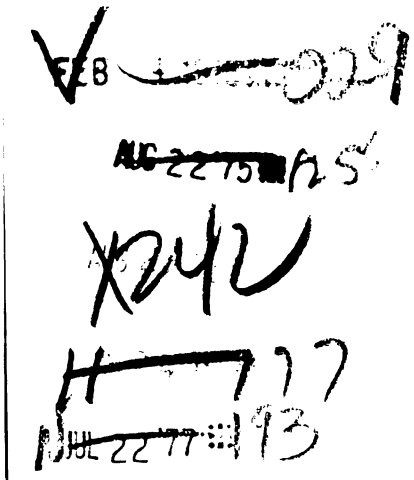

ABSTRACT

THE DEMAND FOR SAVINGS AND LOAN SHARES: AN EMPIRICAL TEST OF THE STATIC AND DYNAMIC INFLUENCE OF INTEREST RATES

By

Richard T. Nyerges

In the years since the end of the Second World War, funds flows from individuals have moved erratically among financial institutions favoring first one institution and then another. Since the mid 1966 period, the fluctuations in funds flows have become considerably more erratic than previously and financial institutions of all kinds have witnessed a phenomenon which has come to be known as disintermediation; a situation in which sources of funds directly seek outlets into capital market instruments and thereby circumvent the traditional financial intermediaries.

Two such periods of disintermediation have been previously recorded in 1966 and 1969-70 and the economy is currently feeling the effects of a third. Although the impact has been felt by all financial institutions, it has been particularly hard on savings and loan associations which, during the past eight years, have been subject to "feast or famine" situations.

The main thrust of this thesis is to provide an explanation for disintermediation as it affects savings and loan associations by

examining both the long-run and short-run demand functions for savings and loan association share accounts.

The technique of inquiry used in the study is linear regression analysis. The basic model may be described as a multiple linear regression model which employes the least squares estimating technique. The data base is composed of quarterly time-series observations which were collected over a twenty year period beginning with the first quarter of 1952 and ending with the last quarter of 1971. In its final "test form" the model may be described as equation (1) below.

$$(1)\ SLA_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3it} + \beta_4 X_{4jt} + \gamma_1 Z_{1t} + \delta_1 X_{1t} Z_{1t} + \delta_2 X_{2t} Z_{1t} + \delta_3 X_{3it} Z_{1t} + \delta_4 X_{4jt} Z_{1t} + \gamma_2 Z_{2t} + \eta_1 X_{1t} Z_{2t} + \eta_2 X_{2t} Z_{2t} + \eta_3 X_{3it} Z_{2t} + \eta_4 X_{4jt} Z_{2t} + \gamma_3 Z_{3t} + \gamma_4 Z_{4t} + \gamma_5 Z_{5t} + \varepsilon_t$$

where: SLA = the aggregate household holdings of savings and loan shares

X_1 = the aggregate level of personal disposable income

X_2 = the own rate (the interest return promised on savings and loan shares)

X_{3i} = the rate of interest promised on the competitive institutional assets (for i = mutual savings bank deposits and commercial bank time and savings deposits)

X_{4j} = the average market return obtained on potentially competitive market instruments (for j = 3 month Treasury bills, 9 - 12 month Government bills, 3 - 5 year Government bonds, state and local obligations, and corporate bonds)

Z_1 = the disintermediation dummy
= 1 during periods of disintermediation affecting savings and loan associations
= 0 otherwise

Z_2 = the normal flow dummy
= 1 during normal flow periods
= 0 otherwise

Z_3, Z_4, Z_5 = the seasonal dummies

Z_3 = 1 during the summer quarter
= 0 otherwise

Z_4 = 1 during the fall quarter
0 otherwise

Z_5 = 1 during the winter quarter
0 otherwise

Dummy variables have been included to allow for testing the proposition that there are changes in the demand for savings and loan shares during periods when market interest rates are pushed beyond the level at which savings institutions may effectively compete for funds.

The results of the study may be summarized as follows:

1. Over the long-term period studied, interest rates play a major role in the determination of the demand for savings and loan shares. Of the two rate classifications examined (institutional and market), institutional rates dominated indicating a degree of residual resistancy toward intermediation.

2. Of the two competitive institutional rates tested, the rate on mutual savings bank deposits consistently entered with a higher degree of elasticity than did the rate on commercial bank deposits thus representing the greatest source of competition for savings and loan shares. The greatest single degree of elasticity is overwhelmingly associated with the own rate. Of the available market rates tested, the intermediate to long-term securities appear to be the most important substitutes although the extremely short-run securities may have some importance. Savers (as a whole) do not appear to be motivated by the tax considerations offered by the state and local obligations.

3. The demand function does not appear to be completely stable over time. Rather the function is subject to shifts definitely among the market rates and possibly among all parameters. The shifts appear to be dependent upon the general fluctuations in interest rates. There is some evidence to indicate that freely competitive institutional rates would lend greater stability to demand although this, by itself, would not totally eliminate the shift potential.

4. Finally, there is some weak evidence to indicate that the intra market asset ranking (i.e., long-term vs. short-term) remains fairly constant even during periods when the market assets assume increasing importance in the determination of the demand for savings and loan shares.

Given the results, the following recommendations are warranted:

First, the ceiling rate on all savings type deposit assets should be removed allowing associations and the remaining financial institutions the flexibility necessary to meet rapid changes in the market rates of interest.

Second, increase the downward flexibility of the rates paid on high yield assets. This, of course, is much easier said than done; but it might be possible. The yields on large deposit, high yield assets don't seem to suffer from downward inflexibility; apparently because large depositors are able to distinguish between special yield assets and regular passbook accounts. Small depositors, on the other hand, are not apparently able to make this distinction. Could this be because associations and other institutions have not attempted to create a difference in the eyes of the saver? Golden Passbooks, Interest Five, and even certificates of deposit don't inherently connote a difference. If termed differently, say a Federal Home Loan Bank Board Association Note or a Federal Savings and Loan Association Note, a distinction between the regular passbook account and high yield assets might be created lessening the downward "stickiness" on rates.

Third, impose and strictly regulate minimum balance requirements to obtain high yield accounts. If special six month or one year assets are to compete with say Treasury bills, why should a minimum balance of $500, $1,000, or even $5,000 be allowed to obtain such an asset when the minimum requirement for a Treasury bill is $10,000?

Fourth, impose and strictly regulate term to maturity requirements. If, for example, lower minimum deposit, longer maturity assets are designed to compete with say corporate bonds or long-term government bonds, why should depositors be allowed to renegotiate these assets in midstream without penalty?

The point of the recommendations is simply this. Associations should be allowed to compete among themselves, with other financial institutions and with credit market instruments on common grounds. Merely allowing for proliferation of financial assets will not solve the problems.

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CHAPTER I

INTRODUCTION: PURPOSE AND HISTORICAL PERSPECTIVE

Purpose of the Study

This study is designed to examine the household demand for savings and loan association shares over a long-run period and over selected short-run periods.[1] The main purpose of the study is to shed some light on three important issues:

- what are the major sources of competition for savings and loan shares;
- is the demand function for savings and loan shares stable over time; and,
- what is the effect of the regulatory interest rate ceilings on the demand for savings and loan shares?

Hopefully the information provided by this study will be useful in helping the savings and loan industry to formulate competitive strategies that will allow it to obtain and maintain a sufficient and necessary inflow of funds both now and in future time periods.

The competitive strategies of savings and loan association managers (and all financial institution managers in general) are closely related to the nature of the demand for their deposit

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[1] Since private, noncorporate individuals represent virtually the only source of funds to savings and loan associations, concentration is focused on the household sector of the economy.

liabilities; its main determinants, its shape, and its stability.[2]

The identification of the main determinants is concerned with isolating those factors most important in giving rise to demand; i.e., it is a search for the conditions that decide the desire and level of desire for a good or service. The relative shape of the demand function indicates the functional relationship that exists between the main determinants of demand and the level of demand. Mathematically it determines the linearity or nonlinearity of the relation, the direction of the relation (slope of the function), and the relative degree of importance of each determinant (the steepness of slope relative to each determinant). Finally, the stability reflects the permanence of the relation; i.e., it tests whether the relationship currently found to exist is the same relationship that existed in prior periods or whether it is the same relationship that is expected to exist in the future.

Isolation of the main determinants is especially important to an association manager in planning what motives to appeal to or what factors to emphasize in the promotion of his product (savings deposits). Should the manager, for example, emphasize nonrate factors such as service or convenience; should he emphasize the rate factor (the interest return on deposited funds); or should he emphasize some combination of the two? To put it another way, should the manager appeal to an individual's desire for adequate housing or other future needs; or should he concentrate on merely providing the highest possible return on all

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[2]The savings and loan association will be referred to as association in the remaining discussion.

savings assets?[3]

Determination of the relative importance of different competitive assets will aid in identifying the direction that a competitive strategy should take. Suppose that it is found that the major source of competition comes from commercial banks and that nonrate factors are considerably more important than rate factors. On a local level this will indicate to a manager that direct price competition is a relatively inefficient method of obtaining funds and that better returns could come from concentrating his efforts in the direction of expanding existing services and innovating new services not provided by local commercial banks. On a national level, it would mean lobbying for expanded services similar to those offered by commercial banks.

If, on the other hand, major sources of competition emanate from the credit market, direct price competition would be mandatory. On a local level, associations should tailor instruments to rival those assets providing the greatest level of rate competition; while on a national level, there should be a concerted effort directed toward the removal of interest rate ceilings.

Knowledge of the stability of the demand function is extremely important. If it can be shown that demand is relatively stable, associations will be able to operate with some assurance that policies set during one period can be used as the basis for competitive strategies

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[3]Deposits were previously referred to as liabilities, here they are referred to as assets. The difference is one of point of view. From the point of view of the association they are a liability; from the point of view of the saver, they are an asset. The latter viewpoint will be adopted throughout the remainder of the study.

in other periods.[4] If however, demand is relatively unstable, it will require associations to be constantly on the outlook for any changes that would require rapid and perhaps broad changes in operating policies.

Background

In the years since the end of the Second World War, particularly in those years since 1960, the funds flows from individuals have moved erratically among financial assets. An examination of the annual funds flows of Households, Personal Trusts, and Nonprofit Organizations indicates frequent changes in preference for thrift deposits, commercial bank deposits, and direct investment in capital market assets. The movement in funds is graphically illustrated in Chart 1-1, which traces this sector's annual funds flows into each of the four selected financial assets stated as a per cent of the sector's total net acquisition of financial assets.

Given this erratic behavior, what could have caused the shifts to occur? A priori reasoning suggests that the return received on a financial asset or the return expected to be received on a financial asset is the major motivating factor for holding an asset. Because savings assets represent a subset of all financial assets, there is reason to believe that expected return would play a major role in

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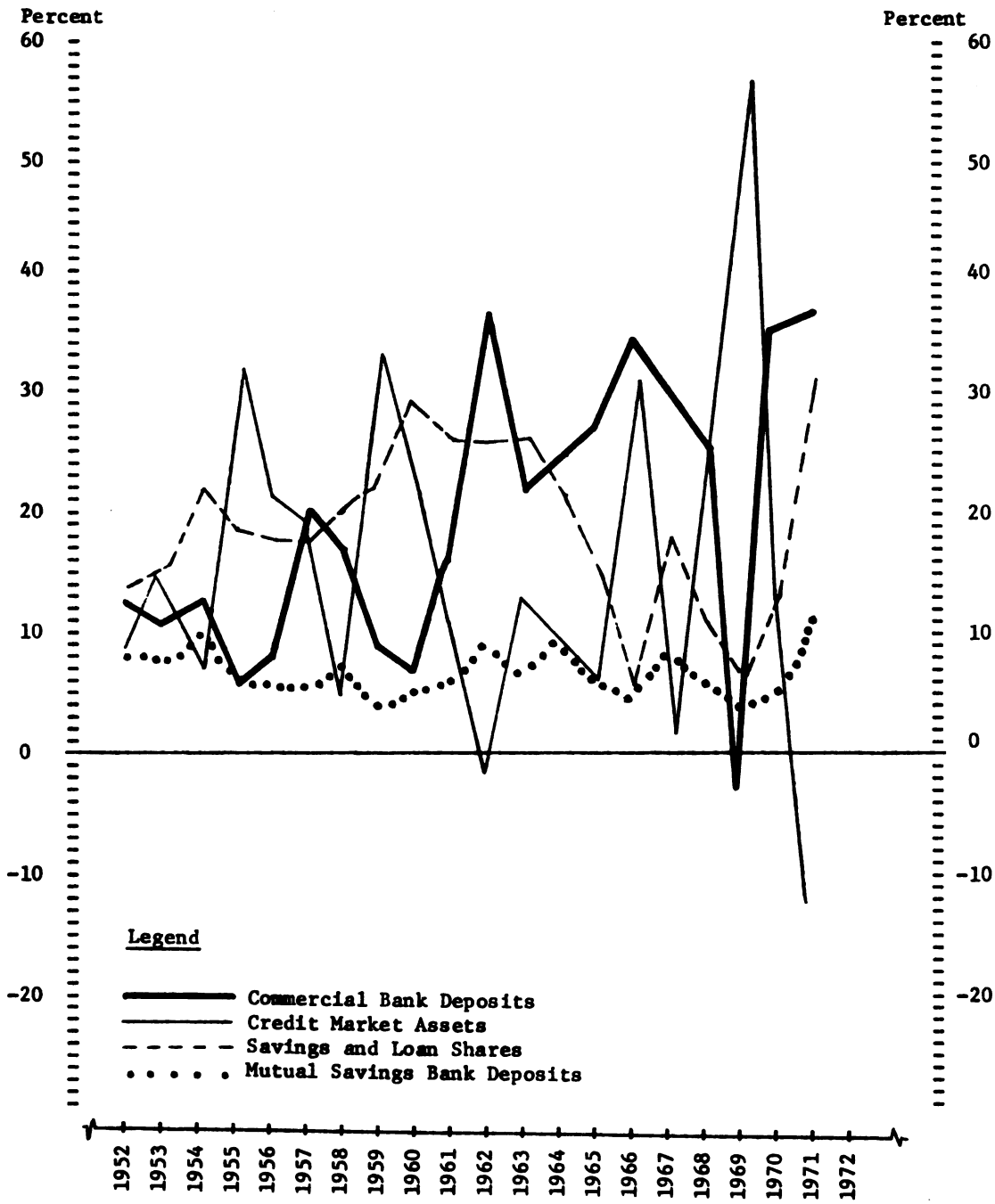
[4]This is not meant to imply that a particular strategy once set should be strictly adhered to in all future periods. What it does imply is that if a certain variable(s) is (are) indicated to be important in one period and if it (they) remains important in other periods, associations should continue to aim the basic direction of the strategy toward this (these) variable(s) while at the same time striving to update specific strategies within this area.

CHART 1-1

Annual Funds Flows Into
Selected Financial Assets As A Percent
Of Total Funds Flows



Source: Flow of Funds Accounts: Annual Flows, 1946-1971, Board of Governors of the Federal Reserve System, (Washington: August, 1972), pps. 10-12, 28-30.

determining the demand for savings assets in general and for savings and loan shares in particular. That is, assuming that two assets are perceived to be similar in risk, differences in the returns offered by these two assets would appear to provide strong motivation to hold the one offering the highest return.

It must be pointed out that there are other factors that could be involved in the movement of funds. It is quite possible that part of the change was due to structural characteristics of the financial system. Part too, may be accounted for by an increase in competition between the savings institutions. Finally, part may be attributed to the regulation of rates paid on savings-type deposits.

Structural Characteristics

Structurally, three important points stand out; the historical development of the institutions, the timing of the impact of the business cycle and monetary policy on the institutions, and the regulation of the institutions.

The domestic financial system has developed along the lines of institutional specialization. Commercial banks historically have concentrated attention on serving the business sector, and to some extent, the state and local government sector while only passively attending to the needs of the individual. Thrift institutions, on the other hand, have grown up concentrating almost exclusively on the individual, servicing both his savings and housing needs. Thus, the commercial banks and thrift institutions have been subject to somewhat different sets of supply and demand conditions.[5]

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[5]See Charlotte and David Alhadeff, "The Struggle for Commerical Bank Deposits", Quarterly Journal of Economics (Feb., 1958), pps. 1-22,

The specialist orientation has also led to a difference in the timing of impact of the business cycle. For example, a change in the business cycle initially affects employment and therefore disposable personal income and savings. These short-run changes in personal income and savings are immediately reflected in the funds flows of the thrift institutions, and to some extent in the funds flows of commercial banks. However, other factors such as inventory changes and business capital expenditures tend to lag the initial changes and thus produce later effects on a large segment of the funds flowing into commercial banks.

Some mention must also be made of the differences in the effects of monetary policy on the different institutions. The Federal Reserve can, through the required reserve ratio, open market operations, and the rediscount rate, immediately affect the operations of the commercial banking sector and the operations of those mutual savings banks that are members of the Federal Reserve System. The savings and loan associations, unless facing simultaneous actions by the Federal Home Loan Bank Board, will only secondarily feel the effects of policies designed to "clamp-down" or "loosen-up" on credit. An extremely timely example of this was the Fed's increase, from 8% to 11%, in the minimum reserve requirements that commercial banks must hold as backing for all large denomination CDs.[6]

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and Jack Vernon, "Competition for Savings Deposits: The Recent Evidence", National Banking Review, Vol. 4, No. 2 (Dec., 1966), pps. 183-192.

[6]"Rise to 11% in Reserves Needed on Big CDs Underscores Fed's Restrictive Money Policy," Wall Street Journal (September 10, 1973), p. 7.

Finally, there are a number of important regulatory differences between institutions. Most notable among these are: the prohibition of the offering of demand deposits by associations; the limitation on the kinds of lending activities the associations can undertake; and the initial lags in the institutionalization and coverage of the Savings and Loan Insurance Corporation (SLIC).

Inter-Institutional Competition

The competitive position between commercial banks and thrift institutions has changed considerably over the period from 1952 - 1971. It has already been noted that commercial banks were historically geared to serving the needs of the business sector and were only passively concerned with the needs of the individual depositor. With the rapid rise in incomes and savings after World War II and the corresponding rapid rise in the asset holdings of thrift institutions, commercial banks found that their supply of funds from the household sector was rapidly diminishing. In an attempt to combat the threat that thrift institutions posed, commercial banks adopted a much more aggressive attitude toward individual depositors during the late 1950s and early 1960s. Through the innovation of new deposit assets and the concept of "full service banking", the banks were able to seek actively a much broader range in both the sources and outlets for funds.

Rate Ceiling Regulation

The current regulation has been forged from two parts, Regulation Q covering the commercial banks and the Stevens Act covering the thrift institutions.

The initial limitation was authorized under Regulation Q of the

Banking Act of 1933, for the purpose of limiting the competition for funds between commercial banks which, during the 1920s, had led to pressures for increased earnings and hence imprudent loans and investments.[7] Although this "protective measure" enjoyed some popularity with small banks, economists have always been suspect of the advantages derived from its existence. Particularly since the 1950s, there has been a growing feeling that deposit rate ceilings do little good and serve primarily to limit the free flow of funds through the economy.

Much of this criticism reached a head in 1961, when the Commission on Money and Credit recommended that the present system of controls be replaced by a standby system to be invoked only during crisis situations. The consensus of opinion among the Commissioners was that deposit rate ceilings on commercial banks were generally more disruptive than beneficial.[8] As the report points out, during times when the ceiling was operative, it was also serving to prevent competition for funds between banks and thrift institutions and between banks and the Treasury, neither of the latter of which were subject to any form of rate ceilings.[9] The net result of the situation was that during periods of rising rates (when ceilings were operative), " ... banks were finding it difficult to retain and compete for funds."[10]

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[7]The Report of The Commission on Money and Credit, Money and Credit: Their Influence on Jobs, Prices, and Growth (Englewood-Cliffs: Prentice-Hall, 1961), p. 167.

[8]See Stanley H. Ruttenberg's dissenting statement in, Ibid., p. 168.n

[9]Ibid., p. 167. Note that the thrift institutions, with the exception of the mutual savings banks that were already members of the Federal Reserve System, were not subject to rate ceiling regulation until passage of the Stevens Act in 1966.

[10]Idem.

The important thing to note about the Commission's position is that it places commercial bank liabilities (deposit assets) in a competitive structure not only with thrift deposits, but also with short-term money market instruments.

The remainder of the present system of regulation was formed in 1966, with the passage of Public Law 89-5977 -- the Stevens Act. The Stevens Act, in an attempt to alleviate the then present pressures of a credit crunch, extended the coverage of interest rate ceilings first to savings and loan associations and later to mutual savings banks.[11] More importantly, the Act gave rate ceilings two new purposes. The rate ceilings were now designed to enforce a differential between the rates paid by commercial banks and thrift institutions and to shield the thrift institutions (and some commercial banks) from the competitive pressures of the capital market.[12]

The last purpose is of particular interest for it must inherently assume that the majority of funds which flow into savings deposits would not necessarily seek other outlets if savings institutions are restrained from paying the market determined equilibrium rate on these funds. To put it another way, in order to be successful in shielding savings institutions from money market pressures, the Act must assume that the ceiling rate will be adequate not only to retain funds already on deposit with the savings institution, but also to maintain

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[11] It extended coverage to those mutuals that were not members of the Federal Reserve System.

[12] The Report of the President's Commission on Financial Structure and Regulation (Washington, D. C.: Superintendent of Documents, Dec., 1971), p. 24.

a fairly constant inflow of new funds into the institutions regardless of what happens to the uncontrolled rates. If this were not the assumption, then it is clear that rate ceilings, by their very nature, would, at the least, reduce or stop capital inflows and would, at the worst, cause capital flight from the institutions being regulated; neither of which is particularly desirable.[13]

The Stevens Act has not escaped criticism; it too has provoked considerable dissatisfaction. In 1971, the President's Commission on Financial Structure and Regulation (the Hunt Commission) recommended that the rate ceilings be initially relaxed and ultimately dropped.[14] The general conclusions of the Hunt Commission are similar to those of the Commission on Money and Credit: not only were the historical patterns of funds flows changed, but it was becoming more difficult for bank and nonbank financial intermediaries alike to obtain new funds and at the same time retain their hold over funds already on deposit. In short, the Stevens Act was not accomplishing its stated purposes.

Examine the situation a bit more closely. The first purpose of the Stevens Act was to maintain a differential between the rates offered on thrift deposits and the rates offered on commercial bank deposits. Although the Act did not specify how large the rate differential should be, it has been suggested by Vernon that a rate

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[13]Note that this assumption is not generally in line with the conclusions of the Commission on Money and Credit. Recall that they concluded that commercial bank deposits were competitive with Treasury bills as well as thrift deposits. While it is entirely possible that thrift deposits face a different set of demand determinants, the assumption must be viewed with suspicion.

[14]Hunt Commission Report, op. cit., pps. 23, 24.

differential of at least one half of one percent be maintained between the average savings and loan rate and the average commercial bank rate in order to allow savings and loan associations to compete effectively with the wider range of services offered by commercial banks and hence to maintain their relative position in the intermediation of funds flows.[15] Chart 1-2 indicates that the Act has not been successful in maintaining the suggested differential.

The second purpose was to shield the thrift institutions from competitive pressures in the capital markets; i.e., to help institutions retain the funds already on deposit and to maintain an adequate flow of new funds into the institutions. Reference to Chart 1-3 indicates that the net acquisitions of funds, if anything, have become more erratic. This phenomenon is of particular interest for it lends support to the conclusion that all deposit assets are potentially competitive with credit market assets.

The Propositions

The foregoing discussion can be summarized by the following three hypotheses:

1. The demand for savings and loan association shares is primarily dependent upon the return offered on the shares and the return offered on all other financial assets available to savers.

2. The demand function, though possibly subject to some structural shifts, is reasonably stable over periods when the rate ceiling is not operative. During these stable periods, commercial bank deposits will represent the greatest source of competition to savings and loan associations.

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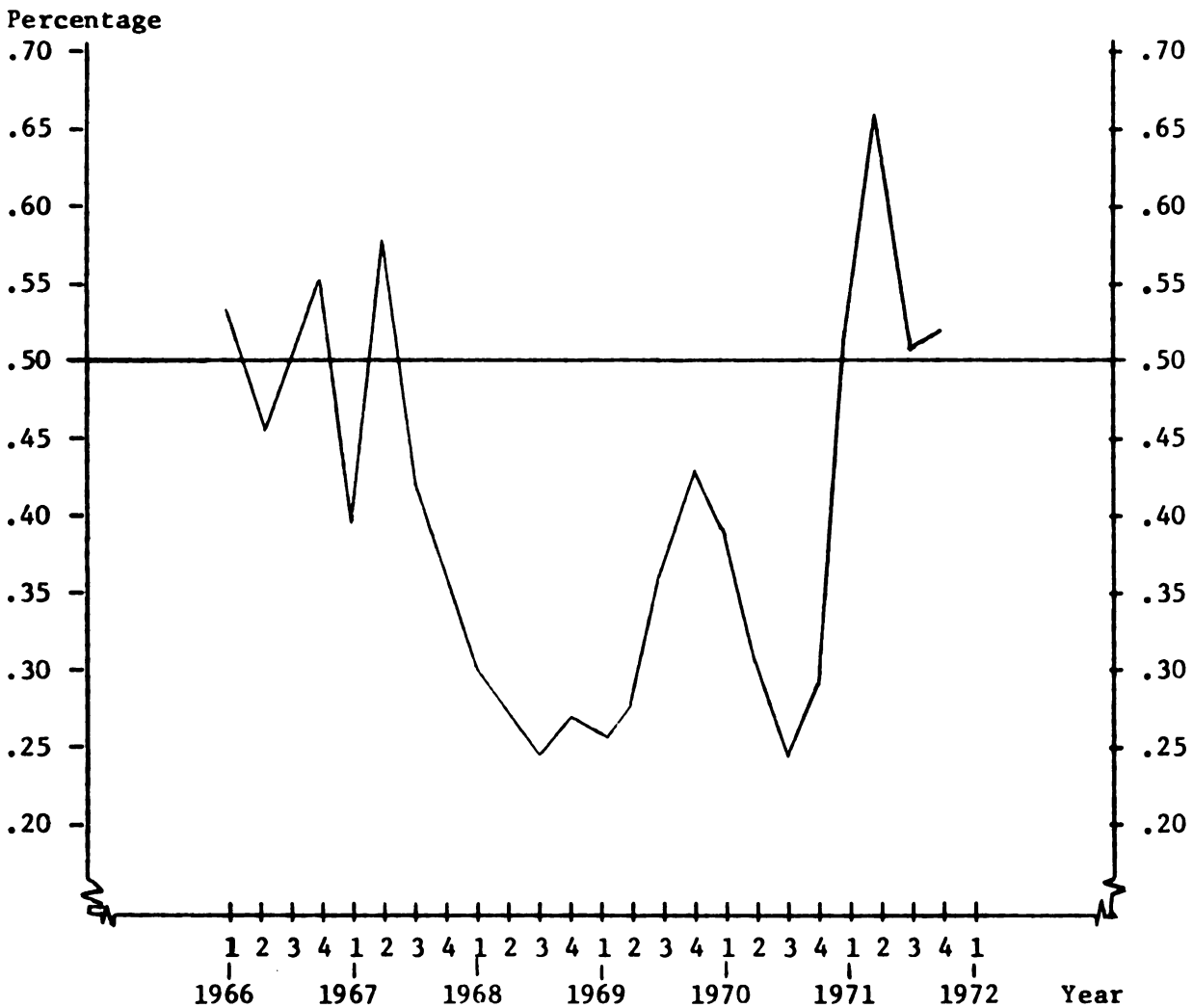
[15] Vernon, op. cit., p. 184.

CHART 1-2

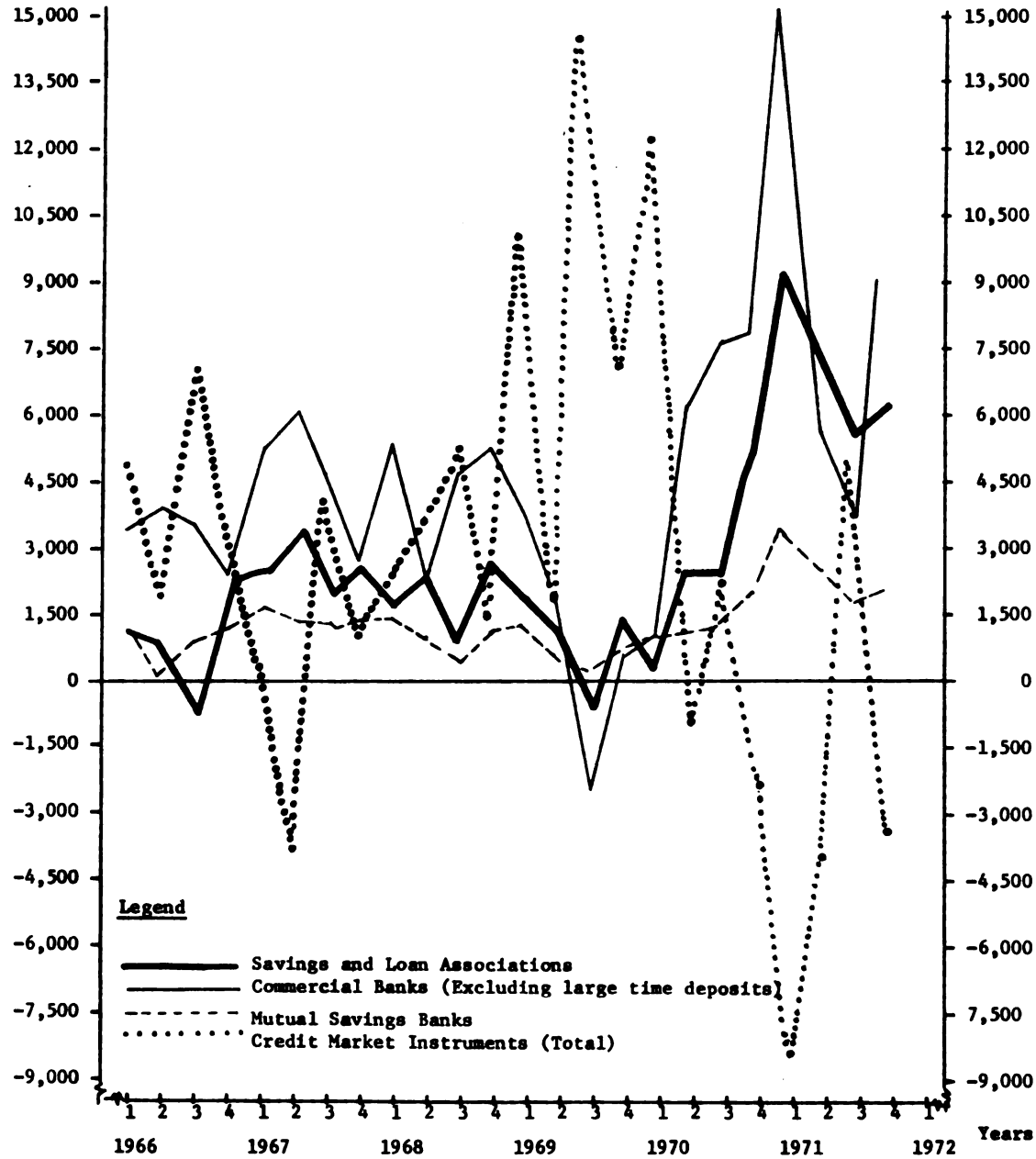
Interest Rate Differential
(Quarterly Average Savings and Loan Rate Minus
Quarterly Average Commercial Bank Rate)



Sources: Federal Reserve Board
United States Savings and Loan League

CHART 1-3

Net Acquisition of Financial Assets
Households, Personal Trusts, and Nonprofit Organizations
Quarterly Flows - Unadjusted
(millions of dollars)



Source: Flow of funds tape provided by the Flow of Funds Section, Division of Research and Statistics, Board of Governors of The Federal Reserve System.

3. During periods when the rate ceiling is operative, the demand function will shift in favor of market assets; i.e., the market assets should become more competitive than previously.

A test of these hypotheses may be made by using the technique of regression analysis. There are two general steps involved. The first step will be to formulate the basic long-run demand function for savings and loan shares and test for the proposed competitive relation between savings and loan shares and other market assets. The second step is to reformulate the demand function or possibly augment the basic demand function to test for demand stability during periods when interest ceilings are operative.

The formulation of the exact model to be employed is discussed in Chapter Three. Before undertaking a detailed explanation of the model however, it will be profitable to review the antecedents of the concern over the demand for financial assets and to examine some of the closely related prior studies. This is done in the following chapter.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

Research of a Related Nature

The relevant literature may be divided into two broad, though not necessarily distinct sections: that which has developed around the question of which assets ought to be included in the proper definition of money; and that which has been concerned with the changing relationship between commercial bank and thrift institutions and the corresponding changes in the demand for the individual deposit assets.[1]

The Demand for Money

The question of which assets ought to be included in the definition of money is not a new issue in monetary economics. Examination of the issue may be traced back to the mid-nineteenth century when rapid expansion of the English financial system prompted by the Industrial Revolution led economists to explore the question of whether or not the deposit liabilities of the banking system ought to be included in the definition of money.

The more recent domestic concern with the issue, as Harry Johnson notes, may be traced to basic disagreements between the "quantity-theory"

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[1]It may also be stated as changes in demand for deposit liabilities, the difference being in whether the point of view is that of an individual or an institution.

approach and the "Keynesian" approach to monetary theory. Although there are a number of differences between the two approaches, the major issues in dispute are:

1. the assets which ought to be included in the "proper" definition of money;

2. the exact determinants of those assets which are included in the different definitions; and,

3. the stability or instability of the demand for money function.[2]

Three major propositions or schools of thought on what ought to be the proper definition of money may be identified.[3] For lack of better terminology, these views may be defined as the Traditional view, the Chicago view and the Gurley-Shaw view. The Traditional view maintains that the major function of money is that of a medium of exchange, thus the definition ought to be restricted to currency plus demand deposits. The Chicago view argues for a somewhat expanded function of money and hence includes within its definition currency plus total commercial bank deposits. The Gurley-Shaw view envisions a broad substitute relation between a large number of liquid assets; hence, it accordingly defines money to include currency plus deposits at all bank and nonbank institutions.

Early econometric research concentrated on explaining income velocity by examining the total demand for money function. In this context, the first two views maintain that there is a stable velocity

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[2]Harry G. Johnson, "Monetary Theory and Policy," American Economic Review, LII (June, 1962), pps. 343-354.

[3]Although Johnson identifies four schools of thought, much of the relevant literature deals with the three views discussed here.

while the latter holds that the velocity may be affected by other "near-money" assets.

Henry Latane´ has been one of the principal proponents of the Traditional view. He argues, a priori, that money ought to be viewed solely as a medium of exchange and thus ought to include only cash and demand deposits. Such a definition would eliminate problems caused by complex relationships with near monies which cannot be considered to be a final means of payment.[4]

To substantiate his position Latane´ followed what he termed a pragmatic approach in the determination of velocity and the demand for money. His conclusion was that historical patterns of demand were closely explained by a simple linear relationship between the ratio of currency and demand deposits to income (money to income) and the reciprocal of high-grade, long-term interest rates. This relation, he maintains, illustrates a constant velocity and validation of the Traditional definition of money.

The Chicago school, and its major proponent Milton Friedman have countered that there is not a specific logical a priori framework upon which a valid definition of money may be built; rather, the question is an empirical one wherein the proper definition of money must be empirically determined from several competitive alternatives.

In a major study undertaken for the Commission on Money and Credit, Friedman and Meiselman experimented with a number of different definitions of money in an attempt to determine which

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[4]H. A. Latane´, "Cash Balances and the Interest Rates -- A Pragmatic Approach," Review of Economics and Statistics, XXXVI (November, 1954), pps. 456-460.

particular definition would "put theory in its best light."[5] The finding was that currency plus total deposits at commercial banks fit more closely an income series than did any other definition employed.[6] However, as they point out, "the appropriate reason for including time deposits is not simply that they are highly correlated with income, but that they are such close substitutes for other monetary items that it is preferable to treat them as if they were perfect substitutes than to omit them."[7]

The Gurley-Shaw view also rejects the idea that the definition of money rests strictly on the basis of a priori reasoning. The basic proposition is that theory must consider the details of financial organization and development. This, they hold, is important because in the process of growth and maturation, financial intermediaries other than commercial banks appear and offer liabilities (deposit assets) which are closer substitutes for money than for primary securities. Thus, there can be a large number of liquid assets that serve as potential competition for money as traditionally defined. The net result is that the existence of those liabilities (deposit assets)

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[5]Milton Friedman and David Meiselman, "The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States, 1897-1958," in Commission on Money and Credit, Stabilization Policies (Englewood Cliffs: Prentice-Hall, Inc., 1963).

[6]This work which employed an expanded version of the permanent income hypothesis substantiated some of Friedman's earlier findings that had been criticized for not providing a close fit for income velocity when tested against data subsequent to the original test period, see his, "The Demand for Money: Some Theoretical and Empirical Results," Journal of Political Economy, No. 67 (August, 1959), pps. 327-351.

[7]John G. Gurley and Edward Shaw, Money in a Theory of Finance (Washington: Brookings Institute, 1960).

reduces the demand for money.

In an independent article, John Gurley applied this proposition by attempting to show that in the postwar period, long-term and short-term interest rate movements could be explained by a definition of money made up as a weighted sum of a number of different liabilities.[8] Gurley used an equation made-up of currency and demand deposits (each of which was assigned a weight of one) and savings and loan shares, mutual savings bank deposits, credit union shares, postal savings deposits, life insurance reserves and U. S. savings bonds (each of which was assigned a weight of one-half). Unfortunately, Gurley did not attempt to derive the best possible weights. More importantly, the results did not show that the use of the expanded definition fit the data any more accurately than other narrower definitions that could be employed.

These three views have generated considerable discussion and controversy. Several studies have been undertaken to examine empirically different aspects of the issue, a number of which are relevant to the proposed investigation are reviewed below.

H. R. Heller

Heller's main concern with the early econometric research was that it concentrated on the extreme long-run period. Hence conclusions derived from a data base extending back to the early 1900s or the late 1890s might not be relevant for current policy formulations. Research

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[8] John G. Gurley, Liquidity and Financial Institutions in the Post-war Economy, Study Paper 14, Joint Economic Committee, 86th Congress, 2nd session (Washington, 1960).

ought to employ a more recent period; for him, the post World War II period. Within this short-run context, Heller concentrates his examination on different possible demand for money functions, the parameters that enter these functions and the stability of these functions.

Heller utilized a multiplicative model assumed linear in the logarithms. His data base covered the years 1947 - 1959 and employed quarterly observations of Gross National Product, private nonhuman wealth, the yield on 60 - 80 day prime commercial paper and the yield on U. S. Government long-term bonds.

The most pertinent portion of Heller's analysis is his examination of the demand for money function. Heller examines two views, the Traditional view and the Chicago view. His purpose was not so much in deciding which view was correct as it was in examining the relevant constraint parameters for each function and the stability of each function.[9] Indeed Heller concludes that the, "...broad (Chicago) as well as the narrow (Traditional) definitions of money will yield a satisfactory demand for money function...."[10] Heller finds that when the Chicago view is employed, the relevant constraint parameter is wealth; whereas when the Traditional view is employed, the relevant constraint parameter is income. The resulting conclusion is that time deposits are "money at rest"; a luxury good in line with Friedman's contention and hence, ought to be related to stock variables. Demand

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[9]Constraint variable is the author's term used to distinguish between variables that control the ability to hold funds and the variables that determine the willingness to hold funds.

[10]H. R. Heller, "The Demand for Money: The Evidence from the Short-Run Data," Quarterly Journal of Economics, LXXIX (May, 1965), p. 299.

deposits, on the other hand, are "money on the wing" and ought to be related to flow variables.

In regard to the question of stability, Heller finds that both functions exhibit a relatively stable nature over the entire twelve year period, a time period which he later refers to as the long-run period. When the period is segmented on the basis of business cycles defined by the National Bureau of Economic Research, both functions exhibit differences in the respective elasticity coefficients. Although the conclusions may be questioned on the basis of the number of observations contained within the various subperiods, the results raise some important questions concerning the cyclical stability of the demand functions.

Heller's conclusions regarding the interest rate parameters are subject to some question since he included only two market rates.

Edger Feige

Feige's purpose is defined to be the clarification of some of the empirical issues of the role of the quantity of money, "...as they relate to the effectiveness of monetary policy in a world of complex financial intermediation."[11] Specifically he finds that the Gurley-Shaw thesis rests upon several untested propositions relating primarily to the substitute relation that exists between money and the liabilities of financial intermediaries; the predictability of this relationship; and, the stability of this relationship.

To explore these issues, Feige defines three hypotheses.[12]

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[11]Edgar L. Feige, The Demand for Liquid Assets: A Temporal Cross-Sectional Analysis (Englewood Cliffs: Prentice-Hall, Inc., 1964).

[12]Ibid., p. 1.

1. The liabilities of nonbank financial intermediaries are close substitutes for money (defined as some subset of those assets whose supply is regulated by the monetary authorities).

2. The demand for money is a stable function of a limited number of variables.

3. The demand for money is independent of the supply.

Feige approached his tests by constructing individual demand functions for the various liquid assets using single equation, least squares regression analysis. The results obtained for the original equations were then checked by restricted efficient estimation procedures. The equations, assumed to be both linear in the variables and the parameters, are estimated using a temporal cross-sectional analysis, i.e., a pooled time-series, cross-sectional approach. The data base covered an eleven year period from 1949 - 1959 and contained 49 observations per year, (one for each of the continuous continental United States and one for the District of Columbia).

Feige used four broad categories of independent variables: interest returns, noninterest returns, convenience costs, and income. Interest returns posed no great difficulties. Feige used the actual rate paid which he constructed by dividing total interest paid by total deposits, (for demand deposits he used total service charges divided by total demand deposits). Noninterest returns were somewhat more difficult to take account of. In the late 1940s and 1950s, many financial institutions, though primarily savings and loan associations, utilized "give-aways" and other promotional devices to attract new accounts. Unfortunately, specific data concerning these promotional schemes was not (and still is not) directly available. Hence, Feige was forced to use advertising expenditures of savings and loan

associations as a proxy to estimate the effects of this variable. Convenience costs also posed a problem. Feige reports that time involved in acquiring liquid assets appears to be a major nonpecuniary consideration in the demand for a particular asset.[13] Since there are no direct figures available, these parameters were also represented by a proxy variable; in this case the per capita number of offices for the particular institution under investigation. For income, Feige constructed a series of permanent personal income represented by a weighted average of past and present values of personal income.

The relevant results of Feige's study may be summarized below.

Stability The degree of cross elasticity indicated a clear case of substitutability between two assets in only one case, demand deposits and time deposits. That is, a substitute relation was indicated to exist between time deposits and demand deposits both when demand deposits were designated as the independent variable and when time deposits were designated as the independent variable. In all other cases, the results were mixed. Savings and loan shares did not appear to be substitutes for demand deposits. Demand deposits, however, showed up as weak substitutes for savings and loan shares.

Time deposits and savings and loan shares also exhibited a mixed relationship. Savings and loan shares entered as substitutes for time deposits; however, time deposits appeared to be independent in the savings and loan demand equation. Finally mutual savings bank deposits exhibited a short-run substitution relation for time deposits

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[13] Ibid., p. 20.

and a weak substitute relation for demand deposits. Mutual savings bank deposits did not enter the savings and loan demand function at a significant level.

Own Rate The own rate variable always entered with the correct sign, but the size of the coefficient of elasticity differed for the different deposit liabilities. It showed up lowest for savings and loan shares.

Income Elasticity The income elasticity always entered with the appropriate sign. It is interesting to note in light of Heller's results, that the coefficient of elasticity was highest for demand deposits. The coefficients for time deposits and savings and loan shares were approximately equal and considerably lower than that obtained for demand deposits.

Stability Feige notes, "(A)lthough it was not possible to reject the stability hypothesis, a review of the coefficients in the demand functions for individual years suggests that these coefficients have been changing in a remarkably regular fashion"; a result which he considers, "...does not support the view that the demand for money function has become less stable."[14]

Philip Hartley

Shortly after Feige published his results, Hartley undertook a re-examination of Feige's data in an attempt to verify his conclusions. Hartley's approach employed three modifications of Feige's approach. First, Hartley employed a narrower definition for time deposits by

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[14] Ibid., pps. 40, 44.

excluding the figures for certificates of deposit.[15] Second, the time period was extended to include the period through 1964. Finally, the equations were run both with and without dummy variables (Feige had incorporated dummy variables in order to capture what he felt were important regional differences). In addition Hartley ran his tests for three different time periods; 1949 - 1959, 1949 - 1964, and 1960 - 1964. Hartley's study may thus be viewed as composed of three main parts.

1. A replication of Feige's study, with and without dummy variables.

2. A replication and updating of Feige's study, with and without dummy variables.

3. An independent period examination utilizing Feige's methods, again with and without dummy variables.

Replication and Updating (With Dummy Variables) Hartley's results for the period 1949 - 1964 when dummy variables were included were generally similar to those obtained by Feige. Thus, in the demand function for time deposits, demand deposits, savings and loan shares and mutual savings bank deposits all entered as substitutes and time deposits entered as complements. There are, however, two points of interest to note. First, in the demand equation for time deposits, while the expected substitute relations appeared, they were generally and in some cases considerably weaker. In the equation for savings and loan shares, the complementary relation between time deposits and

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[15] Philip Hartley, The Demand Function for Selected Liquid Assets, unpublished doctoral dissertation (Seattle: University of Washington, 1966). Although Hartley was able to obtain figures that allowed him to separate certificates from other time deposits, an independent interest rate series did not exist until 1967. Hence, his rate of return on bank time deposits represents an average rate on all time and savings deposits.

savings and loan shares was considerably stronger. In addition, the own rate variable entered with the wrong sign.

Time Deposits - All Periods (Without Dummy Variables) When the dummy variables are removed, the equations of the demand for time deposits show some reversals in the results. First, in the replicated period, 1947 - 1959, mutual savings bank deposits enter as complements, a result opposite to the originally indicated substitute relation. However, in the expanded version, 1947 - 1964, and in the independent extended version, 1960 - 1964, the substitute relation between time deposits and mutual savings bank deposits reappears, but at a weaker level. Next, although savings and loan shares consistently enter the equation as substitute assets, the relationship appears to strengthen rather than weaken as Feige had indicated.

Savings and Loan Shares - All Periods (Without Dummy Variables) When the dummy variables are removed, the different period equations for the demand for savings and loan shares exhibit similar changes to those noted above. Thus, when the period is replicated, 1947 - 1959, Hartley again obtains results just contrary to those of Feige. Time deposits are indicated to be substitutes and mutual bank deposits and demand deposits are indicated to be complements. However, when the study is extended, 1949 - 1964, and when the independent period is studied, 1960 - 1964, time deposits and mutual saving bank deposits again enter as complements and substitutes respectively, the relationships that Feige's results indicated.

Tong Hun Lee

In two related articles, Lee examines the question of whether or not there is a substitute relation that exists between money and non-bank financial liabilities. Lee undertook his initial study because of what he considered to be statistical inaccuracies in Feige's study and erroneous conclusions obtained by other researchers, most notably Milton Friedman. Lee employed three different data bases and estimating models in the first investigation: an annual time series model assumed linear in the logarithms; a pooled cross-section model using data obtained from the Survey of Consumer Finances; and a replication of Feige's pooled cross-sectional model excluding dummy variables.

In the time series investigation, Lee used annual observations for the period 1934 - 1964, excluding the years 1942 - 1945. In setting the demand specification, Lee assumed that demand, "... is a function of permanent income as in Friedman's specification and also of relevant interest rates as in the Gurley-Shaw hypothesis."[16] In order to avoid problems of multicolinearity among rates, Lee used as his two rate parameters the difference between the yield on demand deposits and an average yield on savings and loan shares and mutual savings bank deposits and the difference between the yield on demand deposits and an average on long-term and short-term Government securities. The regressions were then run using both the Traditional (narrow) view and the Chicago (broad) view of money.

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[16]Tong Hun Lee, "Substitutability of Non-Bank Intemediary Liabilities for Money: The Empirical Evidence," Journal of Finance, XXI (September, 1966), p. 442.

The results of the first test indicated that: (1) in all cases there was a substitute relation between money (regardless of the definition employed) and thrift deposits; (2) the substitute relation strengthened when time deposits were included in the definition of money, i.e., when the Chicago or broad view was employed; and, (3) there was not a significant relation between money and the average rate on Government obligations.

In order to check his results Lee then experimented with a micro model, a pooled cross-sectional model employing data from the 1956 - 1959 Survey of Consumer Finances. In this case Lee regressed demand deposits, time deposits at commercial banks and mutual savings banks or savings and loan shares against two measures of income, the annual average returns paid on the deposit assets and a number of demographic variables. The results from those equations Lee concludes, "... show strong support for the proposition that savings and loan shares are substitutes for both demand deposits and savings deposits in banks."[17] He later generalizes this to, "... our conclusion is that savings and loan shares are close substitutes for money whether money is defined to include or exclude time deposits. This conclusion is the same as that reached in the preceding section utilizing time-series data."[18] There are some bothersome points here. It is not the same conclusion. The former (time-series) indicated that thrift deposits were substitutes for money. Thus, in the time-series test, Lee regressed both broad and narrow versions of money against a rate differential between

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[17] Ibid., p. 451.

[18] Ibid., p. 452.

demand deposits and an average thrift rate. In the latter (pooled) test, Lee regressed demand deposits or combined time deposits and mutual savings bank deposits against the individual rates on the various deposit liabilities. Hence, the latter shows the relation between different definitions of money. It is also instructive to note that Lee obtained a symmetrical substitute relation between demand deposits and savings and loan shares, a result similar to that obtained by both Feige and Hartley. Finally, there was not a symmetrical substitute relation between time deposits and savings and loan shares. Savings and loan shares entered as substitutes for time deposits, but the reverse did not hold at a significant level (results just the opposite of those obtained by Feige).

In his last test, Lee modifies Feige's approach by dropping the dummy variables, the variable representing advertising expenditures and the variable adjusting individual holdings of demand deposits to total demand deposits and then replicates the study. The results reverse Feige's findings of no substitutability between savings and loan shares and time deposits, which Lee holds fully confirms his previous two results. (Recall that Hartley came to the same conclusion initially, but that the complement relation returned when the data base was extended).

Lee's second study represents a further exploration of the ideas which he presented in his earlier research.[19] There are two major modifications which he employs here. First, the time period is

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[19]Tong Hun Lee, "Alternative Interest Rates and the Demand for Money: The Empirical Evidence," American Economic Review (December, 1967), pps. 1168-1181.

shortened to cover the years 1951 - 1965 and the rate parameters are expanded to include the yield on 4-6 month commercial paper, the yield on 20 year corporate bonds and Moody's dividend on common stocks as well as the yields on deposit liabilities. As before, the yield parameters are differentials. In this case the yield differentials are calculated as the difference between the individual liability yields and the yield on money defined both broadly and narrowly. All observations are on an annual basis. Lee again employs more than one test model. In the first instance he uses a single equation linear regression and in the second, a step-wise regression model. In both cases, in spite of the fact that additional market rates were employed, Lee reports findings which confirm his earlier conclusions; thrift deposits represent closer substitutes for money than any other financial asset.

Michael Hamburger

In a series of two articles, Hamburger explored various aspects of the household sector's demand for commercial bank time and savings deposits, savings and loan shares, and insurance company reserves.

In his first article, Hamburger concentrates attention on the sector's demand for money and the related questions: what assets should be included in the demand equation; what assets control this demand; which market rates, if any, affect the demand; and, what is the speed of adjustment between the achieved level of demand and the desired level of demand.[20]

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[20]Michael J. Hamburger, "The Demand for Money by Households, Money Substitutes, and Monetary Policy," Journal of Political Economy (December, 1966), pps. 600-623.

To examine these issues, Hamburger adopts a standard regression technique with a stock flow model which assumed linearity in both the variables and the parameters. The data base covered the period 1952 - 1960 and employed quarterly observations of the variables.

Hamburger first approaches the question of the role of interest rates in controlling the demand for money. In his initial equation he regresses money as traditionally defined against Moody's Aaa corporate bond yield and Moody's dividend yield. The results indicated that the two variables explain approximately half of the variation of the function. Equally of interest was that fact that the size of the elasticity coefficients were approximately equal suggesting that short-run changes in demand could come equally from shifts in the market rate or dips in equity yields. To check against biases due to specific rates, Hamburger substitutes different rates for those originally used. The results, he finds, confirm his earlier conclusions.

To test the issue of the proper definition for money, Hamburger experiments with different definitions by introducing expanded versions into his original regression equation. Although he recognizes that it would be more appropriate to regress directly the various definitions against the yields of the different assets, lack of a quarterly series of rates forced him to adopt this particular approach. His results indicated there was not substantial improvement in the fit of the equation brought about by the use of an expanded definition.

Next Hamburger introduced measures of wealth and income in an attempt to clarify the proper constraint variable. Although the fit of the equation improved, the results did not allow him to distinguish effectively between the two variables.

Finally, Hamburger tested the results of the household sector against an aggregate demand for money function, while there were a few minor differences, the only significant difference appeared in the rate of adjustment between the actual level of holdings and the desired level (households appeared to have a longer period of adjustment).

In his second study, Hamburger modifies his approach to the question of which assets should be included in the definition of money (and more importantly for the proposed investigation) he extends the analysis to consider the relationship that exists between various financial assets.[21] Recall that in the first analysis, because of the lack of a quarterly series on deposit yields, Hamburger approached this issue by substituting expanded definitions of money into his original regression equation. In the second study, Hamburger moved to consider directly the demand for time and savings deposits at commercial banks, savings and loan shares, life insurance reserves, and savings deposits at other thrift institutions by regressing these assets against the rates of competing deposit assets, rates on other market instruments and nonhuman wealth. The same time period 1952 - 1960 and the same basic model as used in the first study were employed. Unfortunately a quarterly rate series was still not available; hence, Hamburger shifted to consider semiannual observations.

The results of the second study yield some interesting comparisons. First, equities do not enter any of the equations at a

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[21] Idem., "Household Demand for Financial Assets," Econometrica, Vol. 36, No. 1 (January, 1968), pps. 97-118.

significant level. Bonds enter both the equation for time deposits and the equation for savings shares as a substitute. Moreover, the levels at which it enters are approximately equal. Finally, time deposits enter as substitutes for savings shares and savings shares enter as substitutes for time deposits. These results, Hamburger holds, verify his earlier conclusions.

Savings Institutions: The Relative Standings

Prior to the end of the Second World War, commercial banks dominated the financial scene as "the important" financial intermediary. In December, 1945, of the total 53.4 billions of dollars of savings assets held in financial institutions, commercial banks held 56.47% or 30.4 billions as time and savings deposits.[22] It is noteworthy that the commercial banking sector was able to accomplish this feat while maintaining a rather passive attitude toward the collection of savings funds from the household sector. With the end of the war, this situation began to change. Although all financial institutions prospered, savings and loan associations in particular experienced a previously unparalleled rate of growth; much of which appeared to be at the expense of commercial banks. During the fifteen year period from December, 1946, to December, 1961, total savings deposits increased by 116.8 billions of dollars (60 billions to 176.8 billions). Of this total, commercial banks gained 39.1 billions (a gain of 214.3%). Savings and loan associations,

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[22]These figures are taken from the "Money and Deposit Summary" in; Federal Reserve System, Board of Governors, Flow of Funds Accounts, 1945-1968 (Washington: Board of Governors, 1970), pps. 70-71.

on the other hand gained 53.5 billions (a gain of over 722%). The commercial banks' share of total declined from 57% to 41.46% while the savings and loan associations share increased from 14.34% to 35.07%.[23]

This development did not go unnoticed. As indicated previously, Professors Gurley and Shaw incorporated the growth of financial institutions into their famous hypothesis. The Commission on Money and Credit was a direct result of competitive pressures felt by commercial banks. Finally, it has encouraged a number of independent studies designed not only to explore this particular period, but also aimed toward attempting to clarify the relative relationship between bank and nonbank financial institutions.

Charlotte and David Alhadeff

One of the first major independent studies done was that of Charlotte and David Alhadeff who sought an explanation for, "... the decline of commercial banks savings compared with (the) ... rapidly growing ... savings and loan associations (SLA)."[24]

By examining trends in deposit flows, interest rates and various other quantitative factors, the Alhadeffs concluded that the most popular explanation of the change in the relative positions between commercial banks and savings and loan associations -- a widening in the rate differential along with an increase in the promotion of savings and loans was not an adequate explanation. For them such an

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[23] Ibid.

[24] David A., and Charlotte P. Alhadeff, "The Struggle for Commercial Bank Savings," Quarterly Journal of Economics, LXXII (February, 1958), p. 1.

explanation was superficial, incomplete, and half wrong. Thus, during most of the period, the relative rate differential narrowed rather than widened. Next by emphasizing increased promotion or salesmanship, several important factors, independent of promotion, were ignored. Their analysis of the facts indicated the following:

> The major factors responsible for the shift have been the increased size of savers, the increase in the total number of savers, the construction boom, and the changed preference functions of individual savers in favor of SLA.[25]

Given their conclusions concerning the underlying causes in the change in the trend up to that point (February, 1958), it is interesting to note that they also concluded that, "(T)he future struggle for savings accounts must concentrate on price and product competition and political action."[26] Finally, in assessing the importance of these factors, they note, "(A)ny significant reversal of present shares would have to involve price (rate) competition."[27]

Werboff and Rosen

The Alhadeff's conclusions met with mixed response. Werboff and Rosen in their own study of the competitive relationship between bank and nonbank financial institutions were highly critical of the Alhadeffs, particularly in regard to the conclusion that the individual saver's demand curve has shifted in response to an increased risk preference, Werboff and Rosen maintain that an individual's primary

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[25] Ibid., p. 21.

[26] Ibid.

[27] Ibid.

concern for savings assets is safety and hence to emphasize expanded risk acceptance or tolerance is illogical.[28] Werboff and Rosen are also critical of the Alhadeffs' conclusion regarding the interest rate differentials. Part of the Alhadeffs' argument was that rate differential could not be relied upon as an explanation for the relative growth of savings and loans because the differential behaved just the opposite from what expectations would dictate, i.e., the differential was constant in an absolute sense or slightly narrowing during the period. Expectations indicate that it should have widened. Werboff and Rosen point out that there is a time lag between cause and effect; the impact of the narrowing of the differential was not immediately available in the data.[29] Finally, Werboff and Rosen have questioned whether or not banks are actually able to compete effectively via price competition as is suggested by the Alhadeffs.

Irwin Friend

Irwin Friend collaborating with Murray Brown in a study done for the Commission on Money and Credit examined on a macro level, the general relationship that exists between the financial and nonfinancial sectors of the economy. Their overall purpose is threefold:

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[28] Lawrence Werboff and Marvin Rosen, "Market Shares and Competition Among Financial Institutions," in Commission on Money and Credit, Private Financial Institutions (Englewood Cliffs: Prentice-Hall, Inc., 1963), pps. 265-331. This is an interesting point since the proposed study holds a third alternative; for all assets similar in risk, it is only the size of the rate differential that motivates investment.

[29] While it may be argued that this is a valid point, it has been shown that using the lag that Werboff and Rosen suggest, adjustment would take eight years. See Edward Stevens, "Deposits at Savings and Loan Associations," Yale Economic Essays (Fall, 1966), pps. 541-542.

1. ... to determine the quantitative magnitudes of the theoretical relations which explain the behavior of the economy....;

2. (to use the magnitudes) ... in clarifying certain general problem areas (such as) the effectiveness of monetary controls on financial and ... non-financial sectors; and,

3. (to predict) ... the course of relevant economic variables, such as the short-term interest rates ... on national income.[30]

In part, the study was supportive of the Alhadeffs' conclusions. For example, Friend in discussing nonprice competition and the effects of the housing boom notes the following:

> More aggressive promotion by the savings and loan associations have probably contributed (to the shift in position). (Then too, the) ... associations may also have been willing to make available more flexible terms to borrowers in return for higher interest on mortgage loans....[31]

More importantly for the proposed investigation is the difference in the explanation of the effect of interest rate differentials; " ... it is quite possible that the public has become increasingly aware of the existence of this differential and less and less perturbed about the nominal differences in liquidity."[32] This last statement is particularly interesting since it has been picked up by the Hunt Commission (described as a learning experience on behalf of individuals) as providing a possible explanation for the movement of funds out of

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[30]Irwin Friend, "The Effects of Monetary Policies on Nonmonetary Financial Institutions and Capital Markets," in Commission on Money and Credit, Private ~~Financial Institutions~~ (Englewood Cliffs: Prentice-Hall, Inc., ~~1963~~), p. 117. Private Capital Markets 1964

[31]Ibid., p. 31.

[32]Ibid., p. 29.

financial intermediaries and into direct capital market investments.

The most relevant portion of the Friend-Brown model is the subset of equations used to estimate the demand for time deposits at commercial banks and the demand for shares and deposits at savings and loan associations and mutual savings banks (i.e., the demand for thrift deposits).

The model used was a two-stage least-squares regression equation. The estimating equations assumed linearity in both the variables and the coefficients. The data base employed quarterly observations from the period 1952 II - 1959 IV.

The final estimating form of the demand equation for commercial bank time deposits regressed the holdings of time deposits by the private domestic nonfinancial sector against GNP lagged one period, the rate differential between time deposits and an average aggregate rate on thrift deposits (note that the differential was calculated as the time deposit rate minus the average thrift rate), the rate on time deposits lagged one period, and Standard and Poor's composite index of stock prices.

Although the estimating equations did not consistently indicate statistical significance for the following results, the authors felt justified in drawing three conclusions. First, from experimentation, it was indicated that, "(T)here is a tendency for short-run fluctuations in time-deposits to be counter cyclical."[33] Second, the stock price variable consistently entered with the correct sign implying,

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[33]Murray Brown, "Technical Appendix: An Econometric Model of the United States With Special Reference to the Financial Sector," in Ibid., p. 125.

" ... some substitutability between time deposits and stock price purchases."[34] Finally, the rate differential variable entered with the correct sign and, " ... connotes a moderate degree of substitutability between time and savings (thrift) deposits."[35]

The final estimating form for the demand for thrift deposits regressed these deposits against disposable income, the rate differential between the average thrift deposit rate and the rate on time deposits (in this case the rate differential was calculated as the thrift rate minus the time rate), the rate on time deposits lagged one period, and the rate on thrift deposits lagged one period.

Results from the tests are mixed. That is, two variables entered with the expected sign and two did not. The rate differential entered with the expected sign, but at a low level of significance indicating a weak degree of substitutability. The own rate entered positively as expected. On the other hand, disposable personal income entered negatively in all cases. The explanation, the authors contend, " ... suggested by inspection of the lagged savings (thrift) deposit variable is that a strong upward trend in this variable turns the sign of disposable income which acts as a mild cyclical variable."[36] Finally, the lagged time deposit rate enters positively and significantly. This the authors hold, " ... connotes some portfolio adjustment on the part of the public between time and savings deposits ... (and) implies that these financial investments are competitive in

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[34] Ibid.

[35] Ibid.

[36] Ibid., p. 127.

terms of the public's asset preferences."[37]

Jack Vernon

Vernon concentrates his study on examining and explaining the changing relationship between commercial banks and savings and loan associations. Vernon notes that in the first postwar decade, the advantage shifted in favor of the savings and loan associations, while in the second postwar decade this trend seemed to halt and then to slowly reverse itself back in favor of commercial banks. An examination of the relative percentages of household savings held by commercial banks and savings and loan associations in relation to the differential between the rates paid on deposit liabilities by these two institutions indicates to Vernon, " ... that the decline in the spread between returns paid to savers by S&Ls and commercial banks was the principal factor accounting for the change in the trend of the bank share."[38]

In order to quantify this relation, Vernon regressed the change in the commercial bank's share of total savings assets against the spread in the differential between the average savings and loan rate and the average commercial bank deposit rate. The model was a single variable least squares regression and utilized annual observations for the period 1947 - 1964.

The results indicated that, " ... the variation in spread explains approximately three-quarters of the variation in the change in

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[37]Ibid.

[38]Jack Vernon, "Competition for Savings Deposits: The Recent Evidence," National Banking Review, Vol. 4, No. 2 (December, 1966), p. 184.

the bank share."[39] The bank's ability to be able to compete more effectively with price, Vernon attributes to three factors; favorable regulatory changes, a relative decline in home mortgage interest rates, and an increased acceptance of credit risks by banks in the investment of deposit funds.

George Kardouche

The tight money period of 1966 and the resulting pressures of disintermediation led to a renewed interest of the relationship among the deposit liabilities of bank and nonbank institutions and the relationships between these liabilities and other capital market assets. Partially in response to this renewed interest and partially in response to what he considered to be a lack of attention to and a general lack of agreement on the important issues of elasticity, speed of adjustment, and stability, Kardouche undertook a comprehensive study of the demand for commercial bank time deposits, savings and loan shares, and mutual savings bank deposits.[40]

In order to provide for as complete an analysis as possible, Kardouche breaks his study into two parts. The first approaches the estimation of the demand functions using time-series analysis while the second approaches the estimation by using a pooled time-series, cross-sectional approach.

Time-Series Analysis Estimation of the equations took three

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[39] Ibid.

[40] George Kardouche, The Competition for Savings. Determinants of Deposits at Commercial Banks, Mutual Savings Banks, and Savings and Loan Associations, Studies in Business Economics, No. 107 (New York: National Industrial Conference Board, 1969).

different forms; a purely linear form, a log-linear form, and as a modification to the first two, a first difference form. All three models were single-equation, least squares estimates. To test for speed of adjustment, all models employed a stock flow adjustment mechanism. Observations were drawn quarterly for the periods 1952 - 1966. This base constituted for Kardouche, the long-run period. In order to provide for estimates of stability, the original period was split in half providing two short-run subperiods; 1952 I - 1959 II, and 1959 III - 1966 IV, (note that the split was solely on the basis of convenience).

The basic equations regressed values of the particular asset under investigation against three categories of variables; rates, other competitive variables, and a long-run constraint. Rate variables included: the own rate; i.e., the yield on the particular asset under investigation; the rates on other competing deposit assets; and, the rates on other competing capital market assets, specifically, the yields on Treasury bills, 3-5 year Government bonds, long-term Government bonds, Moody's Aaa corporate bonds, Moody's municipal bonds, Standard and Poor's common stock yields, Standard and Poor's common stock price index, and demand deposits. The category, other competitive variables included the number of offices and the amount of advertising. Finally, the relevant long-run constraint was taken to be the level of net financial assets; i.e., wealth.

Pooled Cross-Sectional Time-Series Analysis In the pooled estimates, Kardouche uses basically the same approach to estimate demand as he did in the time-series analysis. Thus, he experiments with more than one form of estimating equation (linear and log-linear). The general model regresses values of a specific asset against interest

rates, wealth, and convenience/promotion variables. There are six specific differences between the two approaches.

1. The time period is shortened to cover the years 1960 - 1965.

2. Data was obtained from different sources heretofore unavailable.

3. No adjustment mechanism was built into the model.

4. All nonrate variables were deflated by population to yield per capita measures.

5. All rate variables were entered as rate differentials.

6. The regressions were run in sections to allow for differences due to the existence or nonexistence of mutual banks.

The results of Kardouche's study are presented below.[41]

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[41] Ibid., pps. 164, 168-171.

DETERMINANTS OF TOTAL SAVINGS DEPOSITS--
SUMMARY OF TIME-SERIES ANALYSIS, QUARTERLY, 1952-1966

Savings Asset	Substitutes	Other Determinants and Comments	Stability and Speed of Adjustment
Commercial Bank Time and Savings Deposits	Savings shares are closest substitute. Then, in order of closeness: long-term Government bonds; corporate bonds; common stocks (with positive sign); municipal bonds; 3-5 year Government bonds.	Net financial assets of the household sector is main determinant. Advertising by savings associations reduces time deposits. Competition from savings associations appears in 1959-1966, but not in 1952-1959 subperiod.	Demand unstable; 50% of adjustment completed in one year.
Savings and Loan Association Shares	Time deposits if advertising by associations is excluded; corporate bonds when advertising is included. Then in order of closeness: long-term Government bonds; municipal bonds; common stocks (with negative sign); 3-5 year Government bonds; Treasury bills.	Net financial assets of household sector is main determinant. Advertising by savings associations increases savings shares.	Demand unstable; 8% of adjustment completed in one year, or in some tests "negative" adjustment.
Mutual Savings Bank Deposits	Savings shares are closest substitute. Then in order of closeness: long-term Government bonds; corporate bonds; 3-5 year Government bonds; common stocks (with positive sign); municipals; Treasury bills.	Net financial assets of the household sector is main determinant. Advertising by savings associations reduces mutual savings deposits. Competition from savings associations appears in 1959-1966, but not in 1952-1959 subperiod.	Demand unstable; 75% of adjustment completed in one year.

Source: George Kardouche, The Competition for Savings, c 1969 by National Industrial Conference Board, Inc. Reproduced by permission of the Conference Board.

DETERMINANTS OF PER CAPITA SAVINGS DEPOSITS--
SUMMARY OF POOLED CROSS-SECTION/TIME-SERIES ANALYSIS, ANNUAL, 1960-1965

Savings Asset	Substitutes	Income	Convenience: Per Capita Number of Commercial Bank Offices	Convenience: Per Capita Number of Savings and Loan Association Offices	Convenience: Per Capita Number of Mutual Savings Bank Offices	Advertising by Savings and Loan Associations	Other Comments
Commercial Bank Time and Savings Deposits							
A. Without mutual savings banks							
1. Cities	Corporate bonds	Positive	Positive	Negative	..	Wrong sign and nonsignificant	Most important variable is number of commercial bank offices; then income.
2. Country	Savings shares; then corporate bonds	Positive	Positive	Negative but nonsignificant	..	Wrong sign and nonsignificant	Most important variable is income; then savings-shares yield spread; number of commercial bank offices.
B. With mutual savings banks							
3. Cities	Savings shares; then corporate bonds and mutual savings deposits	Positive but nonsignificant	Positive	Negative	Negative	Wrong sign and nonsignificant	Most important variable is savings-share yield spread; three offices variables.
4. Country	Corporate bonds; then mutual savings deposits. Savings-share yield spread negative but nonsignificant	Positive	Positive	Negative	Negative	Wrong sign and significant	Most important variable is number of mutual savings offices; then corporate-bond yield spread and savings association offices
Savings and Loan Association Shares							
A. Without mutual savings banks							
5. SMSA's	Corporate bonds	Positive	Negative but nonsignificant	Positive	..	Positive	Most important variable is advertising; then savings association offices and corporate-bond yield spread.

6. Country.....	Corporate bonds; then time deposits, but both yield spreads nonsignificant	Positive	Wrong sign	Positive	..	Positive	Most important variable is advertising; then savings association offices.
B. With mutual savings banks							
7. SMSA's.....	Corporate bonds; then mutual savings deposits and time deposits	Positive	Negative	Positive	Wrong sign and significant	Positive but nonsignificant	Most important variable is commercial bank offices; then corporate-bond yield, savings association offices and income.
8. Country.....	Corporate bonds; then time deposits and mutual savings deposits, although the last yield spread was nonsignificant	Positive	Negative	Positive	Negative	Positive but nonsignificant	Most important variable is income; then savings association offices.
Mutual Savings Bank Deposits							
9. Cities.....	Savings shares; then corporate bonds; also 3-5 year Government bonds, but yield spread nonsignificant	Negative but nonsignificant	Negative	Negative	Positive	Negative	Most important variable is savings-share yield spread; then number of mutual savings banks and number of savings associations.
10. Country.....	Savings shares; then 3-5 year Government bonds, but yield spread nonsignificant	Positive	Negative but nonsignificant	Negative	Positive	Positive but nonsignificant	Most important variable is number of mutual savings banks; then income.

..Signifies these variables were not tested in that section.

Dhrymes and Taubman

The purpose of the Dhrymes and Taubman study was the investigation of, " ... the determinants of the size of the savings and loan industry ...." as a financial subsector of the economy as a whole.[41] To accomplish their objective, they had to, " ... derive and empirically estimate a model of both the industry and its customers."[42] The final model was constructed as a combination of the empirically best behaved functions of the demand for deposit liabilities and the demand for mortgages within a context of assumed profit maximization in light of the association's expectations (for such things as individual preferences and movements in income).[43]

For the purposes of the proposed investigation, the most relevant portion of their study is the examination of the demand for the deposit liabilities of the savings and loan associations.

Like Kardouche, Dhrymes and Taubman approached the question of the demand for savings and loan shares with a stock adjustment portfolio model. The individual demand equations were estimated by using a single equation multiplicative model assumed linear in the parameters. Quarterly data observations were obtained on a continuous cross-sectional basis using the Standard Metropolitan Statistical Area as the basic unit of observation. The time period covered the years, 1958 - 1965.

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[41]Phoebus J. Dhrymes and Paul J. Taubman, "An Empirical Analysis of the Savings and Loan Industry," in the Study of the Savings and Loan Industry (Washington: U.S. Government Printing Office, 1969), p. 75.

[42]Ibid., p. 69.

[43]Ibid., p. 78.

The general demand function regressed the change in the per capita holdings of savings and loan shares against the following independent variables: per capita normal, disposable income; per capita transitory disposable income; the average rate on savings and loan associations (nonwestern); rates on other competing assets (i.e., commercial bank time deposits, 3 month Treasury bills, corporate bonds, stocks, and the rate on Los Angeles associations); advertising expenditures; the per capita holdings of savings and loan shares at the beginning of the period; and, the per capita number of savings and loan offices.[44]

Because "west coast" savings and loan associations (California, Arizona, and Nevada) have been net importers of capital since 1958, it was hypothesized that there could be important geographical differences in demand. To test this hypothesis, two separate demand equations were estimated; one for the western savings and loans and one for nonwestern associations.

The authors summarize their results as follows:

1. California, Nevada, and Arizona exhibit a substantially faster speed of adjustment than does the rest of the country in the individual's demand function for S&L accounts.

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[44]Several items need clarification. Normal disposable income is defined as a weighted average of past incomes. Transitory disposable income is defined as the difference between disposable personal income and normal disposable income for any time period t. The average rate on savings and loan associations is an average rate paid by nonwestern associations to take account of any geographical differences that could appear. Finally, the corporate bond yield and stocks are left undefined by the authors. Presumably these would refer to a long-term yield and the yield on stocks, but this may not be the case.

2. The longrun (sic) elasticity of savings accounts with respect to the interest rate paid on these accounts is greater than 2 in both sectors of the country, but in the shortrun (sic) elasticity is about 0.1 in the nonwestern areas and 0.4 in the three Western States.

3. There is some evidence of significant substitution between S.&L. accounts in the Western States and the rest of the country and between S.&L. accounts and Treasury bills. (Note, none of the other competing rates consistently entered the equations, a rather surprising result in light of some of the previous studies, particularly Kardouche's.)

4. The "normal" income or wealth elasticity of S.&L. accounts in nonwestern areas is about 1 in the shortrun and 0.2 in the longrun.[45] (sic)

Sandra Cohen

Sandra Cohen's study, though smaller in scale than many of the previously discussed studies, provides some useful information on the regional demand for mutual savings bank deposits. The purpose of her study was to examine the, " ... household interest rate responsiveness via deposit adjustments among mutual savings banks and between mutual deposits and either commercial bank time and savings deposits or money market instruments ...." in a two county region in Massachusetts; Boston County and Middlesex County.[46]

Cohen used a quarterly time-series analysis covering the period from 1967 I - 1970 II. The period is of particular interest because it covers much of the second tight money period. Moreover,

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[45] Ibid., p. 71.

[46] Sandra B. Cohen, "Demand for Mutual Savings Bank Deposits in Two Local Economic Markets," in Proceedings of a Conference on Bank Structure and Competition (Chicago: Federal Reserve Bank of Chicago, 1972), p. 68.

it provides an interesting setting since, "(T)he majority of the (Mutual savings) banks -- those insured by the state's Mutual Savings Central Fund (MSCF) -- were not constrained by ceiling rates imposed by the Federal Deposit Insurance Corporation (FDIC) on the mutual savings banks it insures and regulates."[47]

The typical estimating equation is a single equation, stock flow portfolio model in a multiplicative form. Due to difficulties in obtaining a reasonable local proxy for wealth, no such constraint variable was employed. Cohen tests three different estimating equations. The first regresses the quarterly level of either time or savings deposits (of FDIC or MSCF insured mutuals) against the own rate and the competitive rate offered without a stock adjustment mechanism. The second replicates the first incorporating an adjustment mechanism.[48] The third drops the mutual rates and employs the rates on commercial bank time and savings deposits, U.S. Government short-term and long-term securities and Aaa corporate bond yields as the explanatory variables.[49]

The results are as follows.[50]

1. The own rate coefficients and competing rate coefficients entered with the correct sign and

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[47] Ibid.

[48] It is indicated that rate differentials were employed in some part of the analysis; however, the results do not clearly indicate whether or not rate differentials were employed in all of the estimating equations.

[49] Test results (the equation coefficients) were not given for this case. Hence, it is not clear if rate differentials or the absolute rates were used.

[50] Ibid., pps. 71, 73-74.

significantly in all cases. The implied relation is one of strong substitutability between the two.

2. The majority of the regressions indicate a close fit (R^S = .822 - .984) without the use of a constraint variable.

3. The own rate coefficient consistently exceeds the competing rate coefficient indicating a strong residual resistance to the substitution effect noted in 1.

4. Changes in the legal ceiling rates on time and savings deposits resulted in intrabank deposit shifts reinforcing the conclusion that time and savings deposits may be considered to be strong substitutes. (Unfortunately, results for the own rate coefficient are not reported. It would have been possible, if the coefficients were reported, to expand the information concerning the residual resistance.)

5. Estimates regarding lagged variables were either statistically insignificant or unreliable; hence, no conclusion relating to the speed of adjustment was possible. (Reading "between the lines" indicates that Cohen did not attempt to adjust for problems of colinearity of rates which appears to have produced the results indicated here.)

6. In none of the regressions tested did any of the other proposed competing assets significantly enter as substitutes for mutual bank time or savings deposits. There were six cases in which these assets entered significantly as complements. Since there was no consistency of results, these must be considered as isolated cases. (Given the findings of Dhrymes and Taubman, this may provide some evidence of regional differences in demand.)

7. Finally, there is some evidence (though weak) to indicate that widening rate differentials cause only temporary instability in deposit flows. (Recall Heller's study indicated some possible cyclical instability also.)

CHAPTER III

FORMULATION OF THE MODEL

The Test Model

The decision as to the final form of the test model rests upon several considerations which will be discussed at some length in the body of this chapter. Before launching a discussion of the formulation of the model, it will be noted that, in its final test form, the model may be described as a standard multiple linear regression analysis employing the ordinary least squares technique of estimation. The data base consists of time-series observations collected over a long-run (20 year), period. The expanded test form, presented as equation (1), employs dummy variables which make possible not only estimation of the long-run demand function, but also the estimation of demand during specified subintervals.

$$(1)\quad SLA_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3ti} + \beta_4 X_{4tj} + \gamma_1 Z_{1t} + \delta_1 X_{1t} Z_{1t} + \delta_2 X_{2t} Z_{1t} + \delta_3 X_{3ti} Z_{1t} + \delta_4 X_{4tj} Z_{1t} + \gamma_2 Z_{2t} + \eta_1 X_{1t} Z_{2t} + \eta_2 X_{2t} Z_{2t} + \eta_3 X_{3ti} Z_{2t} + \eta_4 X_{4tj} Z_{2t} + \gamma_3 Z_{3t} + \gamma_4 Z_{4t} + \gamma_5 Z_{5t} + \varepsilon_t$$

where: SLA = the aggregate household holdings of savings and loan shares

X_1 = the aggregate level of personal disposable income

X_2 = the own rate (the interest return promised on savings and loan shares)

X_{3i} = the rate of interest promised on the competitive institutional assets (for i = mutual savings bank deposits and commercial bank time and savings deposits)

X_{4j} = the average market return obtained on potentially competitive market instruments (for j = 3 month Treasury bills, 9 - 12 month Government bills, 3 -5 year Government bonds, long-term Government bonds, state and local obligations, and corporate bonds)

Z_1 = the disintermediation dummy
= 1 during periods of disintermediation affecting savings and loan associations
= 0 otherwise

Z_2 = the normal flow dummy
= 1 during normal flow periods
= 0 otherwise

Z_3, Z_4, Z_5 = the seasonal dummies
Z_3 = 1 during the summer quarter
= 0 otherwise

Z_4 = 1 during the fall quarter
= 0 otherwise

Z_5 = 1 during the winter quarter
= 0 otherwise

The regressions representing the different effects may be represented as equations (2) through (4).

(2) $SLA_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3ti} + \beta_4 X_{4tj} + \gamma_3 Z_{3t} + \gamma_4 Z_{4t} + \gamma_5 Z_{5t} + \varepsilon_t$ (representing the long-term period)

(3) $SLA_t = (\beta_0 + \gamma_1) + (\beta_1 + \delta_1)X_{1t} + (\beta_2 + \delta_2)X_{2t} + (\beta_3 + \delta_3)X_{3ti} + (\beta_4 + \delta_4)X_{4tj} + \gamma_3 Z_{3t} + \gamma_4 Z_{4t} + \gamma_5 Z_{5t} + \varepsilon_t$

(representing the periods of disintermediation affecting the savings and loan associations)

(4) $SLA_t = (\beta_0 + \gamma_2) + (\beta_1 + \eta_1)X_{1t} + (\beta_2 + \eta_2)X_{2t} + (\beta_3 + \eta_3)X_{3ti} + (\beta_4 + \eta_4)X_{4tj} + \gamma_3 Z_{3t} + \gamma_4 Z_{4t} + \gamma_5 Z_{5t} + \varepsilon_t$

(representing the normal flow periods)

Formulation of the Model

It was decided early in the study to employ linear regression as the basic framework for investigation. The linear regression technique is not only a convenient and widely accepted tool, but it will also facilitate comparisons with previous related studies.

The choice of the exact model to be used rests upon a consideration of the following issues.

1. Should the model employ cross-sectional data or time-series data?
2. Should the estimating model be of strictly linear form?
3. Which independent variables ought to be included within the model?
4. What technique of estimation ought to be used?
5. What should be the method of expression used for the independent interest rate variables?

The Data

The difference between time-series data and cross-sectional data is the method by which the individual observations are collected. Quite simply, time-series distinguishes between individual observations on the basis of specific time intervals; as such, time-series regression estimates the equation parameters on the basis of variations occurring within the specified time intervals. Cross-sectional methods distinguish between individual observations (for a given time period) on the basis of some factor other than time, such as geographical location, regional area or age. Thus, a cross-sectional regression estimates the equation parameters from different forms of variation such as inter-regional or inter-individual differences.

There are several advantages in the use of cross-sectional data. For example, the segregation of data by region would make possible the testing of the often claimed differences between the west coast savings and loan associations and those located in other parts of the country. Similarly, a regional data collection method would lend credibility to any estimates of the demand for savings and loan shares that would include the rate paid by mutual savings banks as one of the explanatory variables.[1] Moreover, because observations are generally collected over a yearly period, estimates of demand would help to shed some light on the question of the long-run stability of the demand function. Finally, by limiting observations to a single year period, problems of autocorrelation could be significantly reduced.

Unfortunately, the use of cross-sectional data suffers a major drawback; it is generally unavailable. Even in cases in which data was specifically made available for a particular study (Dhrymes and Taubman and Kardouche), the lack of a large enough sample forced the use of a pooled cross-sectional, time-series analysis.

Time-series data, on the other hand, are readily available from several sources. The Federal Reserve Board, for example, regularly publishes sectoral holdings of financial assets, money market rates, and institutional rates paid on savings deposits. Although further disaggregation of data is not available, it must be recognized that there are certain advantages of generalization available from the use of aggregative data. Because of the reasons cited here, the present study will employ time-series data.

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[1] Recall that mutual savings banks are clustered in the Northeastern section of the United States.

Model Form

The previous chapter has shown that past research has generally concentrated on the use of the linear regression model in estimating the demand for financial assets. Note that this does not necessarily limit the demand function specification to a linear expression. Several nonlinear specifications may be linearized (put in linear form) by expressing the original nonlinear equation in log form. Take as an example the most popular nonlinear model, the multiplicative model.[2]

A multivariate linear model may be expressed as equation (5).

$$(5) \quad Y_i = \alpha + \beta_2 X_{i2} + \beta_3 X_{i3} + \cdots + \beta_k X_{ik} + \varepsilon_i$$

The multivariate multiplicative model has the form of equation (6).[3]

$$(6) \quad Y_i = \alpha X_{i2}^{\beta_2} \; X_{i3}^{\beta_3} \cdots X_{ik}^{\beta_k} \; 10^{\varepsilon_i}$$

By taking the logs of both sides of equation (6), the expression may be put in linear form as in equation (7).

$$(7) \quad \log Y_i = \alpha + \beta_2 \log X_{i2} + \beta_3 \log X_{i3} + \cdots + \beta_k \log X_{ik} + \varepsilon_i$$

It is not always entirely clear from the studies why an individual researcher has chosen one particular demand specification over another. Some (Hamburger for example), simply assume that demand is inherently linear while others (Lee for example), have simply chosen a model

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[2]Another example is the hyperbola. See Kmenta, Elements of Econometrics (New York: The Macmillan Co., 1971), p. 459.

[3]It may also be written as $Y_i = \alpha X_{i2}^{\beta_2} \; X_{i3}^{\beta_3} \cdots X_{ik}^{\beta_k} \; \eta_i$ if ε_i is assumed to be normally distributed with a mean of 0 and a variance = σ^2. In this case, the logrithm of η_i is assumed normally distributed with a mean of 0 and a variance = σ^2. See Kmenta, op. cit., p. 458.

without explanation. At least one other (Kardouche), has tested both linear and nonlinear models. Undoubtedly a part of the lack of explanation must be attributed to the fact that many economists consider the specification of the demand for a financial asset to be entirely an empirical question and hence are unwilling to make any sort of a priori assumption. While this may be a correct position, it should not hide the fact that there is not a strong a priori argument for the use of one particular model over the other. Given this situation, it would seem most appropriate to decide the issue of model specification on the basis of past results. Unfortunately, neither model specification has consistently proven superior to the other in past tests. Thus, the final choice must rest upon other considerations. Since the linear model has dominated the prior works, it was felt that the use of this form of specification in the present study would at least be the most helpful in making possible comparisons between the results to be obtained here and those reported in previous studies.

Variable Selection

The basic model will adopt a portfolio approach to demand; that is, savings and loan shares will be considered to be just one asset of many financial assets that are available to an individual. Based upon the results of prior work, the general demand formulation may be stated as equation (8).[4]

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[4]The basis for this formulation rests in viewing the demand for money as a problem in balance sheet equilibrium as with Friedman, "The Demand for Money: Some Theoretical and Empirical Results," Journal of Political Economy, LXVII (August, 1959), Brunner and Meltzer, "Some Further Investigations of Demand and Supply Functions for Money," The Journal of Finance, XIX (May, 1964), and Chow, "On the Long-Run and Short-Run Demand for Money," Journal of Political Economy, LXIX (October, 1961).

(8) $D_i = f\ (C, r_o, r_i, P)$

where: D = the demand for any financial asset i

r_o = the rate of interest (return) yielded by the particular asset under investigation (here savings and loan shares)

r_i = a vector of rates of interest (return) yielded by two classes of potentially competitive assets; other institutional assets, and credit market financial assets

P = various promotional or convenience variables such as advertising, give-away schemes, one-stop banking services, or the number of branch offices

C = a constraint variable(s)

The need for a constraint variable may be illustrated by considering an individual's demand for all goods and services. In a monetary economy, an individual trades money for certain goods and services which are desired. The funds which he uses are generated by the income that an individual receives for his own goods and/or services which are sold to others. In the short-run period, the ability to generate these funds must have an effect on the individual's demand for all goods and services. In the long-run, however, if no funds are generated, there can be no satisfaction of demand. Hence, income must limit or constrain demand. Since the demand for savings assets represents a subset of the demand for all goods and services, income must constrain the demand for savings assets as well.

The entrance of rate variables is, of course, a necessity. The own rate is entered for a dual purpose; to check the overall level of price elasticity, and to check for any residual resistance to changes in demand due to changes in other interest rate parameters. The

remaining institutional and market rates will also serve a dual purpose; the first being to test the assumption of the importance of the two classes of rates (institutional vs. market), and the second being to test the importance of individual rates in the determination of the demand for savings and loan shares (i.e., to provide for a ranking of the importance of the different market assets).[5]

Ideally the study should focus on the general demand function and thus incorporate all potential determinants including the last category which has been defined as convenience and/or promotional variables. A few of the prior studies have attempted this broad approach by including advertising expenditures and/or convenience proxies. There are, however, certain problems associated with the inclusion of these variables. First, the only factor for which any figures exist is advertising and these figures are obtainable only for savings and loan associations. This by itself would not prevent its use; however, there are additional problems which must be overcome. The figure is an aggregate value including all advertising and promotional schemes, thus preventing any distinction between the two. More importantly though, the figure is reported only on an annual basis and is subject to broad fluctuations. Because this study employs quarterly observations, the annual figure would have to be linearly interpolated to obtain quarterly observations. Interpolation, though not totally accurate, can

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[5]Note the difference between ranking and testing for resistance to moves. Ranking compares price elasticities between rate categories or within a specific rate category to determine which rates are the most important substitutes. Testing for resistance, compares the own rate price elasticity with the price elasticities of other rate variables in order to determine how strong the substitutes are; i.e., how much of a tendency there is to shift into a substitute asset.

be reasonably used in situations in which the main trend is relatively stable. However, if the main trend is unstable, interpolation provides less than satisfactory results and it is better not attempted.

The incorporation of convenience variables requires that proxies be used. Past results suggest that attempts to measure convenience by proxies have been less than successful.[6] Due to the difficulties involved, this study will not attempt to incorporate either convenience or promotional variables into the analysis.

Estimation Technique

Several different estimating techniques are available and while several different methods have been used one of the simplest, the method of ordinary least squares, has generally provided results on a par with those obtained from the use of more complicated techniques.

Even though the method of least squares has proven satisfactory, it does suffer limitations; specifically, it does not provide for information on the improvement in the fit of the estimating equation resulting from the various independent variables, nor does it discriminate between various possible combinations of variables. Such information would be particularly helpful in defining the best estimating equation. It would also augment the information obtained by the elasticity estimates and aid in ranking the different rate variables. However, it is possible to obtain this information through the use of the multiple stepwise regression technique.

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[6] Fiege, for example, has been criticized for his excessive use of dummies. See Lee, "Substitutability of Non-Bank Intermediary Liabilites for Money: The Empirical Evidence," The Journal of Finance, XXI (September, 1966), pps. 453-455.

The process may be briefly described as follows. The simple regression of a dependent variable on a single independent variable is calculated for all independent variables. The regression which yields the highest R^2 is retained and the variable is entered as the first independent variable. The process is again repeated; in this case the dependent variable is regressed against two variables; the initial variable retained and each of the remaining independent variables. The variables from the regression yielding the highest R^2 are again retained (note that this time there are two variables included, the one initially included and a new one which, in conjunction with the initial, yielded the best fit in the second round). The process is repeated until either a satisfactory number of variables have entered or a desired level of significance has been obtained.[7]

On first blush, stepwise regression seems preferable to the ordinary least squares technique. However, deeper examination points up some questions concerning its usefulness. Certainly the information on the improvement in fit is desirable, but the elasticities must still be calculated. As will be mentioned in a following section, there are problems of colinearity among interest rates that must be reckoned with. Since the stepwise method is basically a least squares technique, it is subject to the same difficulties as is the ordinary least squares method. Moreover as should be apparent, the use of the stepwise method can in fact multiply the colinearity problems.

This would then leave the major contribution of the stepwise

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[7]For a good discussion of the method, see Yamane, Statistics: An Introductory Analysis, Third edition (New York: Harper & Row, 1973), pps. 994-998.

method to be the ability to dictate the best combination of independent variables. However, it can be shown that the best combination of independent variables provided by the stepwise method may not be, in fact, the optimal combination or that which provides the highest R^2. Thus, in making the first pass through the variables, the algorithm saves the variable resulting in the highest R^2. In the second pass, it saves the two variables resulting in the highest R^2 and so on through successive passes. But, because the method does not consider all possible combinations, there is no assurance that some other combination of variables would not ultimately result in a better fit of the equation. Since there is no guide to fall back on to help validate the results, the stepwise method must be rejected in favor of the ordinary least squares method.

Method of Variable Expression

Two major problems have plagued time-series analysis of the demand for financial assets; multicolinearity and autocorrelation.[8] In an attempt to reduce these problems, researchers have expressed the interest rate variables in the form of rate differences rather than levels and have expressed both the dependent and independent variables

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[8]Both problems constitute a violation of the assumptions of the "classical normal linear regression model." Colinearity violates the assumption that there is not an exact linear relation between any of the independent variables; i.e., the explanatory variables are mutually independent. Autocorrelation violates the assumption that the stochastic disturbance terms are all independent; i.e., the effect of a disturbance ε_i occurring in one time period does not carry into another time period. (For an excellent discussion of the assumptions and violations, see Kmenta, op. cit., p. 348 and pps. 247-304.)

as first difference values rather than the observed values.[9]

The use of rate differential has been advanced on the grounds that the simple correlation between the various independent variables is reduced when expressed as a differential; and hence, the colinearity of the rates in the regression ought to be similarly reduced.[10] In spite of the fact that the simple correlation matrix does change, such reasoning is not strictly correct for it may be shown that entry of the independent rate variables in difference form leads to the same results as entry of the independent rate variables in level form. Consider the following. Equation (9) is in level form and equation (10) is in difference form.

$$(9) \quad Y_{Lt} = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \varepsilon_{Lt}$$

$$(10) \quad Y_{Dt} = \alpha_0 + \alpha_1 X_{1t} + \alpha_2 (X_{1t} - X_{2t}) + \alpha_3 (X_{1t} - X_{3t}) + \varepsilon_{Dt}$$

where: Y_t = the value of the independent variable in time t

β_0 = the function intercept

β_i = the regression coefficients (for i = 1,2,3)

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[9] A rate difference is simply the net result of subtracting one rate from another. It can be expressed either as the difference between the "own" rate (the rate offered by the dependent variable) and another (independent variable) rate, or the reverse. The only difference resulting will be in the sign of the parameter coefficient. A first difference is the resulting differential between a variable observation in one period (say time t) and the variable observation in the immediately preceding period (time t-1). (Note that this latter method considers only first order autocorrelation.)

[10] Quite apart from the considerations of colinearity, the use of rate differences has been argued for on the grounds that it is the comparison of the rates (the differences) which motivates the movement of funds; and hence, differentials are more meaningful than levels.

X_{it} = the value of the independent rate variable in time t (for i = 1,2,3)

ε_t = the random disturbance term

The definition of the αs correspond to those of the βs.

Equation (10) may be rewritten as equation (11).

$$(11) \quad Y_{Dt} = \alpha_0 + (\alpha_1 + \alpha_2 + \alpha_3) X_{1t} - \alpha_2(X_{2t}) - \alpha_3(X_{3t}) + \varepsilon_{Dt}$$

Compare equation (11) with equation (9). Note that:

$$\beta_0 = \alpha_0$$

$$\beta_1 = \alpha_1 + \alpha_2 + \alpha_5$$

$$\beta_2 = -\alpha_2$$

$$\beta_3 = -\alpha_3$$

$$\varepsilon_{Lt} = \varepsilon_{Dt}$$

Thus: $Y_{Lt} = Y_{Dt}$

The use of first differences results from an attempt to reduce the autocorrelation by a method of data transformation. While the technique of data transformation is valid, the use of first differences is valid only under the assumption that there is nearly perfect autocorrelation existing. Autocorrelation is present if the stochastic disturbance terms are not independent; that is, if $E(\varepsilon_i, \varepsilon_j) \neq 0$ for $i \neq j$ (see footnote 7). The autocorrelation coefficient r, may be estimated by means of the formula presented as equation (12).[11]

$$(12) \quad r = \frac{\sum_{i=2}^{n} e_i e_{i-1}}{\sum_{i=2}^{n} e_{i-1}^2}$$

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[11] This discussion is based upon that of Yamane, op. cit., p. 1006.

where: r = the coefficient of autocorrelation

e_i & e_{i-1} = the estimated disturbance terms in time period t and t-1 respectively

If there is autocorrelation present, it may be removed by transforming both the dependent and independent variables by r as in the following.

$$Y_2 - rY_1 = Y_2^* \qquad X_{2j} - rX_{1j} = X_{2j}^*$$

$$Y_3 - rY_2 = Y_3^* \qquad X_{3j} - rX_{2j} = X_{3j}^*$$

$$\vdots \qquad\qquad \vdots$$

$$Y_n - rY_{n-1} = Y_n^* \qquad X_{nj} - rX_{n-1,j} = X^*_{nj}$$

for i = 1, ...,n time periods

for j = 1, ...,m independent variables in n time periods

where: Y_i = the value of the dependent variable in time period i

X_{ij} = the value of the $j^{\underline{th}}$ independent variable in time period i

Y_i^* = the transformed value of the dependent variable in time period i

X_{ij}^* = the transformed value of the $j^{\underline{th}}$ independent variable in time period i

r = the estimated coefficient of autocorrelation

The technique of first differences adjusts for autocorrelation by means of the following transformation.

$$Y_2 - Y_1 = Y_2^* \qquad X_{2j} - X_{1j} = X_{2j}^*$$

$$Y_3 - Y_2 = Y_3^* \qquad X_{3j} - X_{2j} = X_{3j}^*$$

$$\vdots \qquad\qquad \vdots$$

$$Y_n - Y_{n-1} = Y_n^* \qquad X_{nj} - X_{n-1,j} = X_{nj}^*$$

for i = 1, ... ,n time periods

for j = 1, ... ,m independent variables in n time periods

where: Y_i, X_{ij}, Y^*_i, and X^*_{ij}, are defined above

Note that the technique of first differences is a correct method for removing autocorrelation only when the estimated autocorrelation coefficient $r \simeq 1$. If $r \not\simeq 1$, the use of first differences will tend to bias the results.

Since the use of rate differences offers no particular advantages, the independent rate variables will be entered in level form. Adjustments undertaken to reduce colinearity will be discussed below. Autocorrelation will be adjusted for on the basis of the first data transformation discussed above.

The Test Model

Based on the foregoing, the exact model specification can be described as a multiple linear regression analysis performed on time-series data employing the ordinary least squares method of estimation. The equation is expressed as a function of a single constraint variable, the own rate paid on savings and loan shares and a number of possible competing interest rate levels. Generally, the relationship may be described as equation (13) and expanded as equation (14).

(13) $SLA = f(C, r_o, r_i)$

(14) $SLA = \beta_0 + \beta_1 INC + \beta_2 OWN + \beta_3 CB(T) + \beta_4 CB(L) + \beta_5 MSB + \beta_6 COMM + \beta_7 3MTH + \beta_8 6MTH + \beta_9 9\text{-}12MTH + \beta_{10} 3\text{-}5GOV + \beta_{11} L\text{-}T\ GOV + \beta_{12} SL\ TOT + \beta_{13} SL\ AAA + \beta_{14}\ CORP\ TOT + \beta_{15}\ CORP\ AAA + \varepsilon$

where: SLA = the aggregate value of household holdings of savings and loan shares

constraint variable INC = personal disposable income

OWN = the average interest yield on savings and loan shares

CB(T) = the average interest yield on commercial bank time and savings deposits (from 1967 on, the figure excludes large time deposits; i.e., those over $100,000)

institutional rate variables

CB(L) = the average interest yield on large time deposits (those over $100,000)

MSB = the average interest yield on all mutual savings bank time and savings deposits

COMM = the average market yield on high grade, short-term commercial paper

3 MTH = the average market yield on 3 month Treasury bills

6 MTH = the average market yield on 6 month Treasury bills

9-12 MTH = the average market yield on 9-12 month Government bills

3-5 GOV = the average yield paid on intermediate term Government obligations

market rate variables

L-T GOV = the average yield paid on all government bonds over 5 years in maturity

S&L TOT = the average rate paid on all state and local obligations (Moody's rate)

S&L AAA = the average rate paid on all state and local obligations which have obtained a Aaa rating by Moody's

CORP TOT = the average rate paid on all corporate bonds regardless of their rating (Moody's rate)

CORP AAA = the average rate paid on all corporate bonds that have obtained a Aaa rating by Moody's

Expressed as equation (14), there are two problems with the model, both of which relate to its breath. As it now stands, the model represents what might be commonly termed "a kitchen sink model"; by including

all of the relevant variables, it ends up including too much. Next, because of the high correlation between the individual rates, it is highly susceptible to problems of colinearity. The question then becomes: can it be pared down?

Since the first category, constraint variables, contains only one variable it will remain intact. The second category, institutional rate variables, contains four rates. Any decision to pare the number of rates must take into account three main factors: the time period to be covered; the regional nature of the mutual savings banks; and, the trade-off between possible loss of information and the possible bias due to colinearity.[12] While three of the rate series are available for the entire twenty year period, the series covering large time deposits at commercial banks has been published only since 1967, forcing, perhaps unfortunately, its elimination from consideration.

It has previously been pointed out that mutual savings banks are clustered primarily within the Northeastern section of the United

---

[12]Early in the study it was decided to cover the period from 1952-1971 (the latter representing the latest date for which information was available). In 1952, the Treasury and Federal Reserve Board reached their famous "accord" and the government security market was no longer artifically supported. In addition, by 1952, federal and state deposit insurance programs were operating for all classes of savings institutions and the different deposit accounts could reasonably be considered to be on par in terms of safety.

While coverage of a twenty year period would yield a reasonable estimate of the long-term demand equation, it would, by its very nature eliminate any short-term estimation which, for considerations of stability, are desirable to obtain. Two possibilities arise: chop the period up into two or more subperiods, or segregate the long-run period through the use of dummy variables. Because of the greater amount of information yielded by the latter and its ability to eliminate the necessity of further assumptions for comparisons, the second alternative was selected. This latter point is discussed in greater detail in the text. (see p. 71).

States. It would therefore be desirable to include it as an independent variable only on a regional basis (something this study is not equipped to do). Thus, there is some basis for eliminating the average rate on mutual savings bank deposits from consideration. However, prior studies have indicated that the rate is an important variable in the determination of the demand for savings and loan shares and to completely eliminate it from consideration would serve to eliminate much useful information.

The choice to retain three of the rates subjects the regression to problems of colinearity. One possible method to reduce this problem would be to enter each rate in an individual regression. Although there is some validity in this approach, it would also serve to greatly reduce the available information. In an attempt to strike a compromise, it was decided to form two categories of estimating equations: one including the own rate and the rate paid on mutual savings bank deposits, and the other including the own rate and the rate paid on commercial bank time and savings deposits.[13]

The third category, market rate variables, includes ten rates. As pointed out previously, it is desirable to include a large number of alternatives in order to attempt an isolation of all potential competitors and to provide as much information as possible on the relative importance of each. But some paring is both desirable and possible. The average rate paid on all state and local securities is quite close to the average rate paid on Aaa state and local obligations.

---

[13]Such a distinction would also be helpful in isolating any biases due to regional nature of the mutual savings banks.

The same is true for the average rate paid on all corporate bonds and corporate Aaas.[14] Hence, the use of a single rate in each case should suffice.[15] Since the rate paid on six-month Government obligations is available only from 1967 on, time period considerations force it to be eliminated. Finally, the rate paid on commercial paper was eliminated on the basis that the average size of the required investment was beyond the reach of the majority of individual depositors.

Inclusion of the remaining six rates in any one equation would surely violate the independence assumption and thus, it was decided to enter each rate separately within the classification scheme outlined above.

The resulting general function may be expressed in the form of equation (15).

$$(15)\quad SLA_t = \beta_0 + \beta_1 \text{ Income} + \beta_2 \text{ Own} + \beta_3 \text{ Institutional}_i + \beta_4 \text{ Market}_j + \varepsilon_t$$

where: SLA_t = Aggregate levels of savings and loan shares in time period t

i = MSB, CB(T)

j = 3 MTH, 9-12 MTH, 3-5 GOV, L-T GOV, S&L TOT, CORP TOT

β = The regression coefficients

ε_t = The random error term

Although equation (15) will serve as an adequate long-run estimate of the demand for savings and loan shares, it cannot, in its present

---

[14]The simple correlation between the two pairs is .984 and .993 respectively.

[15]The total rate was selected as the most representative.

form, provide any information on important short-run variations that might occur. Certainly the period from 1952 - 1971 is less than homogeneous. Two major credit crunches in the late 1960s and increasing inflationary tendencies have caused violent fluctuations in interest rates and at the same time placed upward pressures on rate trends. Occurrences such as these would seemingly have some effect on demand that would be masked by any long-run estimation. Because the recent trends appear to be holding rather than abating, it is more than just idle curiosity which dictates some sort of examination of the short-term period.

In a mature monetary economy, funds flows are generally characterized by the process of intermediation; that is, funds move from their source (savers) through a "middle man" (the financial institution) into some form of expenditure (borrowing and spending). In the United States two major classes of financial intermediaries exist, commercial banks and thrift institutions (savings and loan associations and mutual savings banks). Given the process of intermediation, funds in the past have established certain trends, with some percent of the funds flowing into commercial banks and some percent of the funds flowing into thrift institutions. While these patterns are by no means fixed, it is the purpose of demand analysis to establish a general relationship in the long-run and to examine these patterns in the short-run to note any changes that might occur. The task at hand is to isolate any periods in which major changes appear to have occurred in the demand for savings and loan shares and to build these periods into the model by the use of dummy variables.

Although less than perfect, some idea of the changes that have

occurred may be obtained from an examination of certain segments of the flow of funds accounts.

Before undertaking the examination two explanatory comments are in order. First, individuals constitute the major source of funds for savings and loan associations; hence, the examination will focus on the household sector's holdings of financial assets.[16] Next, it is the change in the relative funds flows that will provide the greatest source of information. The aggregate stocks will indicate only the total amounts held in each asset form. The annual flows will indicate not only the present patterns, but also any alterations in these patterns.

The examination and classification of the periods will proceed along the following lines.

> Note the change in the sector's holdings of institutional assets (savings-type deposits) and the sector's holdings of other financial assets (credit market instruments).
>
> (1) If the relative holdings of institutional assets has declined and if the relative holdings of credit market instruments has increased, it constitutes a period of disintermediation.
>
> (2) If the relative holdings of institutional assets has increased and if the relative holdings of credit market instruments has decreased, it constitutes a period of intermediation.
>
> (3) If neither of the above two conditions reasonably exist, it will be considered a normal flow period.[17]

---

[16]The closest sectoral classification for which data is available is that of Households, Personal Trusts, and Nonprofit Organizations.

[17]Clearly some judgment is necessary. It is highly unlikely that the relative holdings of all institutional assets will increase (decrease) at the same time that the relative holdings of all credit market instruments decrease (increase). In each case where personal judgment was used, every attempt was made to prevent arbitrary assignments.

The relevant flow of funds data appears in Table 3-1 and 3-2. Using the classification scheme just presented, the individual years may be classified as follows.

1952 - normal flow period
1953 - normal flow period
1954 - intermediation period
1955 - disintermediation period (commercial banks)
1956 - intermediation period
1957 - normal flow period
1958 - intermediation period
1959 - disintermediation period (commercial banks)
1960 - intermediation period
1961 - intermediation period
1962 - intermediation period
1963 - normal flow period
1964 - normal flow period
1965 - normal flow period
1966 - disintermediation period (savings and loan associations)
1967 - intermediation period
1968 - disintermediation period (savings and loan associations)
1969 - disintermediation period (savings and loan associations)
1970 - intermediation period
1971 - intermediation period

In Chart 3-1, these periods are superimposed on a plot of the institutional rates and the three month Treasury bill rate.[18] From this information, it would appear that there is more than just passive support for the contention that the demand for savings and loan shares (and for institutional assets in general) is functionally dependent

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[18]The three month Treasury bill rate was an arbitrary choice. Since all market rates move together in a band, the result will generalize to the other market rates.

TABLE 3-1

ANNUAL CHANGES IN HOUSEHOLD HOLDINGS OF FINANCIAL ASSETS
(in billions of dollars)

Year	Commercial Bank Deposits	Savings and Loan Shares	Mutual Savings Bank Deposits	Credit Union Shares	Credit Market Instruments (Total)	U.S. Government Securities	State and Local Obligations	Corporate and Foreign Bonds	Investment Company Shares	Corporate Stock	Mortgages	Commercial Paper	Year
1952	2.7	3.1	1.7	.3	3.2	- .2	1.0	*	.5	1.1	.8	*	1952
1953	2.5	3.7	1.8	.3	4.3	.3	2.1	*	.4	.5	1.0	*	1953
1954	2.5	4.4	2.0	.3	2.5	-1.4	2.3	-.4	.5	.2	1.2	*	1954
1955	1.7	4.9	1.8	.4	9.3	2.5	3.4	1.1	.9	.2	1.2	*	1955
1956	2.2	5.0	1.8	.5	7.8	1.1	2.3	.9	1.1	.9	1.5	*	1956
1957	5.2	4.8	1.7	.5	6.3	*	1.8	1.0	1.2	.3	1.9	*	1957
1958	5.3	6.1	2.3	.5	3.0	-2.6	.8	1.1	1.4	.1	2.3	*	1958
1959	2.9	6.6	1.2	.6	10.7	5.0	3.1	.3	1.7	-1.1	1.8	*	1959
1960	2.8	7.6	1.4	.5	4.5	- .5	3.4	.2	1.5	-1.9	2.0	*	1960
1961	6.2	8.7	1.9	.7	3.0	- .7	1.4	.3	1.9	-1.5	1.7	*	1961
1962	10.3	9.4	3.1	.7	- .8	.1	.8	-.6	1.8	-3.9	1.0	*	1962
1963	7.9	11.1	3.3	.8	1.3	3.5	.8	-.6	1.2	-4.0	.3	*	1963
1964	8.2	10.6	4.2	1.1	4.0	2.2	2.0	-.5	1.9	-1.9	.3	*	1964
1965	13.3	8.5	3.6	1.0	2.5	2.2	2.3	.7	3.1	-5.0	- .8	*	1965
1966	11.9	3.6	2.6	.8	11.9	7.3	2.1	2.0	3.7	-4.7	1.4	2.2	1966
1967	17.1	10.6	5.1	.9	2.7	.9	-1.3	3.6	2.6	-6.7	1.0	2.7	1967
1968	17.4	7.4	4.2	1.1	5.3	4.1	- .2	4.8	4.7	-12.3	1.8	2.4	1968
1969	-1.9	3.9	2.5	1.4	30.2	12.1	8.4	5.7	5.7	-9.6	2.0	5.9	1969
1970	27.6	10.9	4.5	1.7	8.1	-4.4	2.3	12.5	2.4	-5.1	2.2	-1.8	1970
1971	32.7	28.1	9.7	2.9	-16.9	-22.6	4.9	7.6	1.1	-6.5	2.4	-3.9	1971

*Not available

Columns two through thirteen present the change in the annual funds flows from Households, Personal Trusts and Nonprofit Organizations into selected savings assets and credit market instruments. Thus each figure represents the difference between the amount of an asset acquired (in the year indicated) and the amount acquired in the immediately preceding year. For example, in 1955, Households acquired 66.8 billion dollars of U.S. Government securities. In 1956, they acquired 67.9 billion dollars of U.S. Government securities. The annual change for 1956 then is 1.1 billion of dollars as recorded.

Sources: Flow of Funds Accounts: 1945-1968 (Washington: Board of Governors of the Federal Reserve System, 1970), pps. 8-9, 18-19.
The Federal Reserve Bulletin (Washington: Board of Governors of the Federal Reserve System).

TABLE 3-2

ANNUAL CHANGES IN HOUSEHOLD HOLDINGS OF FINANCIAL ASSETS
(as a percent of total)

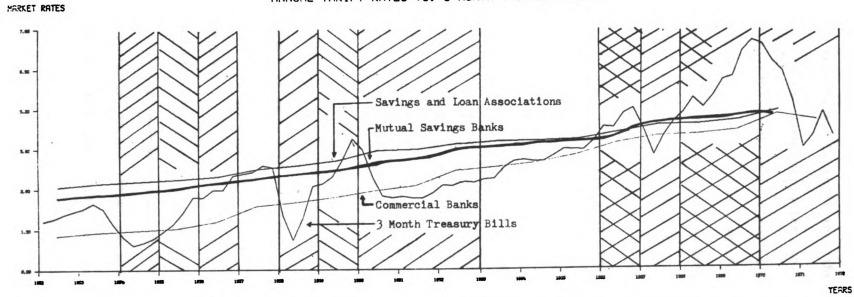
Year	Commercial Bank Deposits	Savings and Loan Shares	Mutual Savings Bank Deposits	Credit Union Shares	Credit Market Instruments (Total)	U.S. Government Securities	State and Local Obligations	Corporate and Foreign Bonds	Corporate Stock	Investment Company Shares	Mortgages	Commercial Paper	Year
1952	14.4	16.6	9.1	1.6	17.1	-1.1	5.3	*	5.9	2.7	4.3	*	1952
1953	12.2	18.0	8.8	1.5	20.9	1.5	10.2	*	2.4	1.9	4.9	*	1953
1954	12.8	22.5	10.2	1.6	12.2	-7.1	11.7	-2.0	1.0	2.6	6.1	*	1954
1955	6.5	18.6	6.9	1.6	35.2	9.5	12.9	4.2	.8	3.3	4.5	*	1955
1956	8.2	18.6	6.7	1.9	29.0	4.1	8.6	3.3	3.3	4.1	5.6	*	1956
1957	18.7	17.2	6.1	1.8	22.2	*	6.5	3.6	1.1	4.3	6.8	*	1957
1958	19.5	22.5	8.5	1.9	11.3	-9.6	2.9	4.0	.4	5.1	8.5	*	1958
1959	8.7	19.7	3.6	1.8	32.5	14.9	9.2	.9	-3.3	5.1	5.4	*	1959
1960	9.9	21.8	5.0	1.8	15.9	-1.8	12.0	.7	-6.7	5.3	7.0	*	1960
1961	19.0	26.6	5.9	2.2	9.2	-2.1	4.3	.9	-4.6	5.8	5.2	*	1961
1962	29.0	26.5	8.7	2.0	-2.3	.3	2.3	-1.7	-11.0	5.1	2.8	*	1962
1963	20.7	29.1	8.6	2.1	3.4	9.2	2.1	-1.6	-10.5	3.1	.8	*	1963
1964	18.9	24.5	9.7	2.5	9.2	5.1	4.6	-1.2	-4.4	4.4	.7	*	1964
1965	28.9	18.5	7.8	2.2	5.4	4.8	5.0	1.5	-10.9	6.7	-1.7	*	1965
1966	24.4	7.4	5.3	1.6	24.4	15.0	4.3	4.1	- 9.6	7.6	2.9	4.5	1966
1967	30.9	19.2	9.2	1.6	4.9	1.7	-2.4	6.5	-12.2	4.7	1.8	4.9	1967
1968	31.5	13.4	7.6	2.0	9.6	7.5	- .4	8.7	-22.3	8.5	3.3	4.4	1968
1969	-3.4	6.9	4.4	2.5	53.2	21.3	14.8	10.1	-16.9	10.1	3.6	10.4	1969
1970	35.6	14.1	5.8	2.2	10.5	-5.7	3.0	16.2	-6.6	3.1	2.9	-2.4	1970
1971	39.3	33.7	11.6	3.5	-20.3	-27.2	5.9	9.2	-7.8	1.4	2.9	-4.7	1971

*Not available

Source: Table 3-1

CHART 3 - 1

ANNUAL THRIFT RATES VS. 3 MONTH TREASURY BILLS



Source: Federal Reserve Board of Governors
United States Savings and Loan League
The Federal Home Loan Bank Board

Year Of Intermediation

Year Of Disintermediation Affecting Commercial Banks Only

Year Of Disintermediation Affecting Savings and Loan Associations

upon the rates offered on other market instruments.

These short-term effects may be built into the model in several different ways. For example, dummy variables can be assigned to the periods of disintermediation (which affect savings and loan associations) or to the periods of intermediation (which affect the savings and loan associations). To expand the information, dummies could be assigned to both disintermediation periods (affecting the savings and loan associations) and to the normal flow periods or to both intermediation periods (affecting savings and loan associations) and to normal flow periods. In order to obtain as much information as possible and to highlight the periods when competitive market rates are expected to be most important, dummies will be assigned to periods of disintermediation (which affect the savings and loan associations) and to the normal flow periods.

One final adjustment is necessary. Because only raw data is used, it is possible that seasonal biases may occur. In order to account for any possible seasonal effects, a third set of dummy variables is included within the model.

The final model may be described as equation (16). Equations (17) through (19) represent the regressions for the long-run period, the periods of disintermediation (which affect the savings and loan associations), and the normal flow periods. Note that allowance is made for changes in both the slope and intercept for the different flow periods, but only for changes in the intercept for seasonal effects. The latter adjustment was based upon prior results.

$$(16)\quad SLA_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3ti} + \beta_4 X_{4tj} + \gamma_1 Z_{1t} +$$

$$\delta_1 X_{1t} Z_{1t} + \delta_2 X_{2t} Z_{1t} + \delta_3 X_{3ti} Z_{1t} + \delta_4 X_{4tj} Z_{1t} +$$

$$\gamma_2 Z_{2t} + \eta_1 X_{1t} Z_{2t} + \eta_2 X_{2t} Z_{2t} + \eta_3 X_{3ti} Z_{2t} +$$

$$\eta_4 X_{4tj} Z_{2t} + \gamma_3 Z_{3t} + \gamma_4 Z_{4t} + \gamma_5 Z_{5t} + \varepsilon_t$$

where: SLA = the aggregate household holdings of savings and loan shares

X_1 = the aggregate level of personal disposable income

X_2 = the own rate (the interest return promised on savings and loan shares)

X_{3i} = the rate of interest promised on the competitive institutional assets (for i = mutual savings bank deposits and commercial bank time and savings deposits)

X_{4j} = the average market return obtained on potentially competitive market instruments (for j = 3 month Treasury bills, 9-12 month Government bills, 3-5 year Government bonds, long-term Government bonds, state and local obligations, and corporate bonds)

Z_1 = the disintermediation dummy
= 1 during periods of disintermediation affecting savings and loan associations
= 0 otherwise

Z_2 = the normal flow dummy
= 1 during normal flow periods
= 0 otherwise

Z_3, Z_4, Z_5 = the seasonal dummies

Z_3 = 1 during the summer quarter
= 0 otherwise

Z_4 = 1 during the fall quarter
= 0 otherwise

Z_5 = 1 during the winter quarter
= 0 otherwise

The regressions representing the different effects may be represented as equations (17) through (19).

$$(17)\quad SLA_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3ti} + \beta_4 X_{4tj} + \gamma_3 Z_{3t} + \gamma_4 Z_{4t} + \gamma_5 Z_{5t} + \varepsilon_t$$

(representing the long-term period)

$$(18)\quad SLA_t = (\beta_0 + \gamma_1) + (\beta_1 + \delta_1) X_{1t} + (\beta_2 + \delta_2) X_{2t} + (\beta_3 + \delta_3) X_{3ti} + (\beta_4 + \delta_4) X_{4tj} + \gamma_3 Z_{3t} + \gamma_4 Z_{4t} + \gamma_5 Z_{5t} + \varepsilon_t$$

(representing the periods of disintermediation affecting the savings and loan associations)

$$(19)\quad SLA_t = (\beta_0 + \gamma_2) + (\beta_1 + \eta_1) X_{1t} + (\beta_2 + \eta_2) X_{2t} + (\beta_3 + \eta_3) X_{3ti} + (\beta_4 + \eta_4) X_{4tj} + \gamma_3 Z_{3t} + \gamma_4 Z_{4t} + \gamma_5 Z_{5t} + \varepsilon_t$$

(representing the normal flow periods)

where: all variables are defined as above.

CHAPTER IV

RESULTS OF THE STUDY

This chapter will focus on the examination and interpretation of the results in line with the propositions stated in Chapter One. The analysis is grouped into three sections; the long-run period, the periods of disintermediation, and the normal flow periods.

The Long-Run Period

Equation Fit

An important consideration of any regression analysis is how well the estimated equation does in explaining the variation in the dependent variable. To put it another way, how good of a predictor is the estimated relation? The fit of the estimated relationship using equation (16) was generally good ranging in the low .80s for all variations employed. Table 4-1 presents a summary of the results.

Although the results are good, they fall short of the excellent results reported in some of the previous studies reviewed. Kardouche, for example, reports all fits in the high .90s.[1] While it is possible that several different factors could have resulted in the lower coefficients of determination, two main factors seem to stand out; the

---

[1]See George Kardouche, The Competition for Savings (New York: National Industrial Conference Board, 1969).

TABLE 4-1

SUMMARY STATISTICS FOR ALL TEST EQUATIONS

Equation[3]	R^2	DW	SE	Market Rate
		Category C[2]		
1	.83824	1.5259	693.45	3 Month Treasury Bills
2	.83365	1.3645	703.23	9-12 Month Government Issues
3	.84003	1.5745	689.60	3-5 Year Government Bonds
4	.81137	1.6346	748.83	Long-Term Government Bonds
5	.80150	1.4687	768.17	State and Local Bonds (Total)
6	.80313	1.6376	765.01	Corporate Bonds (Total)
		Category M		
Equation	R^2	DW	SE	Market Rate
1	.82638	1.3471	718.43	3 Month Treasury Bills
2	.82062	1.1755	730.24	9-12 Month Government Issues
3	.83411	1.4365	702.25	3-5 Year Government Bonds
4	.80687	1.5496	757.72	Long-Term Government Bonds
5	.82156	1.4587	728.33	State and Local Bonds (Total)
6	.80776	1.5742	755.97	Corporate Bonds (Total)

[2]Category C refers to those equations which employed commercial bank deposits as the competitive institutional asset. Category M refers to those equations which employed mutual savings bank deposits as the competitive institutional asset.

[3]The equations refer to the long-run demand estimation obtained using equation (16). The basic model was run twelve times with each run representing a different combination of institutional assets and credit market assets. For example, equation 1 under Category C employed the rates paid on commercial bank deposits, savings and loan shares and 3 month Treasury bills while equation 3 under Category M employed the rates paid on mutual savings bank deposits, savings and loan shares and 3-5 year U.S. Government bonds.

The columns headed R^2, DW, and SE refer respectively to the coefficient of determination, the Durbin-Watson statistic and the standard error of the equation.

The column headed market rate indicates the specific market rate that was employed in each test equation.

variables included, and the time period covered.

Recall that equation (16) did not attempt to include any convenience or promotional variables. Moreover, since there was no attempt made to estimate the speed of adjustment of planned holdings to actual holdings, the lagged value of the dependent variable was also excluded from consideration. Since the nonrate variables do play some role in determining demand, their systematic exclusion has undoubtedly biased the results downward.

There are two aspects to the consideration of the time period covered. First, the time span covered by this study is greater than in any of the previous studies. While this in itself does not guarantee lower correlations, a greater number of observations for a given number of variables can increase the potential for lesser fits. Moreover, the 1952 - 1971 period included two major credit-crunch periods which increased markedly the variability in the holdings of savings and loan shares.

In order to test for the effect of different time periods, a scaled down version of equation (16) was run for the period 1952 - 1966.[4] The results are presented below.

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[4]The time period selected corresponds to that used by Kardouche. In order to provide as much correspondence as possible, the test equation included only income, the own rate, the mutual savings bank rate, the 3 month Treasury bill rate, and seasonal variables.

Constant	Income	Own Rate	MSB Rate	3 Mth T. Bills	S_1	S_2	S_3
-1360.8	-.073231	+1466.0	-308.13	-145.09	+237.30	-427.65	+349.01
	(3.8292)	(3.5662)	(.77051)	(2.7263)	(2.3939)	(4.5875)	(2.9990)*

R^2 = .92874 SE = 230.55

*t values in parenthesis

Note that the coefficient of determination increased by approximately .10, indicating the extreme importance of time period considerations.

Variable Entry

Equations M1 - M6 and C1 - C6 present the results for the long-run period examined. (See Table 4-2). There are three general points of interest that may be drawn from the equations. First, all variables included in the equations entered with the expected sign, in all cases. Income entered positively as did the own rate. The remaining institutional rates and market rates all entered with negative signs confirming the expectation set forth in proposition 1 (i.e., both institutional assets and credit market assets are potentially competitive with savings and loan shares). Moreover, each variable entered at an extremely high level of significance adding strength to the conclusion. Finally, there is generally a good correspondence between the regression coefficients obtained from the category of equations which employed the mutual savings bank rate as the major competitive asset and those which employed the commercial bank rate as the major competitive asset.

In order to compare the importance of the individual rate parameters it is necessary to convert the regression coefficients to

TABLE 4-2

REGRESSION COEFFICIENTS FOR THE LONG-RUN PERIOD: 1952-1971

Equation (Category M)*	Constant	Income	Own Rate	Institutional Rate	Market Rate	S_1	S_2	S_3
				[MSB]	[3 Mth]			
#2 M1	-2423.3	+.042672	+2897.8	-2182.0	-793.11	+187.45	-819.88	+353.43
		(4.7560)	(2.9158)	(2.2615)	(5.6997)	(.81311)-?	(3.4357)	(1.4201)**
				[MSB]	[9-12 Mth]			
#4 M2	-3154.2	+.038186	+3585.4	-2776.1	-681.22	+265.78	-673.12	+465.87
		(4.2382)	(3.5947)	(2.9082)	(5.2986)	(1.1345)	(2.7648)	(1.8673)
				[MSB]	[3-5 Gov]			
#6 M3	-2936.3	+.046451	+4087.5	-3241.4	-906.82	+302.64	-683.62	+359.67
		(5.2258)	(4.2461)	(3.5858)	(5.8355)	(1.3426)	(2.8348)	(1.4995)
				[MSB]	[L-T Gov]			
#8 M4	-2418.5	+.050492	+5735.7	-4340.4	-1680.5	+196.44	-958.29	+243.80
		(5.0895)	(5.3194)	(4.4958)	(5.2032)	(.81385)	(3.8869)	(.90827)
				[MSB]	[SL Tot]			
#10 M5	-3453.3	+.049564	+7507.1	-6533.1	-1280.0	+322.43	-798.72	+193.16
		(5.2707)	(6.2516)	(6.2217)	(5.4916)	(1.3629)	(3.3373)	(.76787)
				[MSB]	[Corp Tot]			
#12 M6	-2748.4	+.082480	+7135.0	-6208.5	-1674.7	+123.75	-1055.4	+85.050
		(6.1734)	(5.9981)	(5.9210)	(5.1582)	(.50794)	(4.2445)	(.31498)

*See note 2
**t values in parentheses

TABLE 4-2--Continued

Equation (Category C)*	Constant	Income	Own Rate	Institutional Rate	Market Rate	S_1	S_2	S_3
				[CB(T)]	[3 Mth]			
C1	-7875.4	+.055446	+3274.0	-2152.1	-745.42	+126.20	-859.72	+334.65
		(5.7445)	(3.7748)	(3.1477)	(5.5048)	(.57047)	(3.7050)	(1.3224)
				[CB(T)]	[9-12 Mth]			
C2	-8813.5	+.053322	+3762.3	-2484.9	-639.86	+200.16	-729.09	+411.70
		(5.4477)	(4.3341)	(3.6716)	(5.1060)	(.89218)	(3.0728)	(1.6039)
				[CB(T)]	[3-5 Gov]			
C3	-8822.0	+.061532	+3942.6	-2616.3	-833.28	+226.73	-761.43	+293.30
		(6.3582)	(4.6295)	(3.9838)	(5.3688)	(1.0313)	(3.2858)	(1.1629)
				[CB(T)]	[L-T Gov]			
C4	-8641.1	+.064912	+4525.2	-2832.0	-1341.5	+183.65	-937.79	+203.53
		(6.0646)	(4.8574)	(3.9806)	(4.1254)	(.77017)	(3.7527)	(.73602)
				[CB(T)]	[SL Tot]			
C5	-10968.	+.065002	+4964.5	-3633.0	-744.77	+272.76	-811.00	+202.30
		(5.8525)	(4.9956)	(5.0351)	(3.3894)	(1.1052)	(3.1449)	(.71484)
				[CB(T)]	[Corp Tot]			
C6	-10178.	+.085312	+4756.9	-3482.3	-1023.4	+173.13	-991.49	+105.18
		(6.1525)	(4.9007)	(4.8743)	(3.3867)	(.70486)	(3.8124)	(.36509)

*See note 2
**t-values in parentheses

elasticity coefficients.[5] This information is presented in Table 4-3.

Note the importance of the institutional rate variables; particularly the own rate variable. In every case, the elasticity coefficient of the own rate is quite high and in all cases, it exceeds the elasticity coefficients of all the other variables.[6]

The elasticity coefficient of income is of particular interest. Being the only nonrate parameter, it can be used as an indication of the importance of nonrate variables. Given the relative size of the coefficient, it would appear that the rate variables; particularly the institutional rates, exert the greatest level of influence on demand. This is not to say that convenience/promotional variables do not have some effect. Obviously, the entry of additional variables would lead to changes in the estimating coefficients and the resulting

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[5]The point elasticity of a continuous linear function of the variable y with respect to x may be defined in terms of derivatives.

$$\eta_{yx} = \frac{dy}{dx} \cdot \frac{x}{y}$$

In the case of a multivariate relation, the same calculation would be represented by partials.

$$\eta_{yx} = \frac{\partial y}{\partial x} \cdot \frac{x}{y}$$

All calculations used here represent the elasticities at the means, i.e.,

$$\eta_{yx} = \frac{\partial y}{\partial x} \cdot \frac{\bar{x}}{\bar{y}}$$

Although it is possible to calculate the elasticities at the extremes, it is probably more meaningful to represent them at the means as done here.

[6]The size of the elasticity coefficients might seem excessively high in light of some previous estimates made. Again, it is expected that much of the difference can be attributed to variations in the time period covered as well as differences in the inclusion or exclusion of nonrate variables.

TABLE 4-3

ELASTICITY COEFFICIENTS AND RELATIVE ELASTICITIES
FOR THE LONG-RUN PERIOD: 1952-1971

Equation	Income	Own Rate	MSB Rate	Market Rate	
			Category M*		
M1	2.26	5.76	4.14 (.72)	1.35 (.23)**	[3 Mth]
M2	2.02	7.13	5.27 (.73)	1.26 (.18)	[9-12 Mth]
M3	2.46	8.13	6.15 (.76)	1.87 (.23)	[3-5 Gov]
M4	2.68	11.41	8.23 (.72)	3.49 (.30)	[L-T Gov]
M5	2.62	14.93	12.39 (.83)	2.34 (.16)	[SL Tot]
M6	4.37	14.19	11.78 (.83)	4.15 (.29)	[Corp Tot]
			Category C*		
Equation	Income	Own Rate	CB(T) Rate	Market Rate	
C1	2.94	6.51	3.22 (.49)	1.27 (.19)**	[3 Mth]
C2	2.83	7.48	3.71 (.49)	1.18 (.16)	[9-12 Mth]
C3	3.26	7.84	3.91 (.52)	1.72 (.22)	[3-5 Gov]
C4	3.44	9.00	4.23 (.47)	2.79 (.31)	[L-T Gov]
C5	3.45	9.87	5.43 (.55)	1.36 (.14)	[SL Tot]
C6	4.52	9.46	5.21 (.55)	2.53 (.27)	[Corp Tot]

*See note 2

**Relative elasticities in parentheses. The relative elasticity may be defined as

$$\frac{\eta_{yx}}{\eta_{yy}}$$

where: η_{yx} = a specific price-cross elasticity

η_{yy} = own price elasticity

elasticities. The point is, given the size of the calculated elasticities and the fit of the estimating equations, things like closeness of proximity, one-stop banking or give-aways would apparently have to go a long way to overcome promised return. Advertising, particularly that which promotes returns, might be a different story.[7] Clearly, it would have been desirable to take account of these variables, but as pointed out, the problems involved precluded any such considerations.

The difference between the own rate elasticity and that of the market rate variables is particularly great implying a residual resistancy to movements between assets during the long-run period. Note that the difference is not nearly as great between the own rate elasticity and the elasticity of other institutional rates implying less resistance to inter-institutional flows. To put this another way, while all the market rates tested entered as substitutes, the comparison of elasticities indicates that, over the long-run period, the market assets are not nearly as strong substitutes as are the other institutional assets.

A savings institution has been characterized as safe haven for funds. Previous studies have indicated that the most important substitutes for savings and loan shares have been the savings assets offered by other institutions. The long-run results of this study confirm those conclusions.

It is interesting to note that over all the equations tested,

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[7]Particularly within the past five years, association advertising has been oriented toward this direction.

the elasticity of the mutual savings bank rate exceeded the elasticity of the commercial bank rate, contrary to expectations. It might reasonably be argued at this point that there is enough difference among and between the two categories of equations (i.e., those employing the mutual savings bank rate and those employing the commercial bank rate) to make such comparisons invalid. In order to get around this point, the elasticities may be placed on a relative basis by taking each elasticity as a percentage of the own rate elasticity.

$$\text{relative elasticity} = \frac{\eta_{yx_i}}{\eta_{yy_{(own)}}} \qquad \text{where } i = \text{MSB, CB(T), and all market rate elasticities}$$

This information is presented in Table 4-3 (p. 88). As can be seen from the Table the importance of the institutional rate variables relative to the market rate variables and the relative importance of the mutual savings bank rate to the commercial bank rate still holds.

It has long been argued, and supported by the results of this study, that the credit markets (both the money and capital markets) present some amount of competition to the financial institutions. However, even among those economists that adhere to this position there is a general lack of agreement on which assets are most important. By comparing the individual elasticities of the credit market instruments some light may be shed on this issue.

The question of ranking presents a problem similar to that encountered in the discussion of the comparison of the relative importance of the institutional rates; i.e., differences in the coefficients of the various equations may unnecessarily bias the

interpretation. This problem can again be avoided by placing the elasticities on a relative basis; i.e., by calculating the ratio of the individual market rate elasticity to the own rate elasticity. (see Table 4-3). Note that both categories of equations lead to similar rankings (see Table 4-4). The long-run securities dominate

TABLE 4-4

MARKET ASSETS RANKED ON THE BASIS OF THEIR RELATIVE PRICE ELASTICITIES LONG-RUN PERIOD: 1952-1971

Category M†	Category C
1. Long-Term Government Bonds	1. Long-Term Government Bonds
2. Corporate Bonds (Total)	2. Corporate Bonds (Total)
3. 3-5 Year Government Bonds*	3. 3-5 Year Government Bonds
4. 3 Month Treasury Bills*	4. 3 Month Treasury Bills
5. 9-12 Month Government Bills	5. 9-12 Month Government Bills
6. State and Local Bonds (Total)	6. State and Local Bonds (Total)

*3-5 year Government bonds and 3 month Treasury bills entered at same relative elasticities.

†See note 2

followed by the intermediate term and then the extremely short-term securities. In both cases, the state and local bonds show up as the least important substitutes.

Conclusions From The Long-Run

Two main conclusions seem warranted. First, it would appear that the individual saver is prompted by the need to hold money aside for purposes other than transaction or speculation; i.e., it would

seem that these are not funds "on the wing", but rather are funds held for what Keynes termed "precautionary motives". There is, though, a major difference that precludes these balances from being classified in the traditional precautionary sense; they are clearly subject to interest rate variations and apparently are more a function of the interest rates than they are a function of income. It may well be that the ordinary saver is simply more sophisticated today than in the 1930s or it may simply be that interest rates are only lately achieving their potential for wider swings.[8] Whatever the reason, interest rates must be considered a main determinant of the demand for savings and loan shares.

Second, from the relative unimportance of state and local securities, it would appear that potential shifts in funds are not motivated by tax considerations. From this, it has in the past been concluded that the wealthy do not dominate savings shifts or that savers have not as yet reached a very high level of sophistication in their own money management. Of the two conclusions, the former seems the most appropriate. From the summary of the average size of deposits (Table 4-5), it is clear that the very wealthy play only a small role. While the latter conclusion may not be totally rejected, given the size of the average savings deposit balance, it is not likely that the average saver is in a high enough tax bracket to gain from shifting

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[8]One of the conclusions reached by the Hunt Commission in their examination of the financial system was that the individual saver has become more sophisticated in the management of his funds. While this is entirely possible, it can also be shown that the potential for disintermediation (i.e., the divergence of the market rates and the institutional rates) reached previously unattained heights during the latter 1960s.

TABLE 4-5

AVERAGE DEPOSIT SIZE
(Savings and Loan Associations)

Year	Average Balance
1952	$1,463
1953	1,549
1954	1,658
1955	1,775
1956	1,811
1957	1,881
1958	1,970
1959	2,040
1960	2,110
1961	2,180
1962	2,299
1963	2,474
1964	2,619
1965	2,711
1966	2,659
1967	2,785
1968	2,921
1969	2,900
1970	3,038
1971	3,427

Source: National Savings and Loan League.

his funds into tax exempt securities.

While the results to this point have generally confirmed expectations, they must still be accepted with some caution. That is, the results have been obtained from the examination of a particular long-run period and hence represent a kind of average response to a number of specific short-run occurrences. It is important to understand that there is nothing here to guarantee that the same response will hold for another twenty year period or that these particular responses will hold for any given subperiod within the period examined. Indeed, it has already been shown that the choice of the period examined does have some effect on the results. This latter point is underscored in the remainder of the analysis.

The Short-Run Periods

It has previously been established that the demand for savings and loan shares is a function of both interest return and safety. However, it has been argued that because the long-run period is less than homogeneous, the estimated long-run relationship may not be indicative of the true relationship that holds over various subperiods.[9] This position has, in part, been supported by the fact that somewhat different results were obtained when the basic model was run for the period 1952 - 1966. The remainder of this chapter examines the results obtained when dummy variables were included

[9]There is some limited empirical work on the question of the stability of demand for financial assets. Heller was one of the first to conclude that there was some instability in demand. More recently, Kardouche, in testing the demand for commercial bank deposits concluded that the demand function exhibited some instability.

to define the periods of disintermediation and the normal flow periods.[10]

Examination of the flow of funds data has shown wide variation in the household sector's acquisition of financial assets possibly indicating short-run shifts or twists in the demand function for institutional assets in general and in the demand function for savings and loan shares in particular. If there are in fact changes in the function, the resulting expectations are for market assets to become more important substitutes and for institutional assets to decline in importance as substitutes during periods of disintermediation with the reverse occurring during periods of intermediation. Just exactly what changes, if any, should occur during the normal flow periods is hard to determine. On the simplest level, it might be expected that the relationships would not vary greatly from those exhibited for the long-run period.

The Disintermediation Periods

Equations M7 - M12 and C7 - C12, presented in condensed form in Table 4-6A, summarize the section of the findings that relates to the periods of disintermediation. Although the results are mixed, there is some evidence to support the expectations relating to the market rates.[11] First, with one exception, all market rate variables enter

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[10]Recall that the examination is restricted to those disintermediation periods that affected the associations. Recall also, that a normal flow period was defined to be one in which neither intermediation or disintermediation dominated.

[11]It may be helpful at this point for the reader to refer to equations M1*-M6* and C1*-C6* (the uncondensed results for the periods of disintermediation), presented in Table 4-6B.

TABLE 4-6A

REGRESSION COEFFICIENTS FOR THE PERIODS OF DISINTERMEDIATION (CONDENSED)**

Equation (Category M)*	Constant	Income	Own Rate	Institutional Rate	Market Rate	S_1	S_2	S_3
				[MSB]	[3 Mth]			
M7	-2923.3	+.042672	+2897.8	-2182.0	-3539.41	+187.45	-819.88	+353.43
				[MSB]	[9-12 Mth]			
M8	-3154.2	+.038186	+3585.4	-2776.1	-3046.62	+265.78	-673.12	+465.87
				[MSB]	[3-5 Gov]			
M9	-2936.3	+.046451	+4087.5	-3241.4	-3391.32	+302.64	-683.62	+359.67
				[MSB]	[L-T Gov]			
M10	-2418.5	+.050492	+5735.7	-4340.4	-1680.5	+186.44	-958.29	+243.80
				[MSB]	[SL Tot]			
M11	-3453.3	+.049564	+7507.1	-6533.1	-1280.0	+322.43	-798.72	+193.16
				[MSB]	[Corp Tot]			
M12	-2748.8	+.082480	+7135.0	+17600.5	-1674.7	+123.75	-1055.4	+85.050
(Category C)*				[CB(T)]	[3 Mth]			
C7	-7875.4	+.055446	+3274.0	-2152.1	-2399.22	+126.20	-859.72	+334.65
				[CB(T)]	[9 Mth]			
C8	-8813.5	+.053322	+3762.3	-2484.9	-2468.86	+200.16	-729.09	+411.70
				[CB(T)]	[3-5 Gov]			
C9	-8822.0	+.061532	+3942.6	-2616.3	-2563.28	+226.73	-761.43	+293.30
				[CB(T)]	[L-T Gov]			
C10	-8641.1	+.064912	+4525.2	+7410.0	-1341.5	+183.65	-937.79	+203.53
				[CB(T)]	[SL Tot]			
C11	-10968.	+.065002	+4964.5	+3391.3	-2720.97	+272.76	-811.00	+202.30
				[CB(T)]	[Corp Tot]			
C12	-10178.	+.085312	+4756.9	+9719.7	-4435.0	+173.13	-991.49	+105.18

*See note 2
**See note 12

TABLE 4-6B

REGRESSION COEFFICIENTS FOR THE PERIODS OF DISINTERMEDIATION (UNCONDENSED)**

Equation Category M†	Constant	Income	Own Rate	Institutional Rate	Market Rate	γ_1	Income δ_1	Own δ_2	Institution δ_3	Market δ_4	S_1	S_2	S_3
				[MSB]	[3 Mth]				[MSB]	[3 Mth]			
M1*	-2923.1	+.042672	+2897.8	-2182.0	-793.11	-56854.	-.018375	+27587.	-11526.	-2746.3	+187.45	-819.88	+353.43
		(4.7560)	(2.9158)	(2.2615)	(5.6997)	(1.3763)	(.33277)	(.98241)	(.68775)	(1.7574)	(.81311)	(3.4357)	(1.4201)††
				[MSB]	[9-12 Mth]				[MSB]	[9-12 Mth]			
M2*	-3154.2	+.038186	+3585.4	-2776.1	-681.22	-40477.	-.0092701	+17751.	-5948.8	-2365.4	+265.78	-673.12	+465.87
		(4.2382)	(3.5947)	(2.9082	(5.2986)	(1.2244)	(.16620)	(.75373)	(.41207)	(2.0109)	(1.1345)	(2.7648)	(1.8673)
				[MSB]	[3-5 Gov]				[MSB]	[3-5 Gov]			
M3*	-2936.3	+.046451	+4087.5	-3241.4	-906.82	-42871.	+.0077526	+23264.	-11250.	-2484.5	+302.64	-683.62	+359.67
		(5.2258)	(4.2461)	(3.5858	(5.8355)	(1.3820)	(.14607)	(.99293)	(.75613)	(2.2721)	(1.3426)	(2.9348)	(1.4995)
				[MSB]	[L-T Gov]				[MSB]	[L-T Gov]			
M4*	-2418.5	+.050492	+5735.7	-4340.4	-1680.5	+11541.	+.016251	-20427.	+16743.	+303.01	+196.44	-958.29	+243.80
		(5.0892)	(5.3194)	(4.4958)	(5.2032)	(.42541)	(.28044)	(1.0333)	(1.3599)	(.22656)	(.81385)	(3.8869)	(.90827)
				[MSB]	[SL Tot]				[MSB]	[SL Tot]			
M5*	-3453.3	+.049564	+7507.1	-6533.1	-1280.0	-36864.	-.0036883	+9595.1	-166.20	-1521.1	+322.43	-798.72	+193.16
		(5.2702)	(6.2516)	(6.2217)	(5.4916)	(1.1566)	(.066588)	(.43340)	(.012097)	(1.3280)	(1.3629)	(3.3373)	(.76785)
				[MSB]	[Corp Tot]				[MSB]	[Corp Tot]			
M6*	-2748.8	+.082480	+7135.0	-6208.5	-1674.7	+8248.8	+.02454	-26513.	+23809.	-137.66	+123.75	-1055.4	+85.050
		(6.1734)	(5.9981)	(5.9210)	(5.1586)	(.27614)	(.34598)	(1.3763)	(2.0539)	(.10753)	(.50794)	(4.2445)	(.31498)

†See note 2

††t-values in parentheses

**See note 12

TABLE 4-6B--Continued

Equation Category C†	Constant	Income	Own Rate	Institutional Rate	Market Rate	γ_1	Income δ_1	Own δ_2	Institution δ_3	Market δ_4	S_1	S_2	S_3
				[CB(T)]	[3 Mth]				[CB(T)]	[3 Mth]			
C1*	-7875.4	+.055446	+3274.0	-2152.1	-745.42	-14364.	-.0057452	+1410.0	+4059.7	-1653.8	+126.20	-859.72	+334.65
		(5.7445)	(3.7748)	(3.1477)	(5.5048)	(.91616)	(.12709)	(.23068)	(1.3540)	(1.6482)	(.57047)	(3.7050)	(1.3224)††
				[CB(T)]	[9-12 Mth]				[CB(T)]	[9-12 Mth]			
C2*	-8813.5	+.053322	_3762.2	-2484.9	-639.86	-11579.	-.0021821	+818.48	+4197.1	-1829.0	+200.16	-729.09	+411.70
		(5.4477)	(4.3341)	(3.6716)	(5.1060)	(.77777)	(.050578)	(.13450)	(1.3714)	(2.0681)	(.89218)	(3.0728)	(1.6039)
				[CB(T)]	[3-5 Gov]				[CB(T)]	[3-5 Gov]			
C3*	-8822.0	+.061532	+3942.6	-2616.3	-833.28	-5438.2	-.022590	-1085.3	+3856.1	-1730.0	+226.73	-761.43	+293.30
		(6.3582)	(4.6295)	(3.9838)	(5.3688)	(.41140)	(.49794)	(.19282)	(1.2797)	(2.1994)	(1.0313)	(3.2858)	(1.1629)
				[CB(T)]	[L-T Gov]				[CB(T)]	[L-T Gov]			
C4*	-8641.1	+.064912	+4525.2	-2832.0	-1341.5	+3559.0	+.0058008	-8262.9	+10242.	-2002.1	+183.65	-937.79	+203.53
		(6.0646)	(4.8514)	(3.9806)	(4.1254)	(.26604)	(.11744)	(1.4546)	(2.8984)	(1.4990)	(.77017)	(3.7527)	(.73602)
				[CB(T)]	[SL Tot]				[CB(T)]	[SL Tot]			
C5*	-10968.	+.065002	+4964.5	-3633.0	-744.77	-8421.6	+.015091	-3334.2	+7024.3	-1976.2	+272.76	-811.00	+202.30
		(5.8525)	(4.9956)	(5.0351)	(3.3894)	(.54975)	(.30097)	(.55107)	(2.1642)	(2.0909)	(1.1052)	(3.1449)	(.71484)
				[CB(T)]	[Corp Tot]				[CB(T)]	[Corp Tot]			
C6*	-10178.	+.085312	+4756.9	-3482.3	-1023.4	-22103.	+.013594	-3451.7	+13202.	-3411.6	+173.13	-991.49	+105.18
		(6.1525)	(4.9007)	(4.8743)	(3.3867)	(1.2285)	(.26436)	(.56944)	(3.4595)	(2.3500)	(.70486)	(3.8124)	(.36509)

†See note 2

††t-values in parentheses

with the expected negative sign (indicating the expected substitute relation). The single exception is hard to reconcile. Had it occurred within both categories of estimating equations, it might have been argued that some sort of selective shift occurred in the demand function. In this case, however, it seems more likely that problems of colinearity lie at the root of the difficulty.

Next, the size of the coefficients of the dummy market rate variables are considerably larger than those relating to the long-term variables thus signifying a substantial increase in the importance of the market rate parameters.[12]

The real test, though, is whether or not the dummy rate variables enter the equation significantly; i.e., whether or not they can be considered to be different from zero. Unfortunately, not all of the coefficients enter significantly, even at the .1 α level; however, only one rate, the rate on long-term government securities fails to enter both categories of equations at a significant level.[13]

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[12] As shown in Table 4-6A, the coefficients of the dummies which enter the equation significantly are added to long-run coefficients to obtain the coefficients representing the period under investigation. As an example consider a simple regression model employing a single independent variable and single dummy. The test equation would be: $Y_t = \beta_0 + \beta_1 X_t + \delta_1 Z_1 X_t + \varepsilon_t$ where Z was some dummy. The regression for the period when the dummy = 0 would be: $Y_t = \beta_0 + \beta_1 X_t + \varepsilon_t$. Finally, the regression for the period when the dummy = 1 would be: $Y_t = \beta_0 + (\delta_1 + \beta_1) X_t + \varepsilon_t$. Assuming that $\delta_1 \neq 0$, i.e., the dummy was significant.

[13] The long-run Government bond rate is the only rate that does not enter significantly in the group using the rate on commercial bank deposits. The .1 α level was used as the cutoff for significance. Note that the long-term Government bond rate would enter just below the .1 level.

Moreover, of all of the rates that do enter significantly, the majority enter at least at the .05 α level. It is, again, possible to consider that a selective shift in demand might have occurred; however, because of the differences between the two categories of estimating equations, it seems more likely that this can be attributed to problems of colinearity between rates, particularly in the cases in which the mutual savings bank rate is employed.

The latter problem makes the ranking of the market rates difficult. However, if one is willing to live with an α level of .1 and make some allowances for nonsignificant entry of some of the rate variables, then the rankings exhibited by both categories of equations during periods of disintermediation are quite close to the rankings obtained during the long-run period. Compare Tables 4-4 and 4-7.[14]

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[14]The rankings in Table 4-7 are based upon the relative elasticities shown in Table 4-8. (See p. 90 for a discussion of the relative elasticities.)

TABLE 4-7

MARKET ASSETS RANKED ON THE BASIS OF
THEIR RELATIVE PRICE ELASTICITIES
PERIODS OF DISINTERMEDIATION

Category M*	Category C
1. 3 Month Treasury Bills	1. Corporate (Total)
2. 3-5 Year Governments	2. 3-5 Year Governments
3. 9-12 Month Government Bills	3. 3 Month Treasury Bills
4. Long-Term Government Bonds (NS)	4. 9-12 Month Government Bills
5. Corporate (Total) (NS)	5. State and Local (Total)
6. State and Local (Total)(NS)	6. L-T Government Bonds (NS)

(NS) The coefficients did not enter the regression at a significant level (i.e., $\alpha = .1$).
*See note 2

TABLE 4-8

ELASTICITY COEFFICIENTS AND RELATIVE ELASTICITIES
FOR THE PERIODS OF DISINTERMEDIATION

Category M*

Equation	Income	Own Rate	MSB Rate	Market Rate	
M7	2.26	5.76	4.14 (.72)	6.04 (1.05	[3 Mth]
M8	2.02	7.13	5.27 (.73)	5.62 (.79)	[9-12 Mth]
M9	2.46	8.13	6.15 (.76)	7.00 (.86)	[3-5 Gov]
M10	2.68	11.41	8.23 (.72)	3.49 (.30)	[L-T Gov]
M11	2.63	14.98	12.39 (.83)	2.34 (.16)	[SL Tot]
M12	4.37	14.19	33.39 (2.35)	4.15 (.29)	[Corp Tot]

Category C*

Equation	Income	Own Rate	CB(T) Rate	Market Rate	
C7	2.94	6.51	3.22 (.49)	4.10 (.63)	[3 Mth]
C8	2.83	7.48	3.71 (.49)	4.56 (.61)	[9-12 Mth]
C9	3.26	7.84	3.91 (.52)	5.29 (.67)	[3-5 Gov]
C10	3.44	9.00	11.08 (1.23)	2.79 (.31)	[L-T Gov]
C11	3.45	9.87.	5.07 (.51)	4.98 (.50)	[SL Tot]
C12	4.52	9.46	14.53 (1.53)	10.98 (1.16)	[Corp Tot]

*See note 2
Relative elasticities in parentheses.

The results are also mixed with regard to the institutional assets becoming lesser substitutes. The strongest support is found in the category of equations which employs the commercial bank rate as the competitive institutional asset. In all cases, the commercial bank rate enters positively (with three of the six cases entering significantly at the .05 α level), implying a lessening in the importance of the variable as a substitute. In fact, in those cases in which the rate enters significantly, it totally overwhelms the long-run coefficient indicating the existence of a complementary relationship. Note that while there is some evidence of sign reversal when the mutual savings bank rate is used, it is not a generally occurring condition.

In spite of the lack of generalization over both categories of estimating equations, the change reflected in the commercial bank rate is quite interesting. Prior to 1967, the rate series on the average rate paid on deposits at commercial banks included all rates, high yield certificates of deposit and passbook accounts alike. However, with the establishment of a separate rate series on high yield certificates, the average rate series covering the remaining accounts became more reflective of the normal passbook rate.[15] This has not been the case with the average rate series available for either savings and loan shares or mutual savings bank deposits. Both series are averaged over all rates paid and thus include high yield special accounts as well as the normal savings accounts. This gives rise to

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[15]This is particularly important in light of the fact that the periods of disintermediation included only the years 1966, 1968, and 1969.

two possibilities; either commercial bank deposits are considered differently from mutual savings bank deposits or the reaction to the commercial bank rate is a more accurate reflection of the saver's attitude to regular passbook accounts. A strict interpretation of the results might lead to acceptance of the former.[16] From the author's viewpoint though, there remains considerable doubt and thus a tendency to accept the latter conclusion.[17]

The remaining results are simply too mixed or enter at too low a level of significance to be of any further use in the analysis.

The Normal Flow Periods

The results obtained by employing dummy variables for the normal flow periods are presented in condensed form in Table 4-9A as equations M13 - M18 and C13 and C18.[18] Two important points may be drawn from the results. The first and most startling result relates to the signs of the independent variables; every sign of every variable is the reverse of that which appeared in the long-run formulation. Second, only one variable, income, consistently entered both categories of equations at a significant level. This latter result is, of course, quite important; however, the consistency of the first result is simply too great to ignore. Thus, while it cannot be

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[16]It should be pointed out that there is some prior evidence to support this claim, see Kardouche, op. cit., pps. 162 to 166.

[17]Recall that the special accounts were excluded due to time period considerations. Expectations are that these accounts would enter as significant substitutes though precisely what their ranking should be relative to the market assets is hard to determine.

[18]It may, again, be helpful to refer to the results in uncondensed form, equations M1**-M6** and C1**-C6** presented in Table 4-9B.

TABLE 4-9A

REGRESSION COEFFICIENTS FOR THE NORMAL FLOW PERIODS (CONDENSED)

Equation (Category M)*	Constant	Income	Own Rate	Institu-tional Rate	Market Rate	S_1	S_2	S_3
				[MSB]	[3 Mth]			
M13	-2923.3	-.013917	+2897.8	-2182.0	-793.11	+187.45	-819.88	+353.43
				[MSB]	[9-12 Mth]			
M14	-3154.2	-.020738	+3585.4	-2776.1	-681.23	+265.18	-673.12	+465.87
				[MSB]	[3-5 Gov]			
M15	-2936.3	-.018202	+4087.5	-3241.4	-906.82	+302.64	-683.62	+359.67
				[MSB]	[L-T Gov]			
M16	-2418.5	-.000102	+5735.7	-4340.4	-1680.5	+196.44	-958.29	+243.80
				[MSB]	(SL Tot]			
M17	-3453.3	-.013365	+2369.8	- 888.7	-138.3	+322.43	-798.72	+193.16
				[MSB]	[Corp Tot]			
M18	-2748.8	+.004581	+2503.7	-1126.6	-527.6	+123.75	-1055.4	+85.050
(Category C)*								
				[CB(T)]	[3 Mth]			
C13	-7875.4	-.015906	+3274.0	-2152.1	-745.42	+126.20	-859.72	+334.65
				[CB(T)]	[9-12 Mth]			
C14	-8813.5	-.020344	+3762.3	-2484.9	-639.86	+200.16	-729.09	+411.70
				[CB(T)]	[3-5 Gov]			
C15	-8822.0	-.013323	+3942.6	-2616.3	-833.28	+226.73	-761.43	+293.30
				[CB(T)]	[L-T Gov]			
C16	-8641.4	+.004279	+4525.2	-2832.0	-1341.5	+183.65	-937.79	+203.53
				[CB(T)]	(SL Tot]			
C17	3905.5	-.011188	+4964.5	-3633.0	-744.77	+272.76	-811.00	+202.30
				[CB(T)]	[Corp Tot]			
C18	-10178.	+.016386	+4756.9	-3482.3	-1023.4	+173.13	-991.49	+105.18

*See note 2

TABLE 4-9B

REGRESSION COEFFICIENTS FOR THE NORMAL FLOW PERIODS (UNCONDENSED)

Equation Category M†	Constant	Income	Own Rate	Institutional Rate	Market Rate	γ_2	Income η_1	Own η_2	Institutional η_3	Market η_4	S_1	S_2	S_3
				[MSB]	[3 Mth]				[MSB]	[3 Mth]			
M1**	-2923.1	+.042672	+2897.8	-2182.0	-793.11	+1158.4	-.056589	-2056.6	+2955.7	+473.42	+187.45	-819.88	+353.43
		(4.7560)	(2.9158)	(2.2615)	(5.6997)	(.66564)	(2.1690)	(.64218)	(.86980)	(.81361)	(.81311)	(3.4357)	(1.4201)††
				[MSB]	[9-12 Mth]				[MSB]	[9-12 Mth]			
M2**	-3154.2	+.038186	+3585.4	-2776.1	-681.22	+1046.3	-.058924	-2228.9	+3175.9	+472.34	+265.78	-673.12	+465.87
		(4.2382)	(3.5947)	(2.9082)	(5.2986)	(.67098)	(2.3226)	(.85657)	(1.1086)	(1.0403)	(1.1345)	(2.7648)	(1.8673)
				[MSB]	[3-5 Gov]				[MSB]	[3-5 Gov]			
M3**	-2936.3	+.046451	+4087.5	-3241.4	-906.82	+981.04	-.064653	-2719.3	+3715.0	+529.31	+302.64	-683.62	+359.67
		(5.2258)	(4.2461)	(3.5858)	(5.8355)	(.67470)	(2.6571)	(1.2079)	(1.4494)	(1.0714)	(1.3426)	(2.9348)	(1.4995)
				[MSB]	[L-T Gov]				[MSB]	[L-T Gov]			
M4**	-2418.5	+.050492	+5735.7	-4340.4	-1680.5	+1039.1	-.050594	-3648.2	+3943.4	+858.99	+196.44	-958.29	+243.80
		(5.0892)	(5.3194)	(4.4958)	(5.2032)	(.58113)	(1.9061)	(1.6463)	(1.5309)	(.89802)	(.81385)	(3.8869)	(.90827)
				[MSB]	[SL Tot]				[MSB]	[SL Tot]			
M5**	-3453.3	+.049564	+7507.1	-6533.1	-1280.0	+1287.8	-.062929	-5137.3	+5644.4	+1141.7	+322.43	-798.12	+193.16
		(5.2702)	(6.2516)	(6.2217)	(5.4916)	(.83960)	(2.5940)	(2.3388)	(2.3429)	(2.9172)	(1.3629)	(3.3373)	(.76785)
				[MSB]	[Corp Tot]				[MSB]	[Corp Tot]			
M6**	-2748.8	+.082480	+7135.0	-6208.5	-1674.7	+1229.8	-.077899	-4631.3	+5081.9	+1147.1	+123.75	-1055.4	+85.050
		(6.1734)	(5.9981)	(5.9210)	(5.1586)	(.78994)	(2.8670)	(2.1000)	(2.0913)	(2.1574)	(.05794)	(4.2445)	(.31498)

†See note 2

††t-values in parentheses

TABLE 4-9B--Continued

Equation Category C†	Constant	Income	Own Rate	Institutional Rate	Market Rate	γ_2	Income η_1	Own η_2	Institutional η_3	Market η_4	S_1	S_2	S_3
				[CB(T)]	[3 Mth]				[CB(T)]	[3 Mth]			
C1**	-7875.4	+.055446	+3274.0	-2152.1	-745.42	+5612.9	-.071352	-1574.7	+2081.2	+566.55	+126.20	-859.72	+334.65
		(5.7445)	(3.7748)	(3.1477)	(5.5048)	(1.0934)	(2.2758)	(.73470)	(1.0261)	(1.1273)	(57047)	(3.1050)	(1.3224)
				[CB(T)]	[9-12 Mth]				[CB(T)]	[9-12 Mth]			
C2**	-8813.5	+.053322	+3762.2	-2484.9	-639.86	+6358.9	-.073666	-1926.3	+2395.0	+495.20	+200.16	-729.09	+411.70
		(5.4477)	(4.3341)	(3.6716)	(5.1060)	(1.4995)	(2.3071)	(1.1214)	(1.4263)	(1.2877)	(.89218)	(3.0728)	(1.6039)
				[CB(T)]	[3-5 Gov]				[CB(T)]	[3-5 Gov]			
C3**	-8822.0	+.061532	+3942.6	-2616.3	-833.28	+6117.1	-.074855	-1930.8	+2360.3	+535.84	+226.73	-761.43	+293.30
		(6.3582)	(4.6295)	(3.9838)	(5.3688)	(1.5729)	(2.3068)	(1.2546)	(1.5308)	(1.2527)	(1.0313)	(3.2858)	(1.1629)
				[CB(T)]	[L-T Gov]				[CB(T)]	[L-T Gov]			
C4**	-8641.1	+.064912	+4525.2	-2832.0	-1341.5	+5745.2	-.060633	-1993.5	+2157.2	+467.73	183.65	-937.79	+203.53
		(6.0646)	(4.8574)	(3.9806)	(4.1254)	(1.3433)	(1.6823)	(1.2110)	(1.3044)	(.53008)	(.77017)	(3.7527)	(.73602)
				[CB(T)]	[SL Tot]				[CB(T)]	[SL Tot]			
C5**	-10968.	+.065002	+4964.5	-3633.0	-744.77	+7062.5	-.072619	-2466.0	+2774.0	+555.15	+272.76	-811.00	+202.30
		(5.8525)	(4.9956)	(5.0351)	(3.3894)	(1.6774)	(2.0195)	(1.4413)	(1.6461)	(1.4345)	(1.1052)	(3.1449)	(.71484)
				[CB(T)]	[Corp Tot]				[CB(T)]	[Corp Tot]			
C6**	-10178.	+.085312	+4756.9	-3482.3	-1023.4	+5901.6	-.068926	-1791.5	+2157.0	+348.40	+173.13	-991.49	+105.18
		(6.1525)	(4.9007)	(4.8743)	(3.3867)	(1.4100)	(1.7916)	(1.0465)	(1.2772)	(.66668)	(.70486)	(3.8124)	(.36509)

†See note 2

††t-values in parentheses

statistically confirmed that there is any shift in the demand function (with the exception of that relative to the income parameter), there is certainly some evidence, though weak, of a wholesale shift in the demand function toward a reduction in the effects of the rate parameters. That is, it would appear that both the constraint and rate parameters have much less of an impact on the demand function for savings and loan shares during the normal flow periods than during the long-run period giving rise to the speculation that the nonrate variables might take precedence in the determination of demand during these periods. (For example compare equation M6 with equation M18). If this is indeed the case, it would help to explain some of the differences in the results of the past studies as well as some of the differences in the results of this study and prior studies.

The elasticity coefficients for each asset and the ranking of importance of the individual assets for the normal flow periods are presented in Tables 4-10 and 4-11 respectively.

Summary of the Test Results

The test results may be briefly summarized as follows. During the long-term period, both the constraint parameter and the rate parameters enter significantly. Of the two, the rate parameters appear to be the most important with institutional rates apparently dominating the market rates. During periods of disintermediation, there is some evidence of a shift in the function toward an increase in importance of the market rate parameters and a decrease in the importance of at least the commercial bank rate. While the own rate still appears to dominate all other rates, the market rates gain considerably in

TABLE 4-10

ELASTICITY COEFFICIENTS AND RELATIVE ELASTICITIES
FOR NORMAL FLOW PERIODS

Equation	Income	Own Rate	MSB Rate	Market Rate	
			Category M*		
M13	.74	5.76	4.14 (.72)	1.35 (.23)	[3 Mth]
M14	1.01	7.13	5.27 (.73)	1.26 (.18)	[9-12 Mth]
M15	.96	8.13	6.15 (.76)	1.87 (.23)	[3-5 Gov]
M16	.005	11.41	8.23 (.72)	3.49 (.30)	[L-T Gov]
M17	.71	4.71	1.68 (.36)	.25 (.05)	[SL Tot]
M18	.24	4.98	4.31 (.86)	1.31 (.26)	[Corp Tot]
			Category C*		
Equation	Income	Own Rate	CB(T) Rate	Market Rate	
C13	.84	6.51	3.22 (.49)	1.27 (.19)	[3 Mth]
C14	1.08	7.48	3.71 (.49)	1.18 (.16)	[9-12 Mth]
C15	.71	7.84	3.91 (.52)	1.72 (.22)	[3-5 Gov]
C16	.23	9.00	4.23 (.47)	2.79 (.31)	[L-T Gov]
C17	.59	9.87	5.43 (.55)	1.36 (.14)	[SL Tot]
C18	.86	9.46	5.21 (.55)	2.53 (.27)	[Corp Tot]

*See note 2
Relative elasticities in parentheses.

TABLE 4-11

MARKET ASSETS RANKED ON THE BASIS OF THEIR RELATIVE PRICE ELASTICITIES FOR NORMAL FLOW PERIODS

Category M†	Category C†
1. Long-Term Government Bonds	1. Long-Term Government Bonds
2. Corporate (Total)	2. Corporate (Total)
3. 3-5 Year Governments*	3. 3-5 Year Governments
4. 3 Month Treasury Bills*	4. 3 Month Treasury Bills
5. 9-12 Month Government Bills	5. 9-12 Month Government Bills
6. State and Local (Total)	6. State and Local (Total)

†See note 2

*3-5 year Government and 3 month Treasury bills entered with the same relative elasticity.

importance. Finally, during the normal flow periods, the constraint parameter becomes considerably less important than in the long-run period. There is some weak evidence of a possible wholesale shift away from the importance of the rate parameters, but this cannot be statistically confirmed.

Given these results, is it possible to find an explanation for this behavior? The credit market assets (both the money market assets and the capital market assets) are free from artificial restraint. Consequently, the returns realized on these assets are allowed to seek their own levels through the normal supply and demand conditions operating within the market place. The case is not the same with savings assets. Although the returns on these assets

fluctuate somewhat with the normal supply and demand conditions operating within the market place, the maximum rate that may be realized is strictly controlled through Regulation Q and the Stevens Act.[19] The upshot of this is that within a range bounded by the pure rate of interest and the ceiling rate, savings assets are free to compete with market assets on either a pure price or yield basis or a nonprice basis. Above this range, savings assets cannot compete on a pure price basis with market assets, although they may attempt to compete on a nonprice basis.[20]

For the period examined, it would appear that the following situations hold. When interest rates fluctuate widely over a relatively short period of time, it appears to capture the attention of savers and the rate parameters apparently dominate nonrate considerations. As long as financial institutions can compete effectively on a pure price basis, the demand function remains fairly stable and the return on market assets are dominated by the return and safety considerations of savings assets.

During periods when rates do not fluctuate rapidly (are either stable or in a gently upward or downward trend), and financial institutions can compete effectively on a direct price basis, the rate parameters appear to decline in importance and presumably nonrate, nonconstraint considerations rise either to a par with rate

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[19]It should also be noted that while technically savings assets can fluctuate within a range, the promised return tends to be a good deal "stickier" than the rates on market assets, particularly in a downward direction.

[20]Presumably the pure rate of interest will never drop to zero.

considerations or above them.

Finally, during periods when rates fluctuate widely and move beyond the range where financial institution can compete effectively on a direct price basis, the market rate parameters assume increasing importance in demand determination. Presumably the greater the gap between the market rates and the ceiling rate (with the market rates exceeding the ceiling rate) the greater the level of importance of the market rate parameters will assume.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

From the foregoing analysis, the following conclusions are warranted:

1. Over the long-term period studied, interest rates play a major role in the determination of the demand for savings and loan shares. Of the two rate classifications examined (institutional and market), institutional rates dominated indicating a degree of residual resistancy toward intermediation.

2. Of the two competitive institutional rates tested, the rate on mutual savings bank deposits consistently entered with a higher degree of elasticity than did the rate on commercial bank deposits thus representing the greatest source of competition for savings and loan shares. The greatest single degree of elasticity is overwhelmingly associated with the own rate. Of the available market rates tested, the intermediate to long-term securities appear to be the most important substitutes although the extremely short-run securities may have some importance. Savers holding savings and loan shares, on the whole, do not appear to be in income brackets that make state and local obligations competitive.

3. The demand function does not appear to be completely stable over time. Rather the function is subject to shifts definitely among the market rates and possibly among all parameters. The shifts appear to be dependent upon the general fluctuations in interest rates. There is some evidence to indicate that freely competitive institutional rates would lend greater stability to demand although this, by itself, would not totally eliminate the shift potential.

4. Finally, there is some weak evidence to indicate that the intra-market asset ranking (i.e., long-term vs. short-term) remains fairly constant even during periods when the market assets assume increasing importance in the determination of the demand for savings and loan shares.

Given the results, it would appear that the demand for savings and loan shares may in a limited sense be characterized as being generated by precautionary motives; i.e., in the sense that the funds are not earmarked for immediate expenditure or for the sole purpose of generating returns. Safety as well as return and convenience must thus be considered. However, the consideration of return is of considerable importance. As long as financial institutions can remain reasonably competitive on a direct price basis, funds will be shifted, probably in the direction of the institution offering the greatest level of convenience or the most competitive rate. Should financial institutions fail to compete effectively on a direct price basis, the return parameter assumes increased importance and presumably could, should the gap between the ceiling rate and the market rate become great enough (with the market rate exceeding the ceiling rate), totally dominate safety and convenience considerations. The financial manager of a savings and loan association (or any other financial institution for that matter) must be both willing and able to compete monetarily for funds in the market place. If by the imposition of an artificially imposed ceiling rate he is precluded from direct price competition, it appears that there is no alternative except for him to lose his grip on both his ability to attract new funds and his ability to retain the funds already on deposit. Hence, any recommendation for greater flexibility must be broader than simply removing the ceiling rate on ordinary passbook accounts. Rather, it should be broad enough to allow for the innovation and use of new market instruments.

Savings and loan associations (like commercial banks) cannot and should not be limited to the use of the ordinary passbook account,

even if the ceiling rate on the maximum allowable interest rate were eliminated. To see why, assume for the moment that this were the case (i.e., no ceiling rate and only the passbook account available). In periods of rising rates associations, in order to obtain new funds and retain hold over existing funds, would be forced to adjust continually upward the rate on all existing accounts. This would be an extremely involved and drawn out process reducing the association's flexibility and its timeliness of change. Moreover, it would be unnecessarily costly. In the first place not all funds have the same tendency to disintermediate and secondly, the passbook rate has historically been "sticky" downward. As a consequence, associations would be forced into higher rates for all savers whether the savers sought the higher rates or not; and they would lock themselves into higher rates which during easy money periods would result in reduced profits or in the extreme case, insolvency. Although the latter situation sounds extreme, it is precisely the situation that occurred following the 1966 credit crunch. Savers strongly resist rate reductions. Managers, aware of this resistance, are apparently willing to face declining profits rather than be the first to reduce passbook rates.

Banks and associations are, of course, not limited solely to the use of ordinary passbook accounts. Beginning in the 1960s and particularly since the late 1960s rate ceilings have been liberalized allowing for higher returns on longer maturity special accounts and certificates of deposit. These changes have presumably provided the institutions with the flexibility to compete with credit market instruments while at the same time protecting their solvency. Although it is a step in the right direction, it has been little more than a

stop-gap measure. As long as there are rate ceilings, associations (and financial institutions in general) will be inhibited from the flexibility necessary to cope with rapid changes in market rates.

What if rate ceilings are completely removed? With the range of instruments now in use wouldn't this put associations in a better position to meet competition from the credit market? Examine hypothetically the situation in somewhat greater detail.

If the rate ceilings were removed, associations (and financial institutions in general) would be, in effect, left with a (nonrate controlled) range of assets consisting of the basic passbook account and a number of high-yield assets (special accounts and CDs).[1] This range of assets would meet a primary objective. It would allow associations to partition their funds, keeping those that do not have a tendency to move in the traditional, extremely flexible[2] low rate passbook accounts while at the same time making available less flexible, high rate competitive alternatives to those funds that do have a tendency to move into credit market instruments.[3]

The competition and cost advantages are four-fold. First, in periods of rising rates, associations would have the flexibility

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[1]Again, the point of view is that of the saver, hence savings accounts and other time deposits are referred to as assets rather than liabilities.

[2]Flexibility from the point of view of the saver; i.e., he or she would be able to obtain cash merely upon request as has traditionally been the case.

[3]Presumably the rate on deposits would not quite reach the same level as the rate paid on the individual market assets. Hence the association's assets would not draw speculative funds that would normally flow into credit market instruments.

necessary for timely adjustment on selective assets thereby reducing to a great extent the tendency of funds to leave, seeking higher returns elsewhere without being forced into blanket rate hikes.

Next, because the rates on these special assets would be flexible both upward and downward, associations would not be trapped into maintaining high rates for unnecessarily long periods. During periods of tight money, high rates are required and will raise costs, but because of the length of maturity requirement, successive rounds of rate hikes would be limited to only new assets offered. In easy money periods, rates would drop to the floor dictated by the regular passbook rate thus moving funds back into this form of deposit.

Third, because of the minimum balance requirements, internal transfers of funds would be reduced to a certain extent.

Finally, if the long-term rate trends are up, associations would retain the ability to raise slowly the minimum passbook rate maintaining their basic competitive position.

The foregoing argument is, of course, rhetorical in light of current regulation. However, even under the current regulated situation some flexibility exists and it may be possible to obtain some idea of the workability of an uncontrolled situation by examining the current conditions.

Discussions with selected local area associations have pointed up a disturbing fact; CDs and special high interest accounts have in many cases simply not become competitive with capital market assets. Moreover, their use has sparked renewed competition between institutions and in some cases, caused individual associations to compete against themselves for funds. In other words, rather than aid the

position of associations, these assets have led to increased costs without increasing the flow of funds into the associations.

While it is true that part of the difficulty lies with the ceiling rates, other difficulties exist. A great source of difficulty lies in the minimum balance requirement. When CDs first appeared on the market, minimum balances of $20,000 and $25,000 were not uncommon. However, though fierce inter-institutional competition for funds, minimum balances of $1,000 have become common. In some cases, special high interest passbook accounts have reduced the minimum opening balance of $1. This along with other problems yet to be discussed has fostered, indeed almost made mandatory, saver shifts from regular passbook accounts to special high yield accounts and certificates. The 1971 figures report a national average of 48% of high yield accounts to regular accounts. (See Table 5-1) Local institutions report rates as high as 60%.

TABLE 5-1

ASSOCIATION SPECIAL ACCOUNTS AS A PERCENT OF TOTAL ACCOUNTS

Year	Percent
1967	17.7
1968	23.2
1969	31.3
1970	40.6
1971	47.9

Source: National Fact Book; Mutual Savings Banking, 1969 and 1972

The net result of this is for the old regular passbook account to be rapidly upgraded into a new regular passbook account yielding a higher return. Moreover, it has made a wider range of alternatives

available to savers who would not normally qualify for minimum balances necessary for the acquisition of assets such as commercial paper or Treasury bills.

Next, the length of maturity requirement is quietly but surely being eroded in many situations. Emergency circumstance withdrawals are being liberally interpreted and many institutions, out of fear of losing customers, are willing to renegotiate and transfer older lower rate special accounts and certificates that have not as yet matured into new, higher rate assets with little or in some cases no penalty to the saver. Hence any advantages accruing to the institution by locking into rates for a year or longer are eliminated thus placing additional pressures on profits.

Finally, downward flexibility seemingly does not exist. As was previously pointed out, regular passbook rates have a tendency to be extremely sticky downward. Apparently the concept of passbook rates has generally transferred to the special accounts and CDs and the smaller depositors have become upset when rates decline. In an attempt to get around this problem institutions and associations have simply stopped offering the special assets when rates decline. While this might seem to accomplish the same purpose as reducing the rate, it has only been partially successful. Many associations (again out of fear of losing customers) continue to reissue the special high yield assets to those already holding them, thus resulting in locking the associations into high rates for long periods.

Many of these problems apparently do not apply to the large depositor (i.e., those individuals with balances of $100,000 or more). Unfortunately, the large depositor is not the mainstay of the typical

association.

The total extent of the practices just noted is not known. Certainly discussions with a few local associations cannot be generalized for the entire country. However, if these practices are allowed to exist in one area, there is a potential for them to occur elsewhere. If these practices are, as strongly suspected, occurring elsewhere, then it is clear that the range of asset offerings is not accomplishing the purpose for which it was intended.

Given that the present system is not totally effective, what changes can be made that would lead to an increase in the effectiveness of the system?

First, the ceiling rate on all savings type deposit assets should be removed allowing associations and the remaining financial institutions the flexibility necessary to meet rapid changes in the market rates of interest.

Second, increase the downward flexibility of the rates paid on high yield assets. This, of course, is much easier said than done; but it might be possible. Recall that yields on large deposit, high yield assets don't seem to suffer from downward inflexibility; apparently because large depositors are able to distinguish between special yield assets and regular passbook accounts. Small depositors, on the other hand, are not apparently able to make this distinction. Could this be because associations and other institutions have not attempted to create a difference in the eyes of the saver? Golden Passbooks, Interest Five, and even certificates of deposit don't inherently connote a difference. If termed differently, say a Federal Home Loan Bank Board Association Note or a Federal Savings and Loan

Association Note, a distinction between the regular passbook account and high yield assets might be created lessening the downward "stickiness" on rates.

Third, impose and strictly regulate minimum balance requirements to obtain high yield accounts. If special six month or one year assets are to compete with say Treasury bills, why should a minimum balance of $500, $1,000, or even $5,000 be allowed to obtain such an asset when the minimum requirement for a Treasury bill is $10,000?

Fourth, impose and strictly regulate term to maturity requirements. If, for example, lower minimum deposit, longer maturity assets are designed to compete with say corporate bonds or long-term government bonds, why should depositors be allowed to renegotiate these assets in midstream without penalty?

The point of the recommendations is simply this. Associations should be allowed to compete among themselves and with other financial institutions on common grounds: the ordinary passbook account and possibly services offered. If associations cannot offer the same services, perhaps they ought to maintain a limited number of advantages in other areas.[4]

Similarly, if credit market assets impose some competitive threat to associations (as the results of this study conclude), then the associations ought to be allowed to compete with these assets though, again, on comparable grounds. Merely allowing for a proliferation of alternatives may foster competition, but totally unregulated competition runs into vast public policy considerations; for example, the

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[4]A discussion of this issue is beyond the scope of this study.

stability of the individual institutions.

In this summary, the author has attempted to set forth reasonable alternatives that would promote competition for funds without creating undue hardships on the financial institutions or the credit markets. There has been no attempt to discuss the ramifications on the housing market or on the traditional role of the thrift institutions, though it is felt that the recommendations outlined above would fit within the context of the recent recommendations by the President to Congress for changes in the financial system.

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The average quarterly rate paid by commercial banks, by deposit type, has been published periodically in the Federal Reserve Bulletin since 1967. Prior to 1966, only an average annual rate is available in the Bulletin (there is some inconsistent, quarterly data during 1966). In this study, annual data linearly interpolated to yield quarterly observations was employed for the period 1952-1967. For the period 1967-1971, quarterly observations were employed.

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