variations are fairly common. Cash holdings of individual credit unions are much less stable than other items on the balance sheet. Nor are the high and low years consistent—the high ratio for one credit union frequently comes in the same

year as the low ratio for another union that is similar in other respects.

Two factors appear to explain the observed variability of credit union holdings of cash assets. First, a large portion of credit unions serve only employees of one company. Most payments on loans and most new savings will be made on payday—and for company and labor-union–sponsored credit unions, this will be the same day of the week or month for all members. The form in which the data are available make it difficult to adjust for this seasonal influence. The credit unions are identified only by a number, with no information regarding the type of membership or the timing of paydays. The influence of common employment for credit union members will also make individual unions highly sensitive to economic conditions, particularly those factors with a strong impact on an individual industry or firm. This influence is reinforced by the usual attitude of credit union managers that the union exists to meet the credit needs of members. They are therefore willing to reduce the liquidity of the credit union if this is necessary to make loans requested by members, particularly when adverse economic conditions make the loans more necessary for members and reduce their ability to borrow elsewhere. Secondly, credit unions are typically small and frequently rely on

part-time managers. This reduces both the incentive and the opportunity to manage cash holdings closely. The combination of these influences leads to a strong tendency simply to let cash holdings accumulate until members request loans.

Studies for commercial banks and savings and loan associations were further limited to members of the Federal Reserve and Federal Home Loan Bank systems, respectively. This was done because of difficulties in obtaining data for nonmembers. In both instances, the error associated with generalization from this study to all units in the area covered is slight since nonmembers are relatively small in size. While data by reserve district are not available, data for states published by the Federal Deposit Insurance Corporation indicate that the seventh reserve district does not differ much from the national average, with about 85 percent of deposits held by member banks. In addition, studies made by the Federal Reserve Bank of Chicago covering both member and nonmembers behave in much the same way as the similarly situated (smaller) member banks.[1]

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[1]These conclusions are based on an unpublished manuscript prepared by the research staff of the Chicago Federal Reserve Bank.

Except for the member bank time series, the statistical results do not reflect behavior of institutions outside the Middle West. The results for member banks in the seventh district are probably fairly close to those that would be obtained from national data, since the district is fairly representative of the nation as a whole. Virtually all types of industry, substantial financial activity, and a variety of types of agriculture are carried on within the district. State banking regulations cover a wide range, the only important omission being state-wide branch banking. To the extent that bank behavior is influenced by branch banking and bank holding companies, this study will reflect the influence of state laws. There is no reason to believe that supervisory policies of the Federal Reserve Bank of Chicago differ very much from those of other Federal Reserve banks. From this we can state that the comparison of banks was not made so as to be applicable for the country, but there is no reason to expect that the results obtained from a more general study would differ substantially from those obtained for the seventh district.

There are good reasons for rejecting any generalization from the savings and loan study to cover all associations in the country. At the end of 1956, members of the Federal Home Loan Bank of Indianapolis shared with the Cincinnati district the

distinction of maintaining the largest average ratio of liquid assets (cash plus government securities) to share capital in the country, with liquid assets equal to 16.0 percent of share capital. The third highest ratio, 13.3 percent, was held by members of the Chicago Home Loan Bank. For most districts, liquid assets amounted to between 12 percent and 13 percent of share capital.[1] This supports an impression obtained from discussions with people familiar with the field to the effect that policies followed by members of the Indianapolis Home Loan Bank are more conservative than those followed by many associations in other parts of the country.

Some other limitations of the data used in this study should be mentioned. The two time series share with all other such studies the problem that the data do not represent a random sample of all possible dates. The theory of statistical inferrence is applicable directly only to the time period covered, and not to subsequent periods. However, projections of time studies provide about the only available statistical basis for prediction, and such predictions have at times proved to be quite accurate, provided no substantial structural changes have occurred. Use of the four

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[1]Based on Savings and Home Financing Source Book, 1957, Federal Home Loan Bank Board, Table 5.

comparisons of member banks in the seventh district, based on group averages, to describe the differences in the behavior of individual banks is also questionable. A random sample of individual banks would be preferable, but these data were not available for this study. If the results had proved to be more significant, a check of the regression equation for samples of banks in some of the larger groups might have been made to indicate whether the behavior of individual banks followed the same pattern that the group data indicate.

Summary of Results

The statistical results indicate that cash is influenced mainly by account liability, but use of a constant ratio would not be sufficiently accurate.

Location does not influence cash holdings in any clear, direct way. Banks that are most distant from the Federal Reserve bank do hold more cash relative to deposits than do less distant banks. However, distance correlates with both type of business (the more remote regions are dominated by rural areas) and size of bank. Both factors tend to increase cash holdings. However, time deposits correlate negatively with distance. This would tend to decrease cash holdings, so distance may have some

influence. Holdings of currency may also increase, relative to other free cash, with distance. The relationship is slightly positive but not significant. However, the relative importance of time deposits would indicate a decline in this ratio with distance, if distance has no influence. The relationship with currency may have changed since the time of the study, because vault cash now counts as part of legal reserves.

The ratio of free cash to account liabilities declines with increasing size, except for the smallest savings and loan associations. This influence is stronger for member banks than for savings and loan associations. This supports the hypothesis presented above (page 149) that required reserves provide some liquidity. The relationship does not appear to be linear, and the smaller savings and loan associations are erratic in this respect. Both factors reduce the value of the regression studies, which depend for effectiveness on a linear relationship. However, the mathematical form of the relationship appears to be complex, so that a linear regression with positive cash for zero deposits fits about as well as any other simple form.

In most cases, government securities appear to be used as a substitute form of liquidity, with the two ratios moving inversely. This substitution fails to appear for banks with the lowest cash ratios or for the smallest savings and loan associations. In both cases, the ratios appear to be independent. For banks, holdings of government securities are larger and cash holdings smaller for banks with more time deposits. For savings and loan associations, government security holdings increase more rapidly than share capital, while the sum of securities and cash may increase with share capital and perhaps more rapidly.

The available data fail to reveal any significant relationship between borrowing and cash holdings. None of the regression studies, with the possible exception of the time series for savings and loan associations, yields a significant result for actual volume of borrowings. We have a problem of conflicting relationships. Many banks and associations will borrow only when necessary to maintain cash reserves at some minimum acceptable level, indicating a negative correlation. However, the act of borrowing will increase reserves, indicating a positive correlation. Increased use of borrowed funds during tight money periods may also increase awareness of the effect of borrowing ability on liquidity, causing a negative correlation between

the volume of borrowing at one time and cash holdings at a later time. Member associations in the Indianapolis district were classified according to whether they had borrowed on one or more of the three annual report dates. The results indicate that non-borrowers may hold slightly more cash than borrowers, but the result would be expected on the basis of differences in size distribution. The weakness of the test and the results obtained are discussed in more detail in Chapter III, pages 90–92.

Factors relating to business conditions and interest rates have no significant influence in the two time studies. This result is consistent with the hypothesis that profit-maximization considerations are independent of these factors. However, lack of statistical significance is not sufficient grounds for stating that no influence exists. Conflicting influences could easily cancel out. In particular, the data indicate that government securities are used as substitutes for cash. It is quite possible that good business conditions, increasing demand for loans, and rising interest rates induce these institutions to reduce liquidity, but that this is accomplished by disposing of government securities instead of by reducing cash holdings.

Group Comparison for Member Banks

An attempt was made to compare the behavior of different banks, using grouped data for member banks in the seventh Federal Reserve district. The study was based on the four call reports (January 1, spring, summer, and fall) for each of three years (1952, 1955, and 1958). The banks were grouped according to three attributes:

1. Reserve classification, with country banks divided into metropolitan area banks and "rural" banks (a total of four categories).
2. City population (twelve categories).
3. Volume of deposits (ten categories).

Each group includes only banks in the same reserve and location classification, and within the same ranges of city population and deposit size. After sorting, groups in adjacent city population and/or deposit size categories were combined to the extent necessary to insure that no individual bank could be identified from the grouped data, this security requirement being the reason for not using a sample of banks. A large portion of the 480 possible groups had no banks in any year (note that the central reserve city banks are in only one city, and none are in any of the four smallest deposit size groups). Combining left

a total of forty-five categories used in 1952, forty-nine categories in 1955, and forty-four categories in 1958. After grouping, the data on individual bank reports were averaged for the four call reports in each year and for all banks in each category. The regression was then run, using the ratio of cash to total deposits as the dependent variable. The independent variables were:

1. Reserve requirement for demand deposits for the reserve classification, averaging the requirements in effect on each call date.
2. Location, assigning a value of one to banks in a netropolitan area and two to "rural" banks.
3. Midpoint of the range of city population.
4. U.S. government securities held. Separate figures for short- and long-term issues would be desirable, but were not available.
5. Total assets.
6. Borrowings.
7. Cash items in process of collection.
8. Demand balances with other banks.
9. Currency and coin.
10. Reserve deposits at the Federal Reserve bank.
11. Private demand deposits.
12. Private time deposits.
13. Total U.S. government deposits.

The expected influence of most of these factors is discussed in Chapter V. Both the location code and the city population should correlate to some extent with type of business and with location in relation to the Federal Reserve bank. If the coefficients turned out to be significant, the first should be positive and the second negative. Cash items in process of collection are a component of cash, but are not immediately available. A positive coefficient would indicate that banks do not rely on this portion of cash as heavily as other cash items, while a zero coefficient would indicate that they are considered to be equivalent to the others.

The results of the regression were entirely negative. Only one regression coefficient—that for government securities in 1958—was significantly different from zero at the .25 level. We cannot, from these statistics, draw any definite conclusions about the effect of any of the independent variables on holdings of cash assets.

A check on the results was obtained by running within-group variances of the ratio of cash to deposits (in percent) for a random sample of the groups in each year. A mode was observed each year between 20 and 25, with a secondary cluster of variances between 30 and 50. This compares with

between-group variances of 7.1 in 1952, 20.5 in 1955, and 6.5 in 1958. The higher within-group variance casts doubt on the results obtained from grouped data in the absence of further tests. There was no discernible tendency for the within-group variances to correlate with the number of banks in the group, the mean ratio for the group, or the bank size code. The check also revealed that an error in computation had been made, affecting the averages for some groups. The error was corrected before further computations were made.

A graphical check of the relationship between the ratio of cash to deposits and the total assets was made. The results were similar for all three years, except that much more spread was observed in 1955 than in the other years. No tendency could be observed for the central reserve city and reserve city banks, mainly because of the small number of observations. They did generally hold a higher ratio than all except the smallest country banks, as expected because of the higher reserve requirements. It appeared that the city banks would fit the same function as the country banks if the required reserves were deducted from total cash. This adjustment was made before the contingency tables were constructed. Deduction of required reserves permits direct comparison of banks in different reserve

classes, and with differing portions of demand and time deposits, on the basis of voluntary cash holdings. For country banks, there is a clear tendency for banks with less than $2 million in total assets to maintain a larger ratio of cash asset to deposits than that maintained by larger banks. Beyond this point, there is apparently a weak tendency for the ratio of cash to deposits to decline as the bank size increases. The observed relationship might be obtained with a constant marginal ratio of cash to deposits, but with a positive amount of cash for zero deposits. There also appears to be a weak tendency for metropolitan-area banks to maintain a lower ratio than "rural" banks of the same size. There is no clear relationship between the variance of the ratio and either the size of the ratio or the size of the bank other than that caused by the spread in the ratios between reserve classifications.

Estimated required reserves were computed by applying the reserve requirements in effect on each call date to the deposit figures. The result was deducted from cash assets to obtain free cash—the best estimate available of the amount of cash the banks were holding by choice. Similar figures were obtained for 1958, with member banks divided into fifty-three geographical

areas.[1] Both sets of data were used to construct contingency tables to examine further the relationship between some of the variables.

The contingency tables indicate a clear inverse relationship between deposit size class and the ratio of free cash to deposits. The relationship does not appear to be linear. The free cash ratio also varies inversely with both government securities and the ratio of time deposits to total deposits. The latter two ratios also move together. The data lead to the following conclusions:

1. Free cash, and probably also government securities, increase less than in proportion to deposits. Large banks are less liquid, relative to deposits, than small banks.

2. Government securities and probably required reserves are apparently sufficiently liquid to substitute for cash. This relationship does not hold for area averages in those areas with the lowest cash ratios. However, this group is dominated by

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[1]The seventh district contains thirty-one metropolitan areas and nineteen rural areas. Dividing banks in four cities according to reserve classification provided five additional areas, or a total of fifty-five. Two of the metropolitan areas were then combined with the surrounding rural area to preserve the identity of individual banks, leaving fifty-three areas.

areas with large banks, which are expected to be less liquid. Too few observations are available to obtain reliable results by size groups, but examination of the data indicates that the substitution effect is stronger than would be shown by tables omitting the effect of size.

3. Banks with a large portion of time deposits appear to rely more on government securities and less on cash. Over-all liquidity appears to be independent of the distribution of deposits between demand and time deposits.

4. The ratio of currency to deposits (obtained only for the area breakdown) appears to be fairly constant except where the amount of check-cashing business is unusually large or small. For thirty-five of fifty-three areas, the ratio was between 1-1/2 percent and 2-1/2 percent. Forty-eight areas averaged between 1 percent and 3 percent. The ratio may decline somewhat with size—all but one area with city reserve classification fell below 1-1/2 percent, with the lowest ratio held by central reserve city banks. Rural area banks are more uniform in this respect than metropolitan area banks. Only two groups fell outside the 1-1/2 percent to 2-1/2 percent range, and all were between 1 percent and 3 percent.

5. Banks farther away from the Federal Reserve bank hold somewhat more cash than the less remote banks, but distribute this cash between currency and other forms in about the same way. The influence is clouded by two conflicting patterns. Deposit size varies inversely with distance, which could account for the influence on cash. However, the importance of time deposits also varies inversely with distance, which would cause the opposite pattern of cash holdings if not cancelled by other factors. It is quite possible that influences related to type of business also correlate with distance in such a way as to cause the observed behavior.

6. Variations of type of banking and competition from other institutions between states have a definite influence on the behavior of banks. Taken by state, the results are:

Illinois has no branch banking, many savings and loan associations, and unusually many currency exchanges. Fewer areas have large average deposits than for the other states (the financial business in Chicago affects only one group), and time deposits are less important than elsewhere. Cash is somewhat low, apparently mainly resulting from less need for currency than other states, while holdings of government securities are high.

Indiana has more savings and loan associations than average, but is otherwise not distinguished to any marked degree. Time deposits are less important than for any other state except Iowa, while holdings of both cash and government securities—particularly the former—are high.

Iowa is dominantly agricultural. Small banks are more common here than in any other state, despite existence of branch banking, and time deposits least important. Cash holdings are extremely high and government securities low. The relatively low ratios of currency to free cash appear to be a result of high cash holdings and about average holdings of currency.

Branch banking is more important in Michigan than in any other state in the district, and other intermediaries less important. Large banks dominate, mainly through the absence of middle-sized banks but with about average portion of small banks. Time deposits are more important than for any other state. Holdings of cash are quite low, and government securities somewhat low. Currency holdings are unusually high, reflecting the large amount of check-cashing business.

Wisconsin has few distinguishing characteristics, except that time deposits are more important than for any state except Michigan. Cash and government security holdings follow the

pattern expected on the basis of time deposits—cash low and securities high.

Savings and Loan Associations, Indianapolis District

A comparison of individual savings and loan associations was made, using random samples of member associations at the Federal Home Loan Bank of Indianapolis. The study was based on annual report data compiled by the Home Loan Bank. A separate computation was made for data as of December 31 for the years 1955, 1956, and 1957. The dependent variable was total cash. The independent variables were:

1. Cash deposited with the Federal Home Loan Bank.
2. Total share capital.
3. Federal Home Loan Bank advances.
4. General reserves and surplus.
5. Total assets.
6. Percentage increase in total assets during the year.
7. First mortgage loans and real estate contracts.
8. Federal Home Loan Bank stock.
9. U.S. government securities.

Tests for statistical significance yielded mixed results. None of the computed regression coefficients were significantly different from zero at the .10 level. However, the size of the correlation coefficients indicates that differences in cash holdings could be explained by one or more of the independent variables. In 1956 and 1957, the largest correlation was with total savings, while in 1955 the correlation with mortgage loans was slightly better. In each year the multiple correlation coefficient was larger, but not enough so to justify the conclusion that the multiple regression yields better results than simple regression.

The simple regression coefficients proved to be more significant, but some difficulty arises in determining which of the factors should be considered to be important. In 1955, the coefficients for deposits at the Home Loan Bank, total savings, total assets, mortgage loans, and Home Loan Bank stock are significant at the .10 level, but none at the .05 level. In both 1956 and 1957, seven of the coefficients—all except Home Loan Bank advances and growth rate—were significant at the .05 level. Of these, all except government securities in 1956 and Home Loan Bank deposits in 1957 were significant at the .005 level, while the coefficients for total savings and total assets in both years, and mortgage loans in 1956, were significant at the .0005 level.

The slope of the simple regression of the total cash on total savings was computed and compared with the ratios of the corresponding means from the sample. In two years, the regression coefficient was substantially smaller than the ratio of the means. In 1955, the regression coefficient was about .052, compared with the ratio of average cash assets to average share capital of .061. In 1957, the statistics were .050 and .062. In 1956, the two values were both quite close to .074. These statistics tend to support the conclusion that the ratio of cash to share capital declines slightly as the size of the association increases, although the results for 1956 are more consistent with the hypothesis that the ratio is a constant. The regression coefficient indicates the marginal relationship, which will be less than the average if the latter declines with increasing size. A plot of the ratio of cash to share capital against total share capital for one year reveals a fairly constant mode of the ratio between .06 and .07, independently of size. However, small associations were more likely to have higher than lower ratios, while large associations were more likely to have small ratios. This indicates that size has the anticipated effect on cash holdings, but that the influence is fairly weak.

Examination of the data indicates that the standard errors of the regression coefficients may have been affected substantially by the high correlations between some of the independent variables. The correlations between share capital and total assets for the three years were .9998, .9985, and .9996, indicating that these are, for our purposes, the same variable. It is obvious that nothing was gained, and statistical significance may have been lost, by including both variables in the multiple regression.

Contingency tables were constructed from the data for 1957, using all member associations except two new ones. Because of similarities, results of a similar series of tables for a random sample of one hundred insured associations in the Chicago district will be discussed in this section. Ratios rather than totals were used in most cases.

The results indicate that the ratio of cash to share capital declines slightly as size increases. This effect is more marked in the Chicago district than for Indianapolis. In both cases, but particularly for Indianapolis, associations with less than $4 million share capital were more likely to have extremely high or extremely low ratios. In both cases, this variability of small associations is the dominant characteristic. The test for independence for associations with over $4 million share capital

turns out to be insignificant in both districts, so we cannot reject the hypothesis that the ratio of cash to share capital is distributed independently of size except for the smaller associations.

The ratios of cash to share capital and government securities to share capital vary inversely for the larger associations. In both cases, the test indicates that the two ratios are not independent either for all associations or for associations with share capital over $3.5 million. The two ratios appear to be independent for the smaller associations.

For both districts, the ratio of government securities to share capital varies directly with share capital, indicating that the larger associations rely more heavily on government securities. For Indianapolis members, the ratio of liquid assets (cash plus government securities) also increases with size, while for Chicago members this ratio appears to be independent of size.

In summary, the smaller associations are quite unpredictable. The larger associations probably hold less cash and more government securities as share capital increases. Within size groups, the two forms of liquidity are substitutes, although this relationship may not hold for the smaller associations.

A check of the cash ratios for borrowing and nonborrowing associations in the Indianapolis district was made. Associations with over $3 million total assets were divided into two groups according to whether or not they had borrowed from the Home Loan Bank on one or more of the three annual report dates for which data were available. The weakness of this test is discussed in Chapter III, pages 90ff. The test failed to disclose any significant variation in the cash ratios for the two groups. The variation that occurred was in the direction expected. Nonborrowers accounted for a slightly larger portion of associations in the next-to-lowest range. This result could be attributed to variations in the size distribution of the two groups. The data available introduce some distortion in the results, part of which may act to reduce the statistical significance. The associations included in the borrower category may include some who consistently borrow prior to the annual report date for the purpose of showing high cash ratios on the published balance sheet. The nonborrower category probably includes some associations that are willing to permit cash holdings to fall quite low on the annual report date rather than show reliance on borrowing, although they may intend to increase liquidity by borrowing early in January. Also, once money is borrowed, cash is increased

first by the act of borrowing, and subsequently in order to repay the loan. No clear conclusions can be drawn in the absence of more reliable data.

Savings and Loan Associations, Chicago District

A similar study was run for a sample of all insured savings and loan associations in the Chicago Home Loan Bank district,[1] based on annual report data for 1957. The dependent variable was cash. The independent variables were:

1. Total assets.
2. Share capital.
3. Percent increase of share capital during the year.
4. Mortgage loans.
5. U.S. government securities.

The multiple regression coefficient for total assets was significant at the .10 level, while those for mortgage loans and government securities were significant only at the .25 level. As was true for associations in the Indianapolis district, total assets

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[1]This is a smaller group than all member associations, since a savings and loan association must be a member of the Federal Home Loan Bank before it can obtain coverage from the Federal Savings and Loan Insurance Corporation.

and share capital were so highly correlated that they should be treated as a single variable. The regression indicates that cash is adjusted to total assets rather than share capital. However, total assets have a slightly higher correlation with the other two significant variables, indicating that share capital may be the more reliable variable. The negative sign obtained for the regression coefficient for share capital is clearly a result of the correlation with total assets.

Correlations were large enough that three of the simple regression coefficients—those for total assets, share capital, and mortgage loans—were significant at the .005 level. The simple regression for government securities is significant at the .10 level. The multiple correlation coefficient is not enough larger than the three largest simple correlations to justify use of the multiple regression equation in preference to simple regression, given the significance levels obtained for the regression coefficients. This conclusion might be changed if dropping some of the variables would improve the significance levels without reducing the multiple correlation substantially.

Time Series for Member Banks

A time study for member commercial banks was based on data published in the Federal Reserve Bulletin for various months. The data covered a period of ninety months from January, 1951, through June, 1958. The dependent variable was cash. The independent variables were:

1. Interbank demand deposits.
2. Other demand deposits.
3. Time deposits.
4. Loans.
5. U.S. government obligations.
6. Other securities.
7. Interest rate on prime commercial paper.
8. Market yield on 91-day bills.
9. Federal Reserve discount rate (New York, start of month).
10. Index of Industrial Production, seasonally adjusted.
11. Required reserves.
12. Excess reserves.
13. Borrowing at Federal Reserve banks.

The data were obtained for five groups of banks:

1. All member banks.

2. Central reserve city banks, New York City.

3. Central reserve city banks, Chicago.

4. Reserve city banks.

5. Country banks.

The same study was run for each group, using the same interest rate and index data for each group.

The coefficients for the three types of deposit were expected to be positive, and if obtained within sufficiently small confidence limits they would indicate the marginal ratio of cash assets to each type of deposit. The coefficients for interbank deposits and demand deposits should be similar unless they are considered to have different velocities, while the coefficient for time deposits should be smaller. Interbank deposits present a complication, particularly in the all member bank series, because these are liabilities for one group of banks and cash assets for another group, so that the effect is hard to isolate. No prediction would be made about the coefficient for loans. The coefficients for securities should be negative if banks actually use these items as substitute sources of liquidity, with the size of the coefficient indicating the degree of liquidity ascribed to securities. The coefficient for other securities should be less than that for government securities, and might be zero. Negative

coefficients for the interest rates would indicate that banks respond to changes in the cost of keeping nonearning assets, while zero coefficients would indicate that this is not an important factor. The index of industrial production should correlate with the demand for loans, since demand for bank loans will change with business activity, of which industrial production is an important segment. A negative coefficient would indicate that banks reduce cash reserves in order to make new loans when business activity increases. The coefficient for required reserves should be positive. A coefficient of one would indicate that banks adjust to the volume of available cash that is not frozen in required reserves, while a smaller coefficient would indicate that banks rely on required reserves to some extent as a source of liquidity. The coefficient for excess reserves should be zero unless banks attribute differing degrees of liquidity to different components of cash assets. A negative coefficient would indicate that banks either consider reserve accounts to be more liquid than other cash items or that they increase such items as correspondent balances more than enough to compensate for the squeeze on reserves during periods of tight money. A slightly positive coefficient might indicate a spurious relationship resulting from the fact that this variable is a part of the dependent variable. A

positive coefficient for borrowings would indicate that, once funds are borrowed, cash is accumulated to permit repayment. A negative coefficient could indicate that, as borrowings increase, the number of banks relying on borrowing ability as a source of liquidity increases; but it could also indicate a reverse causation, with the amount borrowed increasing when the volume of cash is less than would normally be desired to support the existing volume of deposits. A zero coefficient could indicate either that this is not an important variable or that opposing tendencies cancel out.

Examination of the multiple correlation coefficients for the classes of banks reveals that the central reserve city banks are least predictable, while country banks are most predictable. The reserve city banks and all member banks fall in between.

For the central reserve city banks in New York and Chicago, one and three variables, respectively, verge on significance, but the significance level is so low that it could easily be explained by the existence of serial correlation in the data. For New York, the coefficient for interbank deposits is significant at the .25 level. For Chicago, the coefficients for demand deposits, loans, and government securities are significant at the same level. For these banks, the data do not justify rejecting the hypothesis

that changes in holdings of cash over time are explained entirely by factors other than those included in this study.

The results obtained for all member banks and reserve city banks provide more justification for concluding that some of the coefficients are not zero. The coefficients for demand deposits and government securities in both cases, and that for loans for all member banks, are significantly different from zero at the .05 level, so that rejection of the hypothesis that the true coefficients are zero might be justified. However, the existence of serial correlation throws some doubt on the results obtained. Therefore, no positive conclusions can be drawn. The negative coefficients for loans probably reflect response to the demand for loans, increasing deposits without a corresponding increase in cash assets.

The statistics obtained for country banks are clearer in their implications. The coefficients for demand deposits, time deposits, and loans are significantly different from zero at the .005 level, the coefficient for government securities is decidedly significant at the .01 level, and the coefficient for other securities at the .25 level. Serial correlation does not appear to be sufficient to explain these results. We can therefore conclude that demand deposits, time deposits, loans, and probably

government securities are factors that influence cash holdings by country banks. The lack of significance for the coefficient for interbank deposits probably reflects the relatively small amount of such deposits held by these banks—they are usually on the other side of this operation. The negative coefficient for loans probably reflects response to the demand for loans, as indicated above. We should note that the amount of loans made by all member banks will affect the volume of cash only if it changes the volume of interbank deposits or if it induces the Federal Reserve to modify its policy. However, loans made by a group of banks will cause a loss of reserves to banks outside the group, reducing cash, and bring some increase in deposits, which would normally require more cash reserves.

We can summarize the results obtained as follows:

1. We note that in no case do the regression coefficients obtained for the three types of deposits—interbank, demand, and time—differ significantly. In every instance except the central reserve city banks the coefficients computed are remarkably close. The most startling result is that, in every instance except the reserve city banks, the coefficient for time deposits is larger than for demand deposits. The standard errors are sufficiently

large the the three types of deposits sufficiently correlated to explain this result without necessarily rejecting the a priori expectation that demand deposits would require more liquidity reserves than time deposits. This result may also indicate that, during periods of tight money—when all of the variables are large because of prosperous conditions—high interest rates induce the public to hold relatively more of their liquid assets in the form of time deposits rather than demand deposits, while the situation is reversed when credit is easy.

2. The coefficients for the interest rates, the index of industrial production, and borrowings are not significant in any instance. The results indicate that interest rates do not have an important net effect. Both the index of industrial production and loans reflect economic conditions and the pressure to make loans, but the statistical tests indicate that actual loans are a better indicator of the response of banks to this pressure. The lack of significance for borrowings may indicate either that this is not an important variable or that opposing tendencies cancel out.

3. For country banks, the coefficient for required reserves is significantly less than one at the .025 level, and nearly

so at the .01 level. For all member banks this coefficient is significantly less than one at the .25 level—a level which would normally justify rejecting the hypothesis that the coefficient is one, but certainly does not prove that the true value is one. These statistics support the hypothesis that banks depend on required reserves as a source of liquidity, so that this coefficient would be negative in a regression for cash minus required reserves. No conclusion can be drawn from the coefficients for the other classes of banks.

4. In no case is the regression coefficient for excess reserves significantly different from zero, and is in each instance quite small relative to its standard error. Further, the sign is positive for two bank classes but negative for the other groups. These statistics lend support to the hypothesis that the relevant quantity is total cash, regardless of its composition. Although interbank deposits do not provide liquidity for the banking system as a whole, bank managers apparently act as though interbank deposits are equivalent to excess reserves and vault cash.

Time Series for Savings and Loan Associations

An attempt was made to determine factors causing changes over time for member savings and loan associations in the

Indianapolis Home Loan Bank district. The form of the data available made computation difficult. The data were those available for the monthly board meetings. Monthly reports are received from all member associations, but there generally are a few associations whose reports do not arrive in time to be consolidated before the board meetings. Since the number and size of associations missing vary substantially from month to month, some adjustment of the raw data is required. The starting point is the date of one of the annual reports, when actual totals for the district are known. Then we use the ratio of net savings to share capital for the subsequent month for the associations included in the report as the estimated rate of change for all associations. By a chain process of estimation, basing the figure for each month on the estimate obtained for the previous month, the estimated total share capital for all months can be obtained. Then the various ratios to share capital for the reporting associations were multiplied by the estimated total share capital to obtain estimated district totals of Federal Home Loan Bank advances, government securities, and cash.

This process leaves much to be desired, since most of the data are estimates based on several previous estimates. All we can say is that the quantities estimated for any one month bear

approximately the correct relationship to the adjacent months and to other quantities for the same month. Comparison of results on the three annual report dates for which complete data are available indicates that the results obtained are reasonably accurate. In any case, the estimates used are the best monthly information available.

The regression was run using the estimated total cash as the dependent variable. The independent variables were the various ratios and estimates cited above plus the actual district total of deposits at the Home Loan Bank. This last amount is entered on the monthly report directly from the bank's books rather than from the association reports.

Despite the large multiple correlation coefficient, only the coefficients for the ratio of liquid assets to share capital and for Home Loan Bank deposits are significantly different from zero at the .25 level. The correlations with total cash are large enough that four of the simple regression coefficients—those for share capital, Home Loan Bank advances, deposits at the Home Loan Bank, and government securities—are significant at the .10 level. The correlation for Home Loan Bank deposits is larger than any of the others. This statistic probably indicates that these deposits—constituting, on the average, slightly more than half of

total cash—are adjusted closely to the total amount, rather than indicating any difference in liquidity attributed to this form of cash.

CHAPTER VII

CONCLUSION

A number of related propositions have been examined. In many cases, the conclusions have been stated in very general terms. This study is by no means definitive. In a large measure, this is a result of the fact that the statistical tests it has been possible to make are not adequate for the purpose, although they give some general indications.

The hypothesis that intermediaries increase the liquidity of indirect debt, and the related hypothesis that this increase in liquidity increases the interest-elasticity of liquidity preference, was first examined. In support of the first hypothesis is the logic of arguments based on the law of large numbers. Diversification of the portfolio, both by acquiring obligations of many, largely independent, economic units, and by staggering maturities, tends to create a portfolio that is, ceteris paribus, more liquid than the same obligations would be if held directly. The law of large numbers also allows intermediaries to increase in liquidity by permitting account holders to withdraw their funds without notice,

and with relatively small cash reserves, because the aggregate amount of such withdrawals can be predicted. Economies of scale help to keep the cost to account holders, in the form of the lower return on indirect debt, within the limits that many people are willing to pay. The only statistical evidence which can be brought to support this hypothesis is the study by Selden, which indicates that individuals who are induced to accept near-moneys in place of money do not behave much differently than they would holding money.[1] In this respect, intermediaries are not unique—the same thing can be said of any direct debt that serves as near-money. Government savings bonds have the same type of effect as accounts at the mutual thrift institutions. However, intermediaries can enable deficit spending units to issue debt that is fairly illiquid, and still obtain financing from individuals who want to hold assets that are quite liquid.

The major statistical evidence in support of the second hypothesis again comes from Selden. He found that rising interest rates during the 1955 to 1957 period induced individuals to accept near-moneys in place of money.[2] We can also rely on

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[1] Journal of Political Economy, LXVII No. 1.

[2] Ibid.

the argument that existence of near-moneys causes precautionary balances to be responsive to interest rates. Since intermediaries provide a substantial portion of the available supply of near-moneys, they are partially, but not entirely, responsible for this response. On the other side, we have both statistical evidence and arguments that indicate that the effect is not very large. Two studies indicate that the demand for money has a fairly low elasticity with respect to the rate of interest, after other influences have been accounted for.[1] Coupled with these indications about elasticity, an evaluation of the impact of the uncontrolled intermediaries indicates that they are responsible for only a small reduction in the demand for money, at least in absolute terms, during recent tight money periods. This is partly a result of the fact that, even if all intermediaries were prevented from expanding as a result of the demand for loans during tight money periods, the public could still acquire near-money in place of money, and indirectly finance further deficit spending, largely by acquiring some forms of government debt. Two arguments help to support this conclusion. First, the arguments that indicate that most shifts of precautionary balances from money to

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[1] Bronfenbrenner and Mayer, Econometrica, XXVII No. 4; and Friedman, Journal of Political Economy, LXVII No. 4.

intermediary claims will occur at low interest rates, indicating that the major effect is a shift in the liquidity preference function, rather than an increase in its slope. Second, it is probable that speculative balances become less elastic—those who are induced to sell securities in hope that prices will fall are likely to acquire fixed-value claims, such as intermediary accounts, instead of money, if they think that the decline will take some time.

Intermediaries have an undesirable effect on the ability of the Federal Reserve to stabilize our economy only to the extent that they actually succeed in financing deficit spending during tight money periods that otherwise would be stopped. To the extent that they induce the public to accept near-moneys instead of money, they create a potential increase in spending by increasing the supply of loanable funds. Intermediaries can afford to pay a higher return to attract more funds only if their lending rates also increase. If the demand for current output is quite elastic with respect to the rate of interest, increased lending rates will cause aggregate demand to fall. Most of the impact of changes in bank reserves will fall on spending unless the demand for money is also highly elastic. However, if investment demand is quite inelastic, any funds attracted by intermediaries will help

to weaken monetary controls. In this case, intermediaries can increase lending rates without pricing many borrowers out of the market. The impact of changes in bank reserves will fall primarily on the demand for money, and the effect on spending will be small. The best that can be said here is that investment demand appears to be more interest-elastic than some pessimistic appraisals, and investment surveys, indicate.[1] On the other hand, if much of the effect of tight money is achieved through inability to obtain financing at the prevailing interest rate, rather than reduced spending caused by rising interest, the leakage through intermediaries becomes more important. Many qualified borrowers will be willing and able to pay the prevailing rate of interest, but do not spend because they are unable to find lenders. Intermediaries may be able to raise interest rates sufficiently to attract funds, and thereby permit spending to rise because of the increased supply of loanable funds, because the higher interest rates have less effect than the improved availability of credit.

Taken together, the evidence we have examined weighs largely in the direction of supporting the hypothesis that nonbank intermediaries are subject to sufficient indirect restraint during

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[1]White, American Economic Review, XLVI No. 4.

tight money periods that direct controls over them is not essential. However, we have by no means proven this point. Our evidence indicates that intermediaries do cause some leakage from the effect of monetary restraint, and therefore, that greater restraint on bank reserves is required because of their operations. It is possible that various institutional factors limit the amount of restraint that will be imposed on bank reserves below the level required to make monetary restraint sufficiently effective against inflation. The nonbank intermediaries would not then be the only cause for the difficulty, but would be the logical target for action designed to reduce the existing weakness.

In Chapter III, the effect of borrowing by intermediaries was examined. Central bank lending operations could provide a source of reserves that could offset any policy action. If the only restraint on borrowing is profit, it would be necessary to impose a penalty lending rate except when lending is being encouraged. However, there are two other restraints could be effective. A tradition to the effect that sound banks do not borrow very frequently may impose some restraint, keeping the actual volume of borrowing below the level consistent with profit maximization. The evidence indicates that tradition is not completely

effective today.[1] On the other hand, Federal Reserve lending policies virtually force any bank that borrows to repay the loan fairly quickly. This imposes a restraint on borrowing of the same type as would be obtained from an effective tradition against borrowing, although perhaps to a lesser degree.[2] To the extent that the stated Federal Reserve policy is effective in limiting the total volume of member bank borrowing (and not just borrowing by individual banks), the net effect of present discount window policies is an increase in the time lag between policy action and its impact on spending, rather than a reduction in the degree of impact. The major restraint on borrowing by members of the Federal Home Loan Banks is profit. However, the funds thus provided must be obtained elsewhere, so that the restraint on lending by savings and loan associations is transferred rather than eliminated.[3]

The final two chapters were an attempt to fit liquidity functions for member commercial banks and savings and loan associations, with the objective of finding a means of predicting the

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[1] Alhadeff, Monopoly . . ., Ch. IX.

[2] Whittlesey, Quarterly Journal of Economics, LXXIII No. 2.

[3] McKinley, Journal of Finance, XII No. 3.

effect of a change in reserves on lending. The conclusion that can be stated with most assurance is that the behavior of these institutions cannot be predicted accurately on the basis of the statistical work shown here. However, we can indicate the direction of effect on some factors.

We found that the marginal effective reserve ratio (the ratio of desired cash holdings, including excess reserves, to account liabilities) for both types of intermediary seems to be lower than the average ratio. The average ratio of cash to account liabilities declines as the size of the bank or savings and loan association increases. This indicates that the ratio of new loans to new reserves made available is larger than would be obtained by using the average effective reserve ratio, although in the case of member commercial banks it will be somewhat smaller than would be obtained by using the legal reserve requirement. The effect is stronger for commercial banks than for savings and loan associations, apparently reflecting the liquidity derived by banks from required reserves.

The second conclusion is that government securities serve, to some extent, as a substitute for cash holdings. Because of their liquidity, an increase in the amount of government securities held will reduce the amount of cash held. This

indicates that the ability and willingness of financial intermediaries to reduce their holdings of government securities in order to increase loans during tight money periods weakens monetary controls to a lesser degree than the volume of securities sold might indicate. Some tightening of security markets must be accomplished before the public can be induced to buy the securities offered for sale. In addition, because of the effect on the liquidity of the intermediaries, a given amount of new loans will be made only if a somewhat larger amount of securities can be sold. The evidence indicates that intermediaries may be induced to reduce liquidity somewhat when the demand for loans and interest rates rise, but that this is accomplished almost entirely by selling securities, instead of by reducing cash reserves.

The statistical evidence indicates that intermediaries may rely on borrowing ability as a source of liquidity, but the evidence is not conclusive. The best test we were able to obtain, for savings and loan associations, revealed a statistically insignificant tendency in this direction. Further, the associations relying on borrowing were larger, on the average, than the other associations, so that differences in size could account for the variations that were observed. The results can be cited in support of the hypothesis that borrowing ability reduces cash

holdings only because of a bias in the classification. Because of incomplete information, we were forced to count some associations as nonborrowers, and even though they actually do rely on borrowing to a degree—and this group includes some of the associations that we would expect to have low cash ratios.

For commercial banks, we also found substantial variations in cash holdings that seem to reflect differences in the type of business. Both cash holdings and the distribution of free cash between currency and other forms seems to be affected by such considerations as location (farming area, city residential, or business area) and competition from other intermediaries for savings accounts and check-cashing services.

APPENDIXES

STATISTICAL RESULTS

These appendixes include the statistics on which the conclusions given in Chapter VI are based. Appendixes A through E are results of multiple linear regression equations fitted for the data. Appendixes F and G give contingency tables, taking the variables by pairs. The multiple regression equations make it possible to separate the effect of different variables, even when the independent variables are correlated to a degree. However, in the form for which the equations are fitted, it can show only linear relationships. The contingency tables reveal the relationship, regardless of the form, but do not permit separation of the effects of different variables.

Throughout, the results are considered to be statistically significant if the significance level is .01 or less, and insignificant if the significance level is greater than .10. Between those two levels, there is a borderline case which is evaluated on the basis of other considerations.

APPENDIX A

STATISTICAL RESULTS

The data used for these three regressions were based on member bank call reports in the seventh Federal Reserve district. The banks were grouped on the basis of reserve classification, population of the city or metropolitan area, size of bank, and for country banks, whether the bank is located in an urban or rural area. The regression was run on the basis of averages for all banks in each group, and for the four call dates in each year.

The results are uniformly not statistically significant, although the multiple correlation coefficients are reasonably large. The lack of significance may indicate that we have variables that are not important or that the relationships are not linear. The original data indicate that grouping eliminated some of the variation of cash holdings. The variance of the ratio of cash to total deposits between banks in the same group is larger, in every case for which it was checked, than is the same ratio for the group averages.

The following symbols are used in the multiple regression tables:

a_p = the multiple regression coefficient for x_p

x_p = an independent variable

$r_{x_p y}$ = the simple coefficient of correlation between the dependent and independent variables

s_p = standard error of a_p

R = the multiple correlation coefficient

S_e = standard error of estimate for the regression equation

N = number of observations

No entries are made in the significance-level columns for those items which were not significant at the .25 level.

TABLE 6.—Multiple regression; call report data, 1952 (dependent variable: ratio of cash to total deposits, percent).

Variable, x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Required reserve ratio	+.550	+.821	2.310		
2. Location code . . .	-.023	+.841	4.382		
3. City population . .	+.338	-.00082	.0057		
4. Government securities	+.196	-.00118	.0026		
5. Total assets	+.219	+.00031	.0033		
6. Borrowings	+.197	-.00570	.0458		
7. Cash items in process of collection	+.253	+.00255	.0083		
8. Balances with banks	+.179	-.00082	.0163		
9. Currency and coin	+.118	+.00640	.0271		
10. Reserve accounts	+.241	-.00092	.0171		
11. Private demand deposits	+.223	-.000083	.0019		
12. Private time deposits	+.132	+.00018	.0035		
13. Total government deposits	+.206	+.00327	.0143		

$R = .858$; $S_e^2 = 2.67$; $N = 45$.

TABLE 7.—Multiple regression; call report data, 1955 (dependent variable: ratio of cash to total deposits, percent).

Variable, x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Required reserve ratio	+.213	+ .198	4.908		
2. Location code . . .	+.199	+2.977	9.722		
3. City population . .	+.152	+ .0016	.0155		
4. Government securities	+.117	- .0003	.0049		
5. Total assets	+.125	+ .0006	.0073		
6. Borrowings	+.112	- .0046	.156		
7. Cash items in process of collection	+.150	+ .0022	.0238		
8. Balances with banks	+.041	- .0037	.0225		
9. Currency and coin	+.069	+ .0120	.0627		
10. Reserve accounts	+.137	- .00095	.0148		
11. Private demand deposits	+.131	- .00081	.0066		
12. Private time deposits	+.075	- .00047	.0063		
13. Total government deposits	+.126	+ .00067	.0677		

$R = .748$; $S_e^2 = 12.37$; $N = 49$.

TABLE 8.—Multiple regression; call report data, 1958 (dependent variable: ratio of cash to total deposits, percent).

Variable, x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Required reserve ratio	+.446	+ .663	2.665		
2. Location code . . .	+.260	+2.062	4.935		
3. City population . .	+.327	+ .00014	.0055		
4. Government securities	+.354	- .0039	.0037		.25
5. Total assets	+.376	+ .00014	.0019		
6. Borrowings	+.365	- .0046	.0800		
7. Cash items in process of collection	+.415	+ .0016	.0057		
8. Balances with banks	+.394	- .00079	.0132		
9. Currency and coin	+.252	+ .0012	.0134		
10. Reserve accounts	+.394	- .0024	.0088		
11. Private demand deposits	+.387	+ .00020	.0031		
12. Private time deposits	+.266	- .00016	.0022		
13. Total government deposits	+.369	+ .0025	.0121		

$R = .880$; $S_e^2 = 2.11$; $N = 44$.

APPENDIX B

MULTIPLE REGRESSION; MEMBER SAVINGS AND LOAN ASSOCIATIONS

Tables 9–12 give the results of regression equations for random samples of savings and loan associations. The data used are based on year-end annual reports, without any adjustments. The three equations fitted for members of the Indianapolis Home Loan Bank involve more independent variables than that for members of the Chicago bank, since the former provides the additional information.

In each instance, the multiple correlation coefficient is fairly large. Only in the Indianapolis data for 1955 did we fail to find simple correlations large enough to yield several clearly significant simple regressions. However, only one multiple regression coefficient—total assets in the Chicago data—is even on the verge of significance. This reflects the high cross-correlations among the independent variables, and could also indicate that the relationships are not entirely linear.

TABLE 9.—Multiple regression; member savings and loan associations, Indianapolis, 1955 (dependent variable: total cash).

x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Deposits at F.H.L.B. .	+.811	+.456	.597	.10	.25
2. Total share capital . .	+.847	-.0737	.928	.10	
3. Home Loan Bank advances	+.606	-.104	.933	.25	
4. General reserves and surplus	+.716	-.309	1.058	.25	
5. Total assets	+.848	+.424	.880	.10	
6. Percent increase in assets	+.039	+.745	8.975		
7. First mortgage loans and real estate contracts	+.851	-.308	.410	.10	.25
8. Home Loan Bank stock	+.822	-.751	4.108	.10	
9. Government securities	+.524	-.312	.452		.25

$R = .982$; $S_e^2 = 11{,}792$; $N = 90$.

TABLE 10.—Multiple regression; member savings and loan associations, Indianapolis, 1956 (dependent variable: total cash).

x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Deposits at F.H.L.B.	+.960	+ .451	.722	.005	
2. Total share capital .	+.971	+ .319	.879	.0005	
3. Home Loan Bank advances	+.190	+ .339	.896		
4. General reserves and surplus	+.944	- .051	1.166	.005	
5. Total assets	+.969	+ .196	.769	.0005	
6. Percent increase in assets	+.076	+ .555	12.49		
7. First mortgage loans and real estate contracts . . .	+.962	- .459	.612	.0005	.25
8. Home Loan Bank stock	+.952	-1.422	9.162	.005	
9. Government securities	+.919	- .490	.542	.025	.25

$R = .998$; $S_e^2 = 12{,}039.7$; $N = 90$.

TABLE 11.—Multiple regression; member savings and loan associations, Indianapolis, 1957 (dependent variable: total cash).

x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Deposits at F.H.L.B.	+.867	+ .688	.622	.05	.25
2. Total share capital	+.964	+ .235	.610	.0005	
3. Home Loan Bank advances	+.193	+ .325	.711		
4. General reserves and surplus	+.947	- .116	.858	.005	
5. Total assets	+.964	- .0072	.614	.0005	
6. Percent increase in assets	+.083	- .555	10.51		
7. First mortgage loans and real estate contracts . .	+.959	- .226	.406	.005	
8. Home Loan Bank stock	+.959	+2.372	10.42	.005	
9. Government securities	+.938	- .255	.469	.005	

$R = .993$; $S_e^2 = 24{,}973.2$; $N = 90$.

TABLE 12.—Multiple regression; member savings and loan associations, Chicago, 1957 (dependent variable: total cash).

x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Total assets	+.949	+.306	.264	.005	.10
2. Share capital	+.946	-.018	.251	.005	
3. Percent increase in share capital . .	-.082	-.527	8.021		
4. Mortgage loans . . .	+.948	-.259	.302	.005	.25
5. Government securities	+.842	-.468	.370	.10	.25

$R = .990$; $S_e^2 = 19{,}318.6$; $N = 110$.

APPENDIX C

MULTIPLE REGRESSION, MEMBER COMMERCIAL BANKS

Tables 13–17 give the results of multiple regression for time series for member banks, based on data published in the Federal Reserve Bulletin. The data are monthly figures, without adjustment from the published data. In each case, we have ninety observations, covering January, 1951, through June, 1958.

We note that the multiple correlation coefficients vary inversely with the average size of banks in the group. The results give us no basis for predicting the behavior of the central reserve city banks in New York, and virtually none for Chicago. The results for all member banks and for the reserve city banks give us some indications of influences on cash holdings, while the results for country banks are still more reliable.

Because of the existence of serial correlation in the data, the multiple correlation coefficients and the significance levels must be discounted. Once this is done, we observe some indication that, for country banks, cash assets vary directly with both demand and time deposits, and inversely with loans and government securities. For all member banks and for reserve city

banks, only the regression for demand deposits can be considered to be significant. In each case, the standard errors of the regression coefficients are large enough that we are unable to draw accurate conclusions about the size of the effective reserve ratios.

TABLE 13.—Multiple regression; member commercial banks, all member banks (dependent variable: cash assets).

x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Interbank deposits	+.823	+ .800	.632	.10	.25
2. Demand deposits	+.783	+ .745	.290	.25	.01
3. Time deposits .	+.537	+ .751	.466		.10
4. Loans	+.570	- .610	.309	.25	.05
5. Government securities	-.133	- .584	.299		.05
6. Other securities	+.492	- .815	1.071		.25
7. Prime rate . . .	+.371	+202.0	2203.		
8. Yield, 91-day bills	+.385	- 99.5	5952.		
9. Discount rate, N.Y.	+.450	+446.	2166.		
10. Index of industrial production	+.434	- 15.7	66.45		
11. Required reserves	+.094	+ .173	.742		
12. Excess reserves	-.245	- .729	4.536		
13. Borrowed from Federal Reserve banks . .	+.255	+ .401	1.543		

$R = .994$; $S_e^2 = 54{,}420.4$.

TABLE 14.—Multiple regression; member commercial banks, central reserve city banks, New York (dependent variable: cash assets).

x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Interbank deposits . . .	+.290	+ .135	1.773		.25
2. Demand deposits . . .	+.063	+ .0026	.0530		
3. Time deposits	+.118	+ .165	3.210		
4. Loans	+.137	- .153	1.018		
5. Government securities . .	-.063	- .024	1.093		
6. Other securities . . .	-.095	- .137	2.910		
7. Prime rate	+.143	+444.1	3238.		
8. Yield, 91-day bills . .	+.146	+316.0	2544.		
9. Discount rate, N.Y. .	+.142	-291.2	3067.		
10. Index of industrial production .	-.024	- 14.45	109.4		
11. Required reserves . .	+.109	+ 1.102	2.513		
12. Excess reserves	+.198	- .109	14.90		
13. Borrowed from Federal Reserve banks	+.190	+ .427	5.766		

$R = .775$; $S_e^2 = 112{,}913.$

TABLE 15.—Multiple regression; member commercial banks, central reserve city banks, Chicago (dependent variable: cash assets).

x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Interbank deposits	-.022	+ .484	.843		
2. Demand deposits	+.472	+ .617	.479		.25
3. Time deposits . .	-.227	+ .829	2.816		
4. Loans	-.148	- .524	.735		.25
5. Government securities	+.134	- .548	.643		.25
6. Other securities	-.329	- .959	1.818		
7. Prime rate	+.024	+ .270	394.2		
8. Yield, 91-day bills	+.051	-29.30	312.0		
9. Discount rate, N.Y.	-.070	+36.92	394.9		
10. Index of industrial production .	-.114	+ 1.003	14.45		
11. Required reserves	+.452	+ .107	1.766		
12. Excess reserves	-.046	+ .0577	11.74		
13. Borrowed from Federal Reserve banks	-.015	+ .554	1.187		

$R = .903$; $S_e^2 = 2{,}190.2$.

TABLE 16.—Multiple regression; member commercial banks, reserve city banks (dependent variable: cash assets).

x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Interbank deposits	+.845	+ .746	.536	.10	.10
2. Demand deposits	+.870	+ .752	.323	.05	.025
3. Time deposits . .	+.688	+ .746	.593	.25	.25
4. Loans	+.732	- .594	.358	.25	.10
5. Government securities	-.174	- .609	.345		.05
6. Other securities	+.594	- .809	1.473	.25	
7. Prime rate	+.468	+110.7	328.8		
8. Yield, 91-day bills	+.478	-162.6	266.3		
9. Discount rate, N.Y.	+.570	+165.9	381.8	.25	
10. Index of industrial production .	+.614	+ 2.386	42.45	.25	
11. Required reserves	+.604	+ .095	1.102	.25	
12. Excess reserves	-.513	+ .035	6.090		
13. Borrowed from Federal Reserve banks	+.207	+ .525	1.366		

$R = .993$; $S_e^3 = 15{,}248.1$.

TABLE 17.—Multiple regression; member commercial banks, country banks (dependent variable: cash assets).

x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Interbank deposits	+.893	+ .763	1.676	.05	
2. Demand deposits	+.773	+ .880	.276	.25	.0005
3. Time deposits . .	+.557	+ .898	.311		.005
4. Loans	+.563	- .749	.255		.005
5. Government securities	+.430	- .739	.287		.01
6. Other securities	+.563	- .926	.830		.25
7. Prime rate	+.303	+33.80	479.9		
8. Yield, 91-day bills	+.324	+ 7.15	381.7		
9. Discount rate, N.Y.	+.403	+24.11	517.5		
10. Index of industrial production .	+.420	- 7.40	21.07		
11. Required reserves	+.436	+ .053	.399		
12. Excess reserves	-.075	- .190	2.054		
13. Borrowed from Federal Reserve banks	+.270	+ .448	2.113		

$R = .997$; $S_e^2 = 3{,}193.0$.

APPENDIX D

MULTIPLE REGRESSION, FEDERAL HOME LOAN BANK OF INDIANAPOLIS, MONTHLY

Table 18 gives the result of a regression equation for a time series for member savings and loan associations in the Indianapolis Home Loan Bank district. The data are estimates based on the monthly reports submitted in time for the monthly board meetings. The estimates are based on the known totals for all members on the three annual report dates used for the estimates in Appendix B above, reported change of share capital for reporting associations (always a substantial portion of all associations), and the reported ratio of other balance sheet items to share capital for the same associations.

The regression coefficients are in all cases statistically insignificant, despite the high multiple correlation coefficient. Because of the large simple correlations, we can probably conclude that cash holdings are adjusted closely to share capital. The high correlation with Federal Home Loan Bank deposits probably indicates that these deposits are adjusted closely with other cash items.

TABLE 18.—Multiple regression; Federal Home Loan Bank of Indianapolis, monthly (dependent variable: total cash).

x_p	$r_{x_p y}$	a_p	s_p	Significance Level	
				Simple	Multiple
1. Share capital	+.927	+ .052	.114	.01	
2. F.H.L.B. advances . .	-.170	+ .035	1.17		
3. Ratio/advances/share capital	-.861	+2281.	16674.	.10	
4. Withdrawals/share capital	+.004	+ 371.	4257.		
5. Net savings/share capital	+.017	+2043.	6915.		
6. Liquid assets/share capital	-.633	+9607.	8824.	.25	.25
7. Government securities/share capital	-.734	-8902.	20959.	.25	
8. F.H.L.B. deposits . . .	+.975	+ .687	.711	.0005	.25
9. Government securities .	+.830	- .027	1.26	.10	

$R = .996$; $S_e^2 = 8{,}250{,}043.1.$

APPENDIX E

CONTINGENCY TABLES, MEMBER BANK CALL REPORT DATA

Tables 19–42 were prepared from the data that were used in the regression equations given in Appendix A, with a few adjustments. First, some errors in computation of the original data that were discovered after the regression computations were made were corrected. Second, estimated required reserves were deducted from cash assets, and the resulting estimate of free cash was used in these tables. Third, ratios rather than totals were used in most cases.

Tables 19–21 show the relationship between the ratio of free cash to deposits and the volume of deposits. There is a clear inverse relationship between the two variables in each year, indicating that free cash rises less than proportionately to deposits. To some extent, this result could reflect some reliance on required reserves for liquidity, since the group averages for deposits are generally somewhat larger for banks in the city reserve classes than for country banks.

Tables 22–24 show a similar relationship for government securities. There appears to be a growing tendency for the ratio

TABLE 19.—Relationship between the ratio of free cash to deposits and the volume of deposits, 1958.

Total Deposits ($ million)	Ratio of Free Cash to Deposits (pct.)			Totals
	8.9 & Under	9.0–10.9	11.0 & Over	
1 and under 5	0	1	9	10
5 and under 20	5	12	3	20
20 and over	9	4	1	14
Totals	14	17	13	44

Significance level, .005; relationship, inverse.

TABLE 20.—Relationship between the ratio of free cash to deposits and the volume of deposits, 1955.

Total Deposits ($ million)	Ratio of Free Cash to Deposits (pct.)			Totals
	8.9 & Under	9.0–10.9	11.0 & Over	
1 and under 5	1	3	10	14
5 and under 20	4	11	4	19
20 and over	7	6	3	16
Totals	12	20	17	49

Significance level, .01; relationship, inverse.

TABLE 21.—Relationship between the ratio of free cash to deposits and the volume of deposits, 1952.

Total Deposits ($ million)	Ratio of Free Cash to Deposits (pct.)			Totals
	9.0 & Under	10.0–11.9	12.0 & Over	
1 and under 5	0	3	11	14
5 and under 20	4	10	3	17
20 and over	6	6	2	14
Totals	10	19	16	45

Significance level, .005; relationship, inverse.

TABLE 22.—Relationship between the ratio of government securities to deposits and the volume of deposits, 1958.

Total Deposits ($ million)	Ratio of Government Securities to Deposits (pct.)			Totals
	37.9 & Under	38.0–41.9	42.0 & Over	
1 and under 5	0	6	4	10
5 and under 20	1	14	5	20
20 and over	8	3	3	14
Totals	9	23	12	44

Significance level, .005; relationship, inverse.

TABLE 23.—Relationship between the ratio of government securities to deposits and the volume of deposits, 1955.

Total Deposits ($ million)	Ratio of Government Securities to Deposits (pct.)				Totals
	41.9 & Under	42.0–43.9	44.0–47.9	48.0 & Over	
1 and under 5	2	5	5	2	14
5 and under 20	1	7	7	4	19
20 and over	8	1	5	2	16
Totals	11	13	17	8	49

Significance level, .05; relationship, inverse.

TABLE 24.—Relationship between the ratio of government securities to deposits and the volume of deposits, 1952.

Total Deposits ($ million)	Ratio of Government Securities to Deposits (pct.)			Totals
	44.9 & Under	45.0–46.9	47.0 & Over	
1 and under 5	7	4	3	14
5 and under 20	8	5	4	17
20 and over	7	1	6	14
Totals	22	10	13	45

Significance level, .50; relationship, apparently independent.

to vary inversely with size, accompanied by a decline in the ratio through time. Perhaps this indicates that the largest banks have been under most pressure to shift from government securities to loans in recent years. We note that the significance of the relationship has been increasing, and that the ratio of governments to deposits was apparently independent of size in 1952.

Based on Tables 25–27, there appears to be no relationship between the ratio of time deposits to total deposits and size.

TABLE 25.—Relationship between the ratio of time deposits to deposits and the volume of deposits, 1958.

Total Deposits ($ million)	Ratio of Time Deposits to Deposits (pct.)			Totals
	35.9 & Under	36.0–43.9	44.0 & Over	
1 and under 5	5	2	3	10
5 and under 20	7	7	6	20
20 and over	6	3	5	14
Totals	18	12	14	44

Significance level, .75; relationship, apparently independent.

TABLE 26.—Relationship between the ratio of time deposits to deposits and the volume of deposits, 1955.

Total Deposits ($ million)	Ratio of Time Deposits to Deposits (pct.)				Totals
	29.9 & Under	30.0–35.9	36.0–39.0	40.0 & Over	
1 and under 5	4	5	2	3	14
5 and under 10	1	3	1	4	9
10 and under 50	1	7	2	8	18
50 and over	3	2	2	1	8
Totals	9	17	7	16	49

Significance level, >.5; relationship, independent.

TABLE 27.—Relationship between the ratio of time deposits to deposits and the volume of deposits, 1952.

Total Deposits ($ million)	Ratio of Time Deposits to Deposits (pct.)			Totals
	29.9 & Under	30.0–39.9	40.0 & Over	
1 and under 5	5	6	3	14
5 and under 20	0	11	6	17
20 and over	5	7	2	14
Totals	10	24	11	45

Significance level, .25; relationship, independent or inverse.

Tables 28–30 show the relationship between the ratios for free cash and government securities. In 1952 and 1955, the ratios may move inversely, but the relationship is not statistically significant. In 1958, we get a significant relationship resulting from a strong tendency for the two ratios to move together except for banks with one ratio fairly high. Taken at face value, these results are not consistent with the hypothesis that government securities provide a substitute form of liquidity. However, the previous tables show a strong relationship with size for both ratios in 1958, and to a lesser degree in 1955. We may have

TABLE 28.—Relationship between the ratios for free cash and government securities, 1958.

Ratio of Cash to Deposits (pct.)	Ratio of Government Securities to Deposits (pct.)			Totals
	37.9 & Under	38.0–41.9	42.0 & Over	
8.9 and under	7	3	4	14
9.0 through 10.9	0	12	5	17
11.0 and over	2	8	3	13
Totals	9	23	12	44

Significance level, .01; relationship, direct for the two smaller classes of both ratios, independent elsewhere.

TABLE 29.—Relationship between the ratios for free cash and government securities, 1955.

Ratio of Cash to Deposits (pct.)	Ratio of Government Securities to Deposits (pct.)			Totals
	41.9 & Under	42.0–45.9	46.0 & Over	
8.9 and under	3	3	6	12
9.0 through 10.9	3	8	9	20
11.0 and over	5	9	3	17
Totals	11	20	18	49

Significance level, .5; relationship, apparently independent, possibly inverse.

TABLE 30.—Relationship between the ratios for free cash and government securities, 1952.

Ratio of Cash to Deposits (pct.)	Ratio of Government Securities to Deposits (pct.)			Totals
	44.9 & Under	45.0–46.9	47.0 & Over	
9.9 and under	3	1	6	10
10.0 through 11.9	9	5	5	19
12.0 and over	10	4	2	16
Totals	22	10	13	45

Significance level, .25; relationship, independent or inverse.

banks substituting between securities and cash, but with the effect of size on both ratios swamping the substitution effect.

Tables 31–33 show the relationship between the cash ratio and the time deposit ratio. In 1958, any interdependence is insignificant, while we have borderline cases in the other two years. The departures are in the direction of smaller cash holdings for banks with relatively large time deposits. We get some indication that time deposits require less liquidity than demand deposits, but that this is nearly covered by differences in legal reserve requirements.

TABLE 31.—Relationship between the cash ratio and the time deposit ratio, 1958.

Ratio of Cash to Deposits (pct.)	Ratio of Time Deposits to Deposits (pct.)			Totals
	35.9 & Under	36.0–43.9	44.0 & Over	
8.9 and under	3	6	5	14
9.0 through 10.9	6	4	7	17
11.0 and over	9	2	2	13
Totals	18	12	14	44

Significance level, .25; relationship, independent or inverse.

TABLE 32.—Relationship between the cash ratio and the time deposit ratio, 1955.

Ratio of Cash to Deposits (pct.)	Ratio of Time Deposits to Deposits (pct.)			Totals
	32.9 & Under	33.0–39.9	40.0 & Over	
8.9 and under	2	3	7	12
9.0 through 10.9	4	8	8	20
11.0 and over	10	6	1	17
Totals	16	17	16	49

Significance level, .025; relationship, inverse.

TABLE 33.—Relationship between the cash ratio and the time deposit ratio, 1952.

Ratio of Cash to Deposits (pct.)	Ratio of Time Deposits to Deposits (pct.)			Totals
	29.9 & Under	30.0–39.9	40.0 & Over	
9.9 and under	2	6	2	10
10.0 through 11.9	1	12	6	19
12.0 and over	7	6	3	16
Totals	10	24	11	45

Significance level, .10; relationship, inverse or independent, not linear.

Tables 34–36 show the relationship between the government security and time deposit ratios. There appears to be a direct relationship, except for 1952. This gives some indication that banks with relatively large time deposits tend to rely on government securities for liquidity, possibly instead of cash.

Tables 37–39 indicate the relationship between the ratio of liquid assets (cash plus government securities) to total deposits. As expected from the behavior of the two components, there is a significant inverse relationship for each year. The most interesting result is that the effect is weaker than would be

TABLE 34.—Relationship between the government security and time deposit ratios, 1958.

Ratio of Government Securities to Deposits (pct.)	Ratio of Time Deposits to Deposits (pct.)			Totals
	35.9 & Under	36.0–43.9	44.0 & Over	
37.9 and under	5	3	1	9
38.0 through 41.9	10	8	5	23
42.0 and over	3	1	8	12
Totals	18	12	14	44

Significance level, .10; relationship, direct.

TABLE 35.—Relationship between the government security and time deposit ratios, 1955.

Ratio of Government Securities to Deposits (pct.)	Ratio of Time Deposits to Deposits (pct.)			Totals
	32.9 & Under	33.0–39.9	40.0 & Over	
43.9 and under	9	13	2	24
44.0 through 47.9	6	4	7	17
48.0 and over	1	0	7	8
Totals	16	17	16	49

Significance level, .005; relationship, apparently direct but not linear.

TABLE 36.—Relationship between the government security and time deposit ratios, 1952.

Ratio of Government Securities to Deposits (pct.)	Ratio of Time Deposits to Deposits (pct.)			Totals
	44.9 & Under	45.0–46.9	47.0 & Over	
29.9 and under	6	2	2	10
30.0 through 39.9	13	5	6	24
40.0 and over	3	3	5	11
Totals	22	10	13	45

Significance level, .50; relationship, apparently independent.

TABLE 37.—Relationship between the ratio of liquid assets to total deposits, 1958.

Total Deposits ($ million)	Ratio of Liquid Assets to Deposits (pct.)			Totals
	48.9 & Under	49.0–51.9	52.0 & Over	
1 and under 5	0	4	6	10
5 and under 20	3	11	6	20
20 and over	8	4	2	14
Totals	11	19	14	44

Significance level, .01; relationship, inverse.

TABLE 38.—Relationship between the ratio of liquid assets to total deposits, 1955.

Total Deposits ($ million)	Ratio of Liquid Assets to Deposits (pct.)			Totals
	52.9 & Under	53.0–56.9	57.0 & Over	
1 and under 5	0	8	6	14
5 and under 20	3	10	6	19
20 and over	10	3	3	16
Totals	13	21	15	49

Significance level, .005; relationship, inverse.

TABLE 39.—Relationship between the ratio of liquid assets to total deposits, 1952.

Total Deposits ($ million)	Ratio of Liquid Assets to Deposits (pct.)				Totals
	54.9 & Under	55.0–56.9	57.0–58.9	59.0 & Over	
1 and under 5	0	4	4	6	14
5 and under 20	3	8	3	3	17
20 and over	6	2	5	1	14
Totals	9	14	12	10	45

Significance level, .025; relationship, inverse.

expected if holdings of cash and government securities are independent, giving some evidence that banks do use government securities as a substitute for cash.

Tables 40–42 show the relationship between time deposits and liquid assets. The relationship is statistically insignificant for each year. To the extent that any tendency can be observed, it is a direct relationship. This indicates that any inverse relationship between the time deposit ratio and the cash ratio is fully compensated, and perhaps overcompensated, by larger holdings of government securities.

TABLE 40.—Relationship between time deposits and liquid assets, 1958.

Ratio of Time Deposits to Deposits (pct.)	Ratio of Liquid Assets to Deposits (pct.)			Totals
	48.9 & Under	49.0–51.9	52.0 & Over	
35.9 and under	5	7	6	18
36.0 through 43.9	4	7	1	12
44.0 and over	2	5	7	14
Totals	11	19	14	44

Significance level, .25; relationship, independent or direct.

TABLE 41.—Relationship between time deposits and liquid assets, 1955.

Ratio of Time Deposits to Deposits (pct.)	Ratio of Liquid Assets to Deposits (pct.)			Totals
	52.9 & Under	53.0–56.9	57.0 & Over	
32.9 and under	4	7	5	16
33.0 through 39.9	7	8	2	17
40.0 and over	2	6	8	16
Totals	13	21	15	49

Significance level, .25; relationship, apparently independent, possibly direct for top two time deposit classes.

TABLE 42.—Relationship between time deposits and liquid assets, 1952.

Ratio of Time Deposits to Deposits (pct.)	Ratio of Liquid Assets to Deposits (pct.)				Totals
	54.9 & Under	55.0–56.9	57.0–58.9	59.0 & Over	
29.9 and under	3	2	1	4	10
30.0 through 39.9 . . .	5	10	6	3	24
40.0 and over	1	2	5	3	11
Totals	9	14	12	10	45

Significance level, .25; relationship, apparently independent.

APPENDIX F

MEMBER BANK CALL REPORT DATA, AREA GROUPING, 1958

The 1958 member bank call reports for 1958 were regrouped and averaged by geographical area. The grouping is described in the footnote on page 179. The results obtained can be compared with those in the previous appendix to obtain some indication of the effect of location. The major influence of location seems to be on the type of business. The regrouping makes the banks in each group less uniform in respect to the size of bank, and to some extent more uniform with respect to geographical influences.

Tables 43–44 show the relationship between size and cash holdings or government securities, respectively. The cash ratio shows the same significant inverse relationship that we observed in Table 19. However, the relationship does not appear to be linear; the areas with the largest average size of bank account for a very large portion of the groups with the lowest cash ratios, but also a fairly large portion of the groups with the largest cash ratios. The areas with the smallest banks fall heavily in the middle range of the cash ratio. The government security

TABLE 43.—Relationship between size and cash holdings.

Deposits ($ million)	Ratio of Free Cash to Deposits (pct.)			Totals
	8.9 & Under	9.0–11.9	12.0 & Over	
Under 10	3	10	6	19
10 and under 40	3	8	6	17
40 and over	12	0	5	17
Totals	18	18	17	53

Significance level, .005; relationship, inverse, apparently but not linear.

TABLE 44.—Relationship between size and government securities.

Deposits ($ million)	Ratio of Government Securities to Deposits (pct.)			Totals
	34.9 & Under	35.0–39.9	40.0 & Over	
Under 10	4	7	8	19
10 and under 40	5	4	8	17
40 and over	8	6	3	17
Totals	17	17	19	53

Significance level, .5; relationship, apparently independent, possibly inverse.

ratio may move inversely with size, but with this grouping the effect is statistically insignificant.

Table 45 shows the relationship between cash and government securities. As in Tables 28–30, there is some indication of substitution, but it is inconclusive. We get a result verging on significance only by omitting the areas with the smallest cash ratios.

Tables 46–47 show the relationship between cash and government securities, respectively, and time deposits. The fact that Table 46 shows a much stronger inverse relationship between cash

TABLE 45.—Relationship between cash and government securities.

Ratio of Cash to Deposits (pct.)	Ratio of Government Securities to Deposits (pct.)			Totals
	34.9 & Under	35.0–39.9	40.0 & Over	
8.9 and under	6	6	6	18
9.0 through 11.9	4	4	10	18
12.0 and over	7	7	3	17
Totals	17	17	19	53

Significance level, .5 for all cells, .10 omitting the first line; relationship, apparently inverse except for banks with smallest cash ratios.

TABLE 46.—Relationship between cash and time deposits.

Ratio of Time Deposits to Demand Deposits (pct.)	Ratio of Free Cash to Deposits (pct.)			Totals
	8.9 & Under	9.0–11.9	12.0 & Over	
44.9 and under	1	5	12	18
45.0 through 84.9	7	6	5	18
85.0 and over	10	7	0	17
Totals	18	18	17	53

Significance level, .005; relationship, inverse.

TABLE 47.—Relationship between government securities and time deposits.

Ratio of Time Deposits to Demand Deposits (pct.)	Ratio of Government Securities to Deposits (pct.)			Totals
	34.9 & Under	35.0–39.9	40.0 & Over	
44.9 and under	10	2	6	18
45.0 through 84.5	3	8	7	18
85.0 and over	4	7	6	17
Totals	17	17	19	53

Significance level, .10; relationship, possibly direct.

and time deposits than did Tables 31–33 indicates that the effect is probably geographical. Apparently, various regional influences that give the banks relatively more time deposits also act to reduce the need for cash reserves. With this grouping, we observe the same borderline indication that banks with relatively large time deposits also hold relatively more government securities, as was shown in Table 34. Here, the effect seems to be stronger if we omit the areas with the largest ratios of government securities to deposits.

Table 48 shows the relationship between the ratio of currency to free cash and the time deposit ratio. The results may no longer apply, since currency now counts as part of legal reserves. There is a clear direct relationship between the two ratios. Taken with the results of Table 46, this result indicates that banks with relatively large time deposits may hold about the same amount of currency as banks for which time deposits are less important, but that they hold smaller excess reserves or other cash items, such as correspondent balances.

Tables 49–53 show the connection between our various measures and distance from the Federal Reserve bank (Chicago) or branch (Detroit). First, we find that the areas closest to the reserve bank have the largest banks. Then we find that the more

TABLE 48.—Relationship between the ratio of currency to free cash and the time deposit ratio.

Ratio of Time Deposits to Demand Deposits (pct.)	Ratio of Currency to Free Cash (pct.)			Totals
	14.9 & Under	15.0–20.9	21.0 & Over	
44.9 and under	11	4	3	18
45.0 through 84.9	3	9	6	18
85.0 and over	1	6	10	17
Totals	15	19	19	53

Significance level, .005; relationship, direct.

TABLE 49.—Relationship between total deposits and distance from the Federal Reserve bank.

Distance from Federal Reserve Bank (miles)	Total Deposits ($ million)			Totals
	10 & Under	10–40	40 & Over	
89 and under	2	6	9	17
90 through 164	8	4	4	16
165 and over	9	7	4	20
Totals	19	17	17	53

Significance level, .10; relationship, apparently inverse.

TABLE 50.—Relationship between the ratio of free cash to deposits and distance from the Federal Reserve bank.

Distance from Federal Reserve Bank (miles)	Ratio of Free Cash to Deposits (pct.)			Totals
	8.9 & Under	9.0–11.9	12.0 & Over	
89 and under	10	5	2	17
90 through 164	5	7	4	16
165 and over	3	6	11	20
Totals	18	18	17	53

Significance level, .025; relationship, direct.

TABLE 51.—Relationship between the ratio of time deposits to demand deposits and distance from the Federal Reserve bank.

Distance from Federal Reserve Bank (miles)	Ratio of Time Deposits to Demand Deposits (pct.)			Totals
	44.9 & Under	45.9–84.9	85.0 & Over	
89 and under	2	7	8	17
90 through 164	5	5	6	16
165 and over	11	6	3	20
Totals	18	18	17	53

Significance level, .10; relationship, probably inverse.

TABLE 52.—Relationship between the ratio of government securities to deposits and distance from the Federal Reserve bank.

Distance from Federal Reserve Bank (miles)	Ratio of Government Securities to Deposits (pct.)			Totals
	34.9 & Under	35.0–39.9	40.0 & Over	
89 and under	5	4	8	17
90 through 164	2	7	7	16
165 and over	10	6	4	20
Totals	17	17	19	53

Significance level, .25; relationship, independent or inverse.

TABLE 53.—Relationship between the ratio of currency to free cash and distance from the Federal Reserve bank.

Distance from Federal Reserve Bank (miles)	Ratio of Currency to Free Cash (pct.)			Totals
	14.9 & Under	15.0–20.9	21.0 & Over	
89 and under	2	8	7	17
90 through 164	4	5	7	16
165 and over	9	6	5	20
Totals	15	19	19	53

Significance level, .25; relationship, independent or inverse.

distant banks hold more free cash. This would be expected on the basis of size, but the effect is stronger, and also is counter to what we would expect on the basis of the relationship for time deposits. Since time deposits appear to be less important for banks in the more distant areas, our previous results would indicate that the cash ratio should also fall. On balance, this indicates either that distance has some influence or, more likely, that the banks in rural areas tend to hold relatively more cash than do banks in the larger cities. The government security ratio shows an insignificant tendency to fall with distance. The ratio of currency to free cash also shows an insignificant tendency to fall. This may indicate that currency holdings actually rise with distance, since the denominator in the ratio shows a tendency to rise.

Tables 54–58 compare the area groupings by states. First, although some size variation between the states can be observed, it is not statistically significant and is not strong enough to explain the variation of the several ratios. Rather, such factors as the type of industry, branch banking laws, and competition from other financial institutions seem to influence the results. We also find that much of the effect found for distance can be observed in the state-by-state comparison. The results are described in

TABLE 54.—Relationship between state location and size.

Deposits ($ million)	State					Totals
	Ill.	Ind.	Iowa	Mich.	Wis.	
Under 10	4	4	6	3	2	19
10 and under 40 . .	6	2	4	1	4	17
40 and over	3	3	1	8	2	17
Totals	13	9	11	12	8	53

Significance level, .25.

TABLE 55.—Relationship between state location and ratio of cash to deposits.

Ratio of Cash to Deposits (pct.)	State					Totals
	Ill.	Ind.	Iowa	Mich.	Wis.	
8.9 and under	5	0	1	9	3	18
9.0 through 11.9 . .	5	3	3	3	4	18
12.0 and over	3	6	7	0	1	17
Totals	13	9	11	12	8	53

Significance level, .005.

TABLE 56.—Relationship between state location and ratio of government securities to deposits.

Ratio of Government Securities to Deposits (pct.)	State					Totals
	Ill.	Ind.	Iowa	Mich.	Wis.	
34.9 and under . . .	3	1	7	5	1	17
35.0 through 39.9 .	2	5	2	7	1	17
40.0 and over	8	3	2	0	6	19
Totals	13	9	11	12	8	53

Significance level, .005.

TABLE 57.—Relationship between state location and ratio of time deposits to demand deposits.

Ratio of Time Deposits to Demand Deposits (pct.)	State					Totals
	Ill.	Ind.	Iowa	Mich.	Wis.	
44.9 and under . . .	5	4	8	0	1	18
45.0 through 84.9 .	6	4	2	3	3	18
85.0 and over	2	1	1	9	4	17
Totals	13	9	11	12	8	53

Significance level, .005.

TABLE 58.—Relationship between state location and ratio of currency to cash.

Ratio of Currency to Cash (pct.)	State					Totals
	Ill.	Ind.	Iowa	Mich.	Wis.	
14.9 and under . . .	4	3	7	0	1	15
15.0 through 20.9 .	6	4	2	2	5	19
32.0 and over	3	2	2	10	2	19
Totals	13	9	11	12	8	53

Significance level, .005.

detail on pages 181–83 above. The most striking result is that the state in which branch banking is most prevalent, Michigan, has relatively low cash and government security ratios, and high time deposit and currency ratios. The two states with the most rural areas, Iowa and Indiana, have high cash ratios and low time deposit ratios.

APPENDIX G

CONTINGENCY TABLES, SAVINGS AND LOAN ASSOCIATIONS

The data on which these tables are based are derived from annual report data as of the end of 1957. With the exception of Table 67, the data for the Indianapolis Federal Home Loan Bank district include reports for all member associations in the district except for two associations that had been established too recently for the data to be meaningful. For Table 67, only associations with over $3 million total assets were included. For the Chicago district, a sample of one hundred was drawn from the insured associations in the district.

Tables 59–60 show the relationship between cash and size. For Indianapolis, the results are insignificant if we include all associations, and verge on significance if we omit associations with less than $4 million share capital. For Chicago, the results verge on significance. We have some indication that the cash ratio declines with size, but the effect is weaker than for commercial banks.

Tables 61–62 show the relationship between size and holdings of government securities. In neither case is the relationship

TABLE 59.—Relationship between cash and size, Indianapolis.

Share Capital ($ million)	Ratio of Cash to Share Capital (pct.)					Totals
	4.9 & Under	5.0–6.9	7.0–9.9	10.0–12.9	13.0 & Over	
1.9 and under	14	10	6	14	7	51
2.0 through 3.9 . . .	12	10	10	5	5	42
4.0 through 6.9 . . .	8	14	14	10	4	50
7.0 through 9.9 . . .	5	13	5	2	1	26
10.0 through 19.9 .	8	11	10	3	2	34
20 and over	6	14	5	4	0	29
Totals	53	72	50	38	19	232

Significance level, .10 for all cells, over .5 omitting first two lines; relationship, apparently independent.

TABLE 60.—Relationship between cash and size, Chicago.

Share Capital ($ million)	Ratio of Cash to Share Capital (pct.)				Totals
	4.9 & Under	5.0–6.9	7.0–9.9	10.0 & Over	
Under 2	12	4	6	6	28
2 and under 4	7	12	4	5	28
4 and under 10	11	6	6	2	25
10 and over	14	2	3	0	19
Totals	44	24	19	13	100

Significance level, .05; relationship, inverse.

TABLE 61.—Relationship between size and holdings of government securities, Indianapolis.

Share Capital ($ million)	Ratio of Government Securities to Share Capital (pct.)					Totals
	3.9 & Under	5.0–5.9	6.0–8.9	9.0–12.9	13.0 & Over	
Under 2	20	10	9	7	5	51
2 and under 4 . . .	9	11	11	5	6	42
4 and under 7 . . .	16	8	10	10	6	50
7 and under 10 . . .	5	8	4	5	4	26
10 and under 20 . .	6	7	5	11	5	34
20 and over	0	3	11	8	7	29
Totals	56	47	50	46	33	232

Significance level, .05 for all cells or omitting first two lines, over .5 for first two lines alone; relationship, apparently direct for larger associations.

TABLE 62.—Relationship between size and holdings of government securities, Chicago.

Share Capital ($ million)	Ratio of Government Securities to Share Capital (pct.)				Totals
	3.9 & Under	4.0–5.9	6.0–8.9	9.0 & Over	
Under 2	11	9	4	4	28
2 and under 4	13	4	4	7	28
4 and under 10	6	8	6	5	25
10 and over	1	4	7	7	19
Totals	31	25	21	23	100

Significance level, .10; relationship, probably direct.

clearly significant, and with the Indianapolis associations there is no significant relationship for the smaller associations. To the extent that an actual relationship exists, it is in the direction of relatively larger holdings of government securities for the larger associations.

Tables 63–64 show the variation of total liquid assets (cash plus government securities) with size. We have some indication of a significant relationship for the Indianapolis associations, but it is fairly weak. To the extent that a tendency can be observed,

TABLE 63.—Relationship between total liquid assets and size, Indianapolis.

Share Capital ($ million)	Ratio of Liquid Assets to Share Capital (pct.)					Totals
	10.9 & Under	11.0–13.9	14.0–16.9	17.0–19.9	20.0 & Over	
1.9 and under	18	12	6	5	10	51
2.0 through 3.9 . . .	10	13	7	5	7	42
4.0 through 6.9 . . .	7	15	12	11	5	50
7.0 through 9.9 . . .	6	10	2	3	5	26
10.0 through 19.9 .	3	8	15	2	6	34
20.0 and over	2	6	7	7	7	29
Totals	46	64	49	33	40	232

Significance level, .025.

TABLE 64.—Relationship between total liquid assets and size, Chicago.

Share Capital ($ million)	Ratio of Liquid Assets to Share Capital (pct.)			Totals
	10.9 & Under	11.0–16.9	17.0 & Over	
Under 2	17	7	4	28
2 and under 4	15	8	5	28
4 and under 10	10	11	4	25
10 and over	5	11	3	19
Totals	47	37	16	100

Significance level, .25; relationship, apparently independent.

it is in the direction of greater liquidity for the larger associations. The result for Chicago is statistically insignificant.

Tables 65–66 show the relationship between the two liquidity ratios. In both cases there is a significant inverse relationship. We have a strong indication that savings and loan associations substitute between cash and government securities. However, for both districts this substitution does not seem to hold for the smaller associations. For the Indianapolis district, separate checks were made for associations larger than $3.5 million share capital and those smaller. The smaller associations showed

TABLE 65.—Relationship between two liquidity ratios, Indianapolis.

Ratio of Cash to Share Capital (pct.)	Ratio of Government Securities to Share Capital (pct.)					Totals
	3.9 & Under	4.0–5.9	6.0–8.9	9.0–12.9	13.0 & Over	
4.9 and under	4	9	14	12	14	53
5.0 through 6.9 . . .	11	17	16	19	9	72
7.0 through 9.9 . . .	15	10	10	10	5	50
10.0 through 12.9 .	15	8	7	4	4	38
13.0 and over	11	3	3	1	1	19
Totals	56	47	50	46	33	232

Significance level, .005 for all associations and all over $3.5 million share capital, .5 for associations under $3.5 million share capital; relationship, inverse for larger associations.

TABLE 66.—Relationship between two liquidity ratios, Chicago.

Ratio of Cash to Share Capital (pct.)	Ratio of Government Securities to Share Capital (pct.)			Totals
	3.9 & Under	4.0–8.9	9.0 & Over	
4.9 and under	4	26	14	44
5.0 through 9.9	20	16	7	43
10.0 and over	7	4	2	13
Totals	31	46	23	100

Significance level, .005; relationship, inverse, but this does not appear to hold for the smaller associations.

no significant relationship. The same type of behavior seems to hold for the Chicago associations also. Taken with the previous tables, we find a definite substitution effect, with some tendency for the larger associations to depend more heavily on government securities than do the smaller associations. The smallest associations do not follow any clear pattern, which may reflect the fact that the gain from maintaining a close check on nonearning assets can be less than the cost if the volume is small.

In preparing Table 67, the associations in the Indianapolis district were classified as "borrowing associations" if they

TABLE 67.—Relationship between the ratio of cash to share capital and borrowing, Indianapolis.

Associations	Ratio of Cash to Share Capital (pct.)					Totals
	4.9 & Under	5.0–6.9	7.0–9.9	10.0–12.9	13.0 & Over	
Borrowers	21	47	26	12	6	112
Nonborrowers	11	14	13	11	5	54
Totals	32	61	39	23	11	166

Significance level, .25; relationship, possibly independent, possibly lower cash ratio for borrowing associations.

reflected borrowings on the published balance sheet for 1955, 1956, or 1957. Further discussion of this test and its weakness is presented on page 90 above. Because of the irregularity observed for the smaller associations, only those associations with total assets over $3 million were included. The results are inconclusive. The variation was in the direction of lower cash ratios for the borrowing associations, but it was not statistically significant. The result could also be explained on the basis of the size distribution of the two groups; the larger associations appeared more heavily in the borrower category. However, the difficulty of classification probably biased the data in the other direction; those associations that will normally borrow, but did not do so on any of the three dates used, are expected to have lower cash ratios than the average.

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