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THE IMPACT OF DEREGULATION ON THE TRUE COST OF SAVINGS DEPOSITS: EVIDENCE FROM ILLINOIS AND WISCONSIN SAVINGS AND LOAN ASSOCIATIONS

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The Impact of Deregulation on the True Cost of Savings Deposits: Evidence from Illinois and Wisconsin Savings and Loan Associations

By

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ABSTRACT

Ceilings on the savings deposit rates payable by savings and loan associations (S&Ls) under the Interest Rate Adjustment Act of 1966 gave rise to S&L efforts to attract savings deposits through sufficiently low-cost nonrate competition. These devices are generally interpreted as implicit interest--payments to depositors in some form other than cash. A statistical cost accounting technique is used to estimate the full cost of S&L regular passbook savings deposits inclusive of explicit and implicit interest. The study focuses on Illinois and Wisconsin S&Ls. The resulting full cost of regular passbook savings deposit estimates over the 1976-1983 period tend to move with competitive rates. However, S&Ls are only able to offer a discrete set of services to pay implicit interest and require market interest rates to move by some threshold amount before offering additional services. Subsequently, as the amount of subsidized services increases, the rise in implicit interest induces an over adjustment of the full cost of regular passbook savings deposits to changes in market interest rates.

The Depository Institutuions Deregulation and Monetary Control Act of 1980 mandated the removal of all rate ceilings on consumer-type deposits no later than 1986. The Garn-St Germain Depository Institutions Act of 1982, which authorized the creation of money market deposit accounts (MMDAs) with a limited transactions feature, accelerated progress toward the final deregulation required by the Monetary Control Act.

Deposit rate ceilings, which were imposed on commercial banks' deposits by the Banking Act of 1933, were extended to the savings and loan association (S&L) industry by the Interest Rate Adjustment Act of 1966. Conventional wisdom has it that deposit rate ceilings have kept down S&L deposit costs and are thus a source of monopsony profits to S&Ls. The corollary--that the removal of deposit rate ceilings would involve a loss of monopsony profits--suggests that the recent widespread losses experienced by the S&L industry are partly due to the removal of deposit rate ceilings. Deposit rate ceilings, however, have affected S&L costs in ways other than their direct influence on interest expenses. The imposition of deposit rate ceilings on S&L deposits gave rise to efforts by S&Ls to attract deposits by offering inducements other than the direct payment of competitive deposit rates. In a deposit rate-constrained savings deposit market, competition took the form of provision of financial and nonfinancial goods and services to depositors in order to increase deposit holdings. Some of these goods and services were labor intensive, while others were capital intensive. Nonrate competition--the financial analogue to nonprice competition--became an important equilibrating mechanism in the rate-constrained savings deposit

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market.[1] The provision of financial and nonfinancial goods and services in lieu of explicit interest is viewed as an implicit interest payment to depositors.

In recent years, a number of studies have estimated the amount of implicit interest paid on deposits and how quickly these implicit rates have been adjusted to changes in market interest rates. These studies fall generally into two groups. One group has focused generally on the implicit interest rate on demand deposits. For example, studies by Startz (1979), Barro-Santomero (1972), Klein (1974) and Taylor (1984) are perhaps the best of this type. Startz uses accounting data to calculate a measure of services remitted, while Barro-Santomero and Taylor use survey data to derive a marginal rate of remittance. Klein, on the other hand, assumes that banks costlessly evade regulations and pay a competitive rate, operationally defined as the 4-6 month commercial paper rate.

A second set of studies has focused on thrift institutions. The studies in this area are those of Taggart (1978) and Spellman (1980), both of whom have used expense data to estimate the amount of implicit interest payments. The purpose of this paper is to study the relationship between market interest rates and full cost of S&L savings deposits inclusive of explicit and implicit interest. This is done using a framework that allocates to the interest or dividend cost those operating and nonoperating costs attributable directly or indirectly to the deposit liability. This methodology has a certain advantage

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[1]The theory of nonprice competition among firms in price-constrained goods markets has been developed by Stigler (1968) and probably originated with Chamberlin (1962). Nonprice competition among financial institutions has been studied by Havrilesky and Schweitzer (1975) and White (1976) for banks, Spellman (1977) for S&Ls, and Taggart (1978) for mutual savings banks.

not found in the other studies. Namely, it does not require any assumption about the specific way that implicit interest payments are made or the relationship between various ways of making such payments.

This paper is of interest because it focuses on the extent to which Regulation Q-type deposit rate ceilings have held down savings deposit costs and thereby enhanced S&L profitability.

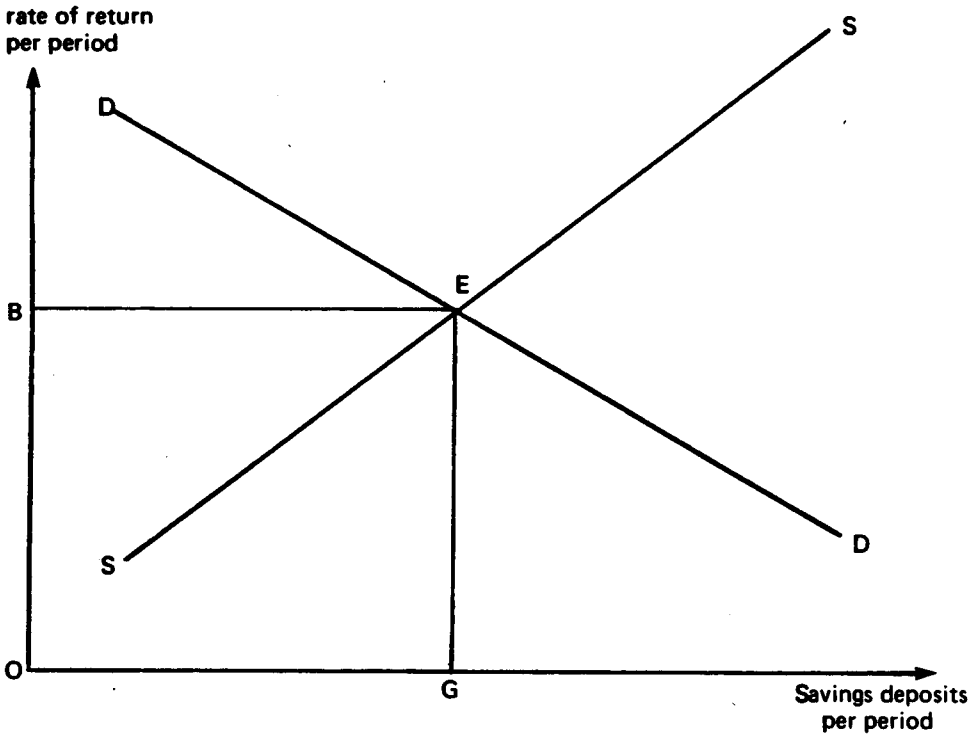
I. Effects of Savings Deposit Rate Ceilings

Suppose that Regulation Q-type deposit rate ceilings were completely effective as a means of limiting S&L costs, meaning that a 5 1/2 percent ceiling on regular savings deposits would limit S&L deposit costs to no more than 5 1/2 percent per year (aside from compounding), regardless of the level of interest rates in unregulated markets. In this situation, if the deposit rate ceiling were removed, competition would force S&Ls to pay existing depositors higher rates for the same deposit balances, causing a dollar-for-dollar reduction in pretax S&L profits. According to this view, dismantling those ceilings could cause a substantial fall in S&L profitability. Such a view ignores the effects of Regulation Q on S&L costs other than direct interest expenses.

The effects of deposit rate ceilings on the demand and supply of S&L savings deposits can be illustrated with the aid of Figure 1. In Figure 1 the horizontal axis measures the volume of savings deposits per period in the S&L industry. The vertical axis measures price in terms of rate of return per period for savings deposits.

The solid curve DD in Figure 1 represents the derived demand or average revenue curve for savings deposits on the part of S&Ls. This curve is derived from the demand on the part of S&L customers for loans and takes account of reserves held to satisfy liquidity and/or regulatory requirements. The

Figure 1



negative slope of the DD curve may be attributed principally to the negative slope of the underlying demand curve for loans of the S&L industry.

The solid curve SS in Figure 1 represents the supply or average cost of savings deposits to the S&L industry. This curve has a positive slope since more savings deposits will be drawn into the S&L industry the higher the interest rate paid on savings deposits.

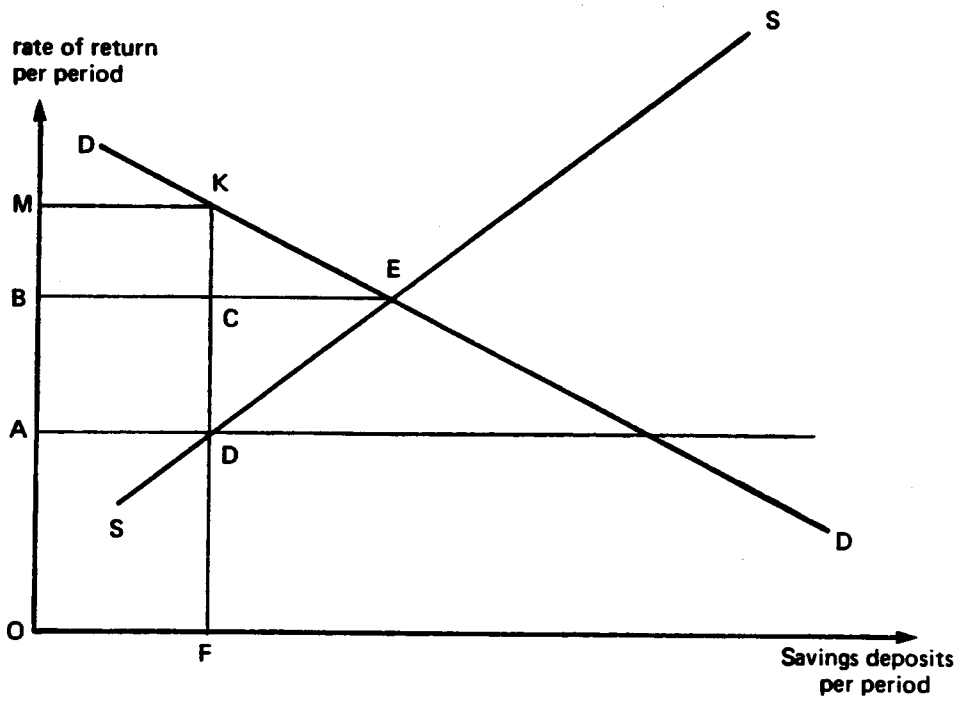
Both the DD and SS curves assume a given level of free or subsidized savings deposit services are provided by S&Ls. An increase in the level of such services shifts the derived demand curve for savings deposits down by the cost of the increased servcies provided, and the supply curve down by the value of the increased services to depositors.

In a world without Regulation Q deposit rate ceilings, the market for savings deposits will be cleared at the point E, the intersection of the demand and supply curves. Savings deposits will bear an interest rate of OB, and deposit balances of $OG will be held.

Now consider the imposition of Regulation Q deposit rate ceilings on the S&L industry. In order for the savings deposit rate ceilings to have any effect they must be set below the unregulated savings deposit rates at a level such as OA in Figure 2. At OA percent, depositors would be willing to hold only $OF in savings deposits. On these balances, the ceilings would cause a loss to depositors equal to the area bounded by ABCD. This loss to depositors represents a windfall gain to S&Ls. Since they are constrained to raise funds at a lower rate than they would be willing to pay, their profits increase.

In addition, those depositors who move their funds elsewhere in response to the savings deposit rate ceilings suffer a deadweight loss equal to the triangle CDE. This represents the utility these depositors would have derived from being able to keep their funds on deposit at the market-clearing rate OB. There is no offsetting gain to the S&L industry. Similarly, the area KCE

Figure 2



is a measure of the deadweight loss to the S&L industry as a result of the ceilings. With the volume of $OF of savings deposits the demand or average revenue of savings deposits is OM which is greater than OB. This reflects the fact that loan volume must contract with savings deposits and a decreased volume of loans likely can be placed at higher loan interest rates. Thus, the effect of the imposition of Regulation Q interest rate ceilings is to decrease savings deposits interest rate, restrain deposit and loan volume, increase loan rates and increase S&L industry profits.

However, the imposition of Regulation Q deposit rate ceilings creates a wedge between the average cost of savings deposits, given by the SS curve, and the value of these deposits to S&Ls, given by the DD curve. Since each additional dollar of savings deposits is now more valuable to S&Ls, they can be expected to turn to sufficiently low-cost nonrate forms of competition to attract more deposits. These devices are generally interpreted as "implicit interest"--payments to depositors in some form other than cash. Common types of implicit interest include the provision of services at a price below the S&L's cost and attempts to make it more convenient for customers to use S&L services.

One form of implicit interest is the provision of deposit services--deposit taking, money orders, statement maintenance, and other services--at fees substantially below marginal and average costs. To attract profitable deposit balances without paying higher explicit rates, S&Ls also undertake a range of costly promotional activities by advertising, providing gifts for new deposit accounts, and particularly by providing increased customer convenience. Establishing additional branch offices, installing automated teller machines, and lengthening operating hours raise S&L expenses, but also increase convenience for existing and potential depositors. Other things the

same, convenience attracts additional S&L depositors. Research indicates that S&Ls have established a large number of additional offices in their efforts to substitute implicit interest, in the form of convenience, for explicit interest payment prohibited by Regulation Q. A recent study by Chase (1981) presented evidence that 38.3 percent of all S&Ls offices in California in 1978 existed solely because S&Ls were forced to compete for funds through nonrate means. Taggart (1978) found that 25.4 percent of all mutual savings bank branches in Massachusetts were established to compete for deposits with rates restricted by Regulation Q.

The expenditure of S&L resources on nonrate forms of competition shifts the DD schedule down by the cost of the resources used and shifts the SS schedule down by the value of the resulting services to depositors. This results in even smaller spread between the Regulation Q cost of savings deposits and their value to S&Ls. As this spread decreases, so do S&L profits. Because the competitive level of subsidized services in the unregulated equilibrium is that level for which the cost of subsidized services to an S&L equals their value to depositors at the margin, increases in subsidized services under Regulation Q interest rate ceilings add more to S&L cost than value to depositors.[2] Graphically, these increases in subsidized serivces shift the DD schedule down more than the SS schedule. This means that at the new equilibrium with Regulation Q interest rate ceilings, savings deposits will be less than at the levels without Regulation Q. The Regulation Q equilibrium will be reached at the intersection of two new curves, such as D'D' and S'S' in Figure 3. At E_1 in Figure 3, the equilibirim is characterized by an explicit savings deposit rate ($OA = HE_1$)

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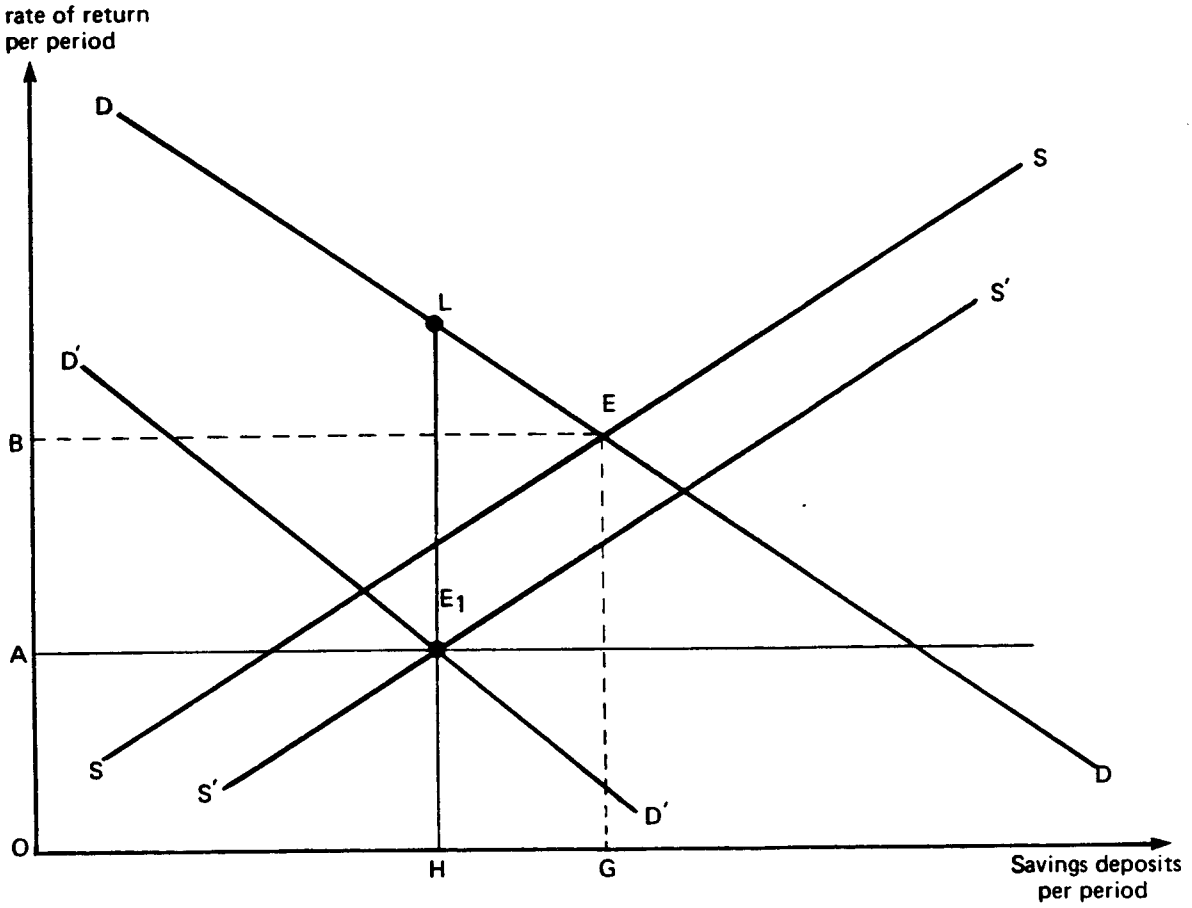
[2]Implicit in this statement is the notion of diminishing marginal utility. The more a depositor has of subsidized services, the lower the value he places on those services.

Figure 3



equal to the Regulation Q ceiling and also equal to the average revenue of savings deposits so that S&L profits are again normal, an implicit interest rate of E_1L percent so that the full cost of savings deposits equals HL percent ($HE_1 + E_1L$), an S&L industry savings deposit and loan volume which is smaller than that in an unregulated environment assuming subsidized services are not perfect substitutes for explicit interest payments on savings deposits, and a higher S&L loan rate than in an unregulated environment if the demand for S&L loans is less than completely elastic. This paper is primarily concerned with the magnitude of the full cost of savings deposits (HL) and the associated implicit interest rate (E_1L).

II. Recent Studies of the Full Effect of Deposit Rate Ceilings - Implicit Interest

The total amount of all form of implicit interest--subsidized services, additional conveniences, free gifts, advertising, and so forth --has been estimated independently by two researchers. Taggart (1978) found that Massachusetts mutual savings banks in the 1970-1975 period returned to their depositors implicit interest equal to nearly 40 percent of the difference between the regulated deposit rates and the explicit rates he estimated would have been paid in the absence of Regulation Q. In a study of S&Ls nationwide, Spellman (1980) found that appproximately 50 percent of all explicit interest savings arising from Regulation Q were "returned" to depositors in implicit forms. The implication is that thrift institutions could have paid substantially higher deposit rates simply by trading off increased interest expense for the higher operating expenses resulting from nonprice competition. But these studies shed little light on how implicit compensation has adjusted over time. This paper presents a study of the cost of savings deposits at Illinois and Wisconsin S&Ls for the years 1976-1983. The results

suggest that the full cost of savings deposits tends to move sympathetically with changes in the yields on 3-month Treasury bills and on money market mutual fund shares.

III. A Mathematical Representation of the Model

To examine empirically the full cost of savings deposits, a framework for analyzing the profitability of S&Ls is needed. Accounting data on net revenues--the difference between net interest income and noninterest operating costs--is used as a measure of the performance of the individual, or ith, S&L. The three elements included in the performance measure are related according to the following definition:

$$\text{Net Income Before Taxes} = \text{Net Return} - \text{Noninterest Cost} \tag{1}$$

or in symbols

$$NRQ_i = RQ_i - CQ_i \tag{2}$$

where NRQ_i is the ith S&L's net income before taxes; RQ_i is net interest income, which includes interest earned on asset items less interest paid on liabilities; and CQ_i is noninterest costs that arise from holding and servicing assets and liabilities.

The performance ratio for each S&L reflects that firm's profit or loss from each element in its portfolio (such as mortgage loans, consumer loans, deposits, and federal agency securities). The return to the ith S&L from the jth element of its portfolio j=1,2,..., J, can be decomposed into prices and quantity shares. The prices are denoted by X_j, (j=1,2,...k, k+1,...J), where j=1,2,...k is the set of all j's containing asset elements--gross rates of return--and j = k+1, k+2,...,J is the set of liability elements--gross

rates of cost.[3] The quantity denoted by Q_{ij}, measures the amount that the ith S&L holds in the form of the jth element. That is,

$$RQ_i = X_{io} + \sum_{j=1}^{J} X_j Q_{ij} + \omega_i \quad \text{for all } i,\ i=1,2,\ldots,N \tag{3}$$

where X_o represents "fixed" revenue and ω_i is a stochastic error term.

The noninterest expense of the ith S&L, composed of expenses from the different elements of its portfolio, also can be decomposed into price and quantity. The prices are denoted by Y_j, $j=1,2,\ldots J$ and are the noninterest costs associated with the elements of the S&L portfolio, and correspond to the same categories of quantities, Q_{ij}, as are shown in the net interest income equation in (3). The noninterest expense equation is given by:

$$CQ_i = Y_o + \sum_{j=1}^{J} Y_j Q_{ij} + \mu_i \quad \text{for all } i,\ i=1,2,\ldots,N \tag{4}$$

where Y_o represents "fixed" cost and μ_i is a stochastic error term.

Substituting into equation (2) for RQ_i and CQ_i in (3) and (4),

$$NRQ_i = Z_o + \sum_{j=1}^{J} Z_j Q_{ij} + \epsilon_i \quad \text{for all, } i = 1,2,\ldots,N \tag{5}$$

where $Z_o = X_o - Y_o$ represents net fixed revenue, $Z_j = X_j - Y_j$ $(j=1,2,\ldots J)$ represents net rate of return on the jth element of a S&L portfolio, and $\epsilon_i = \omega_i - \mu_i$. Equation (5) is used to analyze the cost of savings deposit at S&Ls in Illinois and Wisconsin. A linear regression using cross-section data will allocate observed S&L income to the various balance sheet items. From equation (5), the estimated Z_j's may be interpreted as net rates of return on assets for $j=1,2\ldots,k$ and should be positive, while those for $j=k+1, k+2,\ldots,J$ will represent imputed marginal

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[3]The gross rates of return and cost have the following properties:

$Xj > 0$ for $j = 1,2,\ldots,k$ and $Xj < 0$ for $j = k+1, k+2,\ldots,J$

liability costs and should be negative. The estimated Z_0 reflects net income before taxes not associated with balance sheet items.

The model as specified in equation (5) cannot be estimated directly because assets and liabilities are related to each other through the balance sheet identity. Perfect multicollinearity and singular cross-product matrix will occur in the estimation unless one asset and one liability are deleted. Usually vault cash and capital accounts are deleted in bank cost allocation models. Cash is excluded because its rate of return is zero; capital is omitted since the cost of equity is not directly reflected in net earnings. A more general solution to this problem is that proposed by Graham (1977) where the omitted balance sheet items are eliminated by expressing them in terms of the remaining assets and liabilities. With this technique, estimated Z_j's represent deviations of the return on jth asset (for j=1,2...k) or liability (for j=k+1, k+2,...J) from that of the omitted asset or liability. Fixed assets and capital accounts are deleted here so that equation (5) becomes

$$NRQ_i = Z_0 + \sum_{j=1}^{J-2} Z_j Q_{ij} + \varepsilon_i \text{ for all } i,\ i=1,2,\ldots,N \qquad (6)$$

The use of cross-section data in estimation commonly results in a heteroskedastic error term. To avoid inefficiency in the estimation of the coefficients asssociated with heteroskedasticity of the error term, all variables have been deflated by total assets.

Then equation (6) becomes

$$NR_i = Z_0/TA_i + \sum_{j=1}^{J-2} Z_j V_{ij} + \upsilon_i \text{ for all } i,\ i=1,2,\ldots N \qquad (7)$$

where NR_i is the i<u>th</u> S&L's ratio of net income before taxes to assets; TA_i is the i<u>th</u> S&L total assets; V_{ij} measures the percentage share of the total asset portfolio that the i<u>th</u> S&L holds in the form of the j<u>th</u> element; and υ_i $(=\varepsilon_i/TA_i)$ is a stochastic error term.

IV. An Expanded Model

The above statistical cost model implicitly assumes that all S&Ls face identical interest rates on various asset and liability items, so that interfirm variations in portfolio mix simply reflect different portfolio preferences. In fact, however, a number of factors may affect the yields that S&Ls earn and pay on assets and liabilities and therefore their income flows. For example, prior to the Garn-St Germain Depository Institutions Act of 1982, a state statute in Illinois prohibited state-chartered S&Ls from enforcing due-on-sale clauses and from changing the mortgage rate during the life of a loan. Wisconsin had no statutory restrictions on due-on-sale clauses and, in addition, allowed institutions to change the mortgage rate during the life of a loan. The variable mortgage rate contracts written by some of the Wisconsin S&Ls gave them the right to vary the mortgage rate during the life of a loan without giving notice. Exclusion of this information from the model will result in inefficient estimation and may lead to biased coefficient estimates. In order to account for this factor, on expanded model is used here.

The expanded least squares cost accounting model is

$$NR_i = Z_o/TA_i + \sum_{j=1}^{J-2} Z_j V_{ij} + \sum_{j=1}^{J-2} Z_j' \text{ Dum } S_{ij} + v_i \text{ for all } i,\ i=1,2,\ldots,N \qquad (8)$$

where S_{ij}'s are the V_{ij}'s from equation (7). Some of the S_{ij}'s are zero, correspondiung to those portfolio elements that are not affected by state differences in legal, regulatory and institutional structures; Dum is a dummy variable that has a value of one when the observation corresponds to S&Ls in Wisconsin and zero otherwise; and Z_j' ($j = 1,2,\ldots,J-2$) is the increase (or decrease) in the net rate of return on the jth portfolio element of S&Ls in Wisconsin relative to S&Ls in Illinois. Hence, Z_j' measures the difference

between the net rate of return on the jth portfolio element for Wisconsin S&Ls and on the corresponding element for S&Ls in Illinois.

V. Empirical Results

Equation (8) is estimated by ordinary least squares.[4] Data utilized in this cross-section regression came from December financial reports filed with the FHLBB by each S&L in Illinois and Wisconsin during the period 1976 through 1983. Income and expenses have been converted to annual flows by doubling the semi-annual amounts shown in the reports.[5] The separate portfolio elements used to specify the V_{ij}'s are listed in the appendix. The list includes mortgage loans, mortgage-backed securities, consumer loans, real estate held in judgment, real estate held for development, other assets (excluding fixed assets), NOW accounts, savings deposits, large CDs, other time deposits, FHLB advances, other short-term borrowings, and other liabilities. The multiplicative dummy variable included in equation (8) was specified for the mortgage loans in order to distinguish the net rate of return earned on this portfolio element by Wisconsin S&Ls from that earned by Illinois S&Ls.

The 1981 introduction of NOW accounts nationwide led to some shifting of funds from passbook savings deposits. A variable, Diff2, is used in the estimation to control for the effects of an unusual large decline in passbook savings deposits on imputed net rates of return. The variable equals the ratio of savings deposits to total assets in 1981 less the ratio of savings

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[4]See Donald D. Hester and John F. Zoellner. "The Relation Between Bank Portfolios and Earnings: An Econometric Analysis," Review of Economics and Statistics (November 1966), pp. 372-86 for an early example of this kind of portfolio analysis.

[5]The approach adopted in this paper implicitly assumes that all current expenses are related to current profits. Some of these expenses, however, will affect future profits so that current period profits are not only affected by current expenses but past expenses as well. This is likely to bias the estimated net return and full cost coefficients.

deposits to total assets in 1980. Also the June 1978 introduction of 6-month money market certificates (MMCs) at S&Ls and other depository institutions has resulted in some shifting of funds from passbook savings deposits. The massive advertising compaign for money market certificates that accompanied their introduction spurred the growth of 6-month MMCs and possibly influenced the relationship between S&L earnings and portfolio composition--especially in 1978 when there was a large shift of funds to 6-month MMCs from savings deposits. A variable, Diff1, was used in the estimation to capture the effects of the 6-month MMCs on savings deposits. The variable equals the ratio of savings deposits to total assets in 1978 less the ratio of savings deposits to total assets in 1977.[6]

For each S&L, the ratio of net income before taxes to total assets (NR_i) and the quantity of each asset/liability held (V_{ij} and S_{ij}) are known. Ordinary least squares estimation of each Z_j is obtained using equation (8). Then, for savings deposits we can observe X_{SD} (maximum allowable explicit rate payable on passbook savings deposits), but not Y_{SD} (noninterest cost of savings deposits). However, an estimate of the noninterest cost of savings deposits (Y^*_{SD}) can be derived from the following equations

$$\begin{aligned} \hat{Z}_{SD} &= X_{SD} + Y_{SD} \\ Y^*_{SD} &= \hat{Z}_{SD} - X_{SD} \end{aligned} \tag{9}$$

where $\hat{Z}_{SD}$ is the estimate of the full cost of savings deposits obtained from equation (8).

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[6]Both Diff1 and Diff2 were included at the estimation stage to control for rapid changes in deposit categories because of interest rate deregulation.

Table 1
Imputed Cost of Passbook Savings Deposits
(percent)

Year	(1) Imputed Cost of Passbook Savings Deposits	(2) Ceiling Rate on Passbook Savings Deposits	(3) Yield on 3-Month Treasury Bills[2]	(4) Difference (1) - (2)	(5) Percentage Difference (4)/(1)	(6) Difference (1) - (3)	(7) Percentage Difference (6)/(1)
1976	6.82	5.25	5.11	1.57	23.0	1.71	25.1
1977	6.94	5.25	5.28	1.69	24.4	1.66	23.9
1978	6.61	5.25	7.32	1.36	20.6	-0.71	-10.7
1979[1]	8.82	5.50	10.21	3.32	37.6	-1.39	-15.8
1980	9.06	5.50	11.75	3.56	39.3	-2.69	-29.7
1981	15.36	5.50	14.68	9.86	64.2	0.68	4.4
1982	15.85	5.50	11.09	10.35	65.3	4.76	30.0
1983	12.17	5.50	8.83	6.67	54.8	3.34	27.4

[1]Maximum rate of return on passbook savings deposits was changed effective July 1, 1979.

[2]Annual averages of the yield on 3-month Treasury bills were constructed from monthly figures. The month yields on 3-month Treasury bills were taken from Salomon Brothers, An Analytical Record on Yields and Yield Spreads.

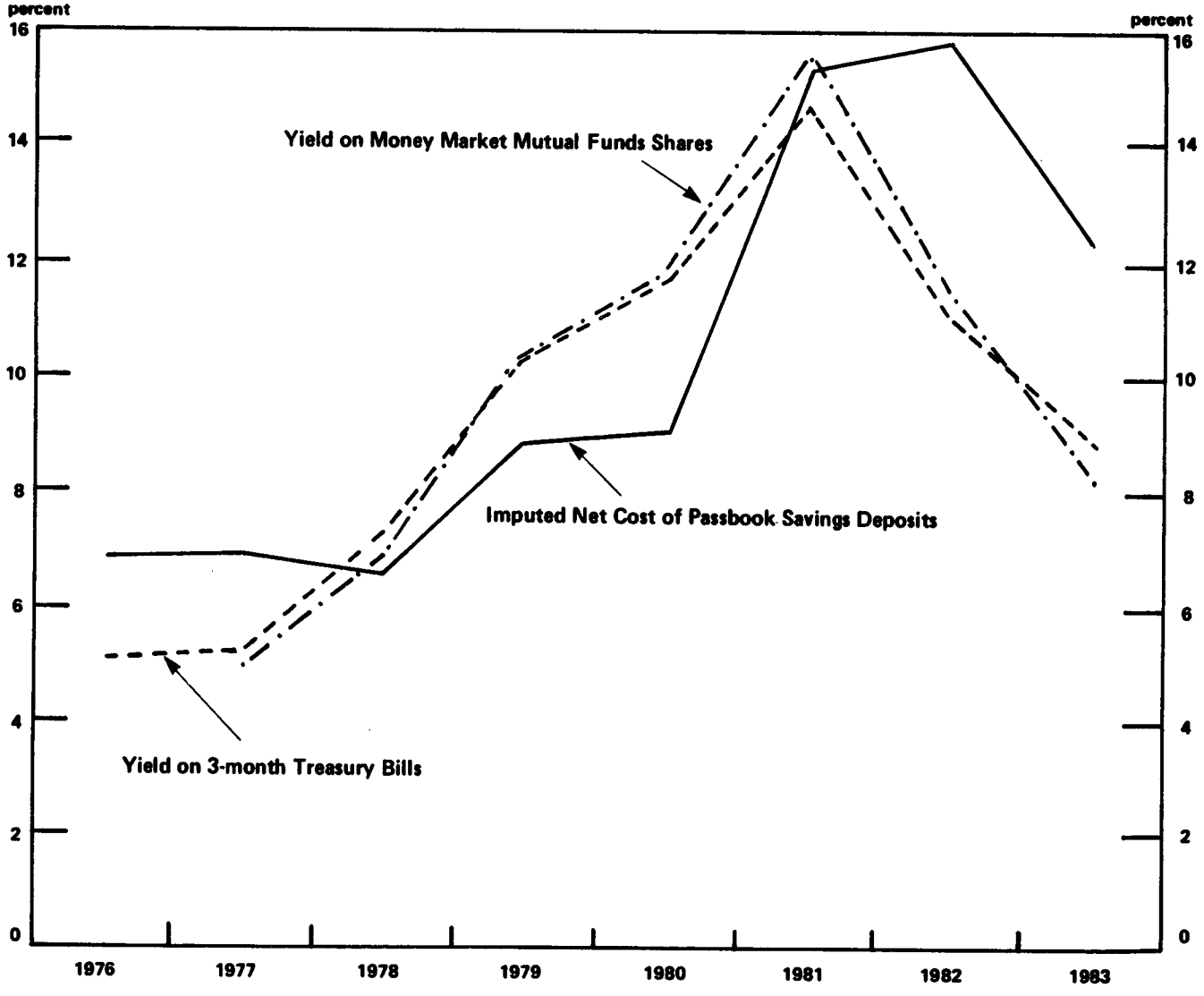
Table 2
Profitability of Savings
and Loan Associations

Net Income Before Taxes as a
Percentage of Total Assets

Year	Illinois	Wisconsin
1976	0.70	0.97
1977	0.83	1.09
1978	0.91	1.15
1979	0.76	1.03
1980	-0.06	0.49
1981	-1.17	-0.65
1982	-0.79	-0.37
1983	0.06	0.64

SOURCE: U.S. Federal Home Loan Bank Board

Figure 4
Selected Money Market Yields and Imputed Net Cost of Passbook Savings Deposits
(annual rates)



Notes: (1) Annual averages of the yields on Money Market Mutual Funds (MMMFs) shares were contructed from monthly averages of daily figures. Annual averages of the yields on 3-month Treasury bills were contructed from monthly figures.
(2) Yields on MMMFs shares represent the annualized total return net of management fees and expenses. Source: Donoghue's Money Fund Report of Holliston, Mass., various issues.
(3) The yields on 3-month Treasury bills were taken from Salomon Brothers, An Analytical Record on Yields and Yield Spreads.

The complete empirical results are presented in the appendix. A primary concern of this paper is the imputed cost of savings deposits. Table 1 presents the imputed savings deposit costs, the applicable maximum allowable explicit rates of return payable on passbook savings deposits, and the differences between these rates for each year. The differences, interpretable as estimates of the level of implicit deposit rates, ranged from 1.36 percent in 1978 to 10.35 percent in 1982. In 1978, when the net return on assets was the highest (see Table 2), the implicit deposit rate was correspondingly lowest. The empirical results suggest that at S&Ls in Illinois and Wisconsin in the 1976-1983 period the implicit component interest rate averaged nearly 48 percent of competitive interest rates.

Figure 4 presents some evidence on the relationship between the imputed cost of passbook savings deposits and money market interest rates. Figure 4 clearly shows a close relationship between the average imputed cost of passbook savings deposits and yields on 3-month Treasury bills and money market mutual funds shares. Fluctuations in the implicit deposit rate, however, tend to lag changes in market interest rates. This is not surprising since it may be very costly to make instantaneous adjustments in the level of services provided or the technology for producing services may be such that continuous adjustment is impossible. S&Ls may only be able to offer a discrete set of services and may require market interest rates to move by some threshold amount before adjusting the packages of subsidized services provided to depositors. Moreover, the results suggest that the implicit deposit rate tends to over adjust to changes in market interest rates. And this, in turn, tends to lead, on average, to higher costs then if the deposit rates were tied to market interest rates, particularly during periods of volatility interest rates. For example, the full cost of savings deposits averaged about 90 basis points more than the yield on 3-month Treasury bills.

These comparisons provide evidence that in a deposit rate-constrained savings deposit market, S&Ls endeavor to adjust implicit interest rates in response to changes in money market interest rates. The implications is that any change in a constrained savings deposit rate environment that raises (lowers) interest rates on assets competing most directly with savings deposits will result in higher (lower) implicit interest rates. While the imposition of binding deposit rate ceilings represented an attempt to hold down the cost of funds to S&Ls, it appears that this was not totally effective because S&Ls found other devices to encourage customers to hold more deposits. And these devices generally led to an increase in S&L "full" cost of funds above the regulated explicit interest rate level. The solution provided in this way, however, is far from socially optimal--depositors are not properly compensated (in a efficiency sense) for the use of their funds. Furthermore, Regulation Q deposit-rate ceilings causes S&Ls to tie up real resources in making implicit interest payments. The costs of making these payments are an absolute loss to the society.

In a freely competitive financial system, the savings deposit rate at S&Ls would be linked closely with rates in other financial markets and encourage the public to hold the socially optimum quantity of savings deposits.[7] Such results would follow if S&Ls were free to pay a competitive interest rate on the stock of savings deposits and charged the full private and social costs of savings deposits. Klein (1974), however has shown that the practice of paying implicit interest may result in deposit levels more closely approximating the social norm than otherwise, although some deadweight losses still remain because payments in kind are not equivalent in social value to the same dollar amount of explicit interest.

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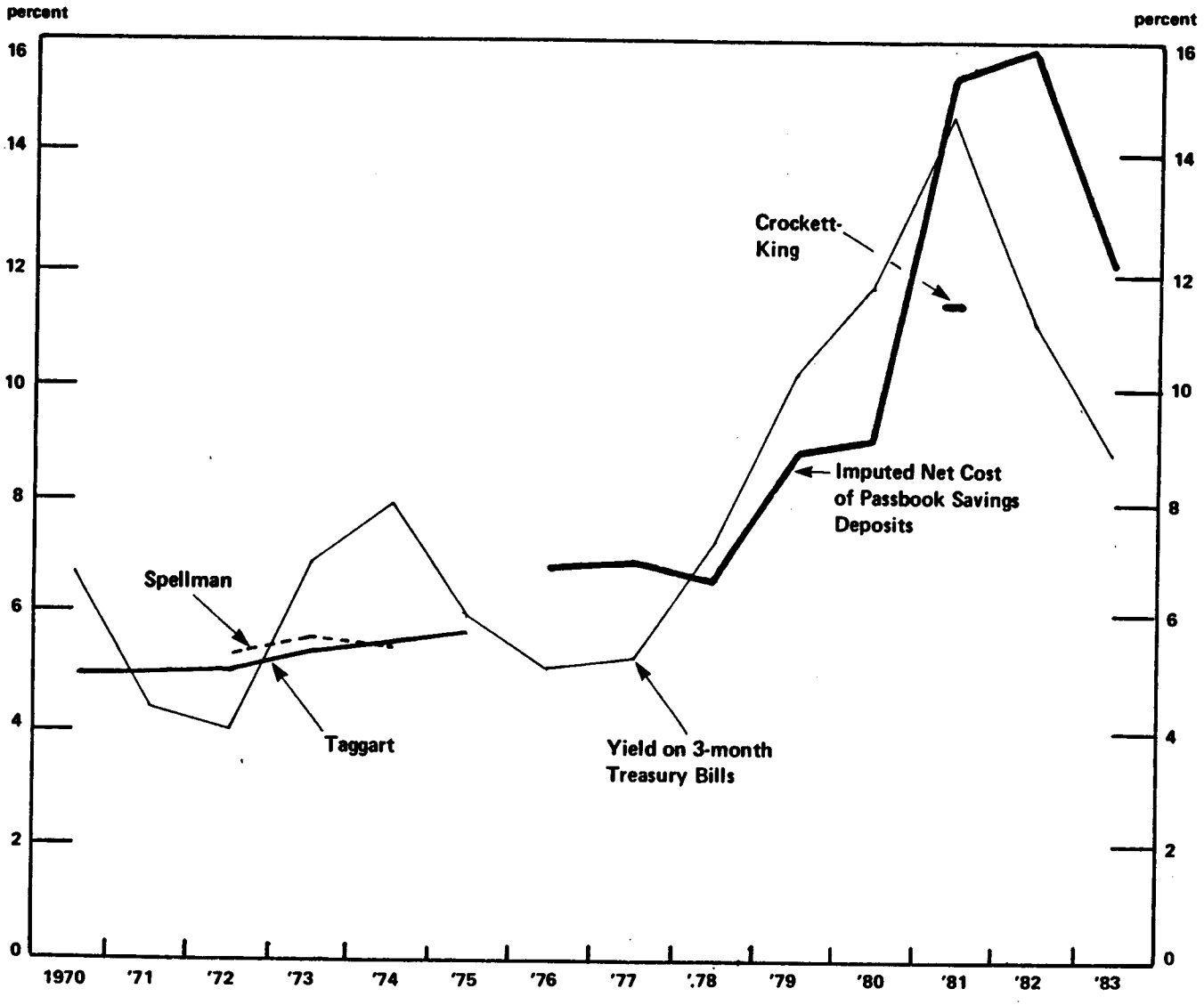
[7]See Klein (1974) for a detailed discussion of this point for demand deposits.

Figure 5
Estimates of the Full Cost of Savings Deposits



Notes: (1) Annual averages of the yields on 3-month Treasury bills were contructed from monthly figures.
(2) The yields on 3-month Treasury bills were taken from Salomon Brothers, An Analytical Record on Yields and Yield Spreads.
(3) Taggart's estimates of the full cost of deposit are contructed as the sum of the Regulation Q deposit rate ceiling and his estimates of excess expenses as a percent of average actual deposits, both time and regular passbook savings deposits.
(4) Spellman's estimates of the full cost of deposits are contructed as the sum of the Regulation Q deposit rate ceiling and and his estimates of the implicit rate.
(5) The Regulation Q deposit rate ceiling represents the maximum rate of return payable on passbook savings deposits.

VI. Previous Studies on Implicit Deposit Rates

The empirical results presented above provide evidence that Illinois and Wisconsin S&Ls paid implicit interest on their savings deposits. The estimates show that the implicit passbook savings deposit rate tends to move sympathetically with changes in the yields on money market interest rates. Some insight into the importance of the results can be provided by an examination of previous studies analyzing implicit deposit rates.

Figure 5 shows various estimates of the full cost of savings deposits. The Taggart (1978) estimates are for savings deposits of Massachusetts savings banks. In Massachusetts, 172 of the 178 savings banks were non-federally-insured and thus not subject to Regulation Q interest rate ceilings until 1970. In 1970, Congress further extended the ceilings to include non-federally-insured Massachusetts savings banks. At first, very little implicit interest is paid by these savings banks, but the amount increases substantially to about 40 basis points in 1975.

The Spellman (1980) estimates of the full cost of savings deposits are for S&Ls nationwide. These estimates are very close to those of Taggart, and they appear to be somewhat sticky, hardly changing at all even when the 3-month Treasury bills rate moved around. A third study has focused on the full cost of regular passbook savings deposits of state-chartered S&Ls in Texas. Crockett and King (1982) have used statistical cost accounting techniques to estimate marginal rates of return for various S&L asset and liability items in 1981. The imputed net costs of regular passbook savings deposits for Illinois and Wisconsin S&Ls as shown in Figure 5 appear plausible when compared against the earlier studies.

The evidence on the payment of implicit interest on demand deposits at commercial banks suggests that large corporations receive a competitive yield, whereas households receive substantially less. First, interviews with corporate treasurers indicate that at least since the mid-1970s, large

corporations have earned competitive rates of return in the form of subsidized cash management and credit services.[8] These returns are generally calculated as some open market rate minus the opportunity cost of reserve requirements and are usually adjusted according to changes in market rates on a monthly or quarterly basis.

Implicit returns are paid through compensating balance arrangements, whereby demand deposit balances are set at levels such that the value of "free" services represents a competitive return. Thus, if market rates fall in a particular month, balance requirements would be raised, for any given level of services to be paid for through compensating balances. It should be noted, however, that these arrangements do not imply that corporations hold more demand deposit balances than they would otherwise. Bank services can also be paid for by fees. Thus, the corporation can decide what level of transaction balances it wishes to hold, and those balances are counted as payment for a certain amount of services, depending on the level of market rates and reserve requirements. The customer is then billed for any remaining charges for services provided by the bank.

Figure 6 shows various estimates of implicit rates of return on demand deposits. The competitive yield earned by large corporations is represented by Klein's (1974) estimates.[9] A second set of implicit deposit rate

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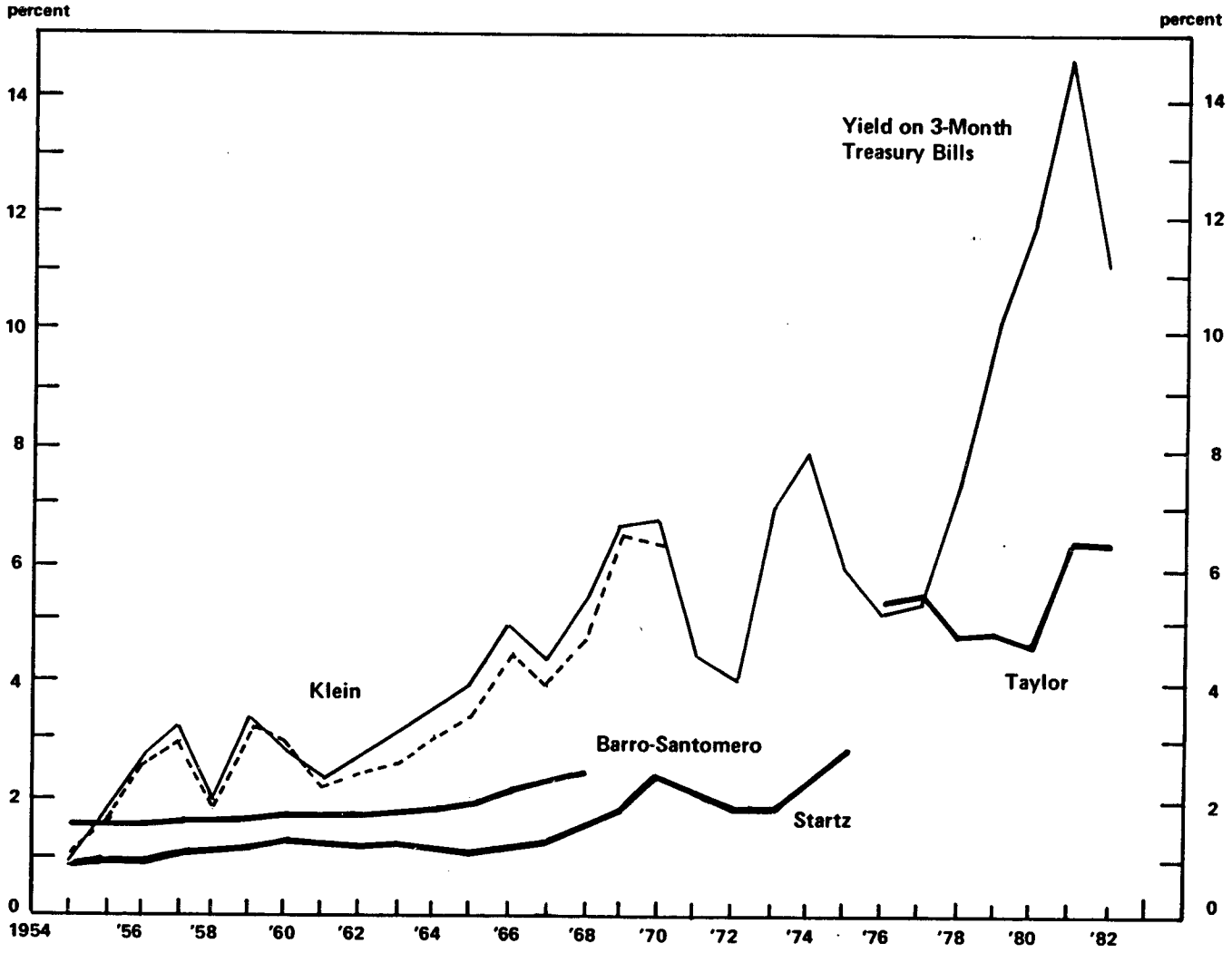
[8]See for example Thomas D. Simpson (1979).

[9]Klein assumes that competition among banks means that the Regulation Q interest rate ceiling is completely evaded. As a result banks pay effectively all of their earnings to depositors in the form of interest payments to deposits, including demand deposits. This competitive hypothesis allows Klein to estimate implicit interest from the rate of return banks earn on their portfolios which he proxies by the 4-6 month commercial paper rate. This rate is adjusted downwards by the average reserve requirement on demand deposits to take account of the "tax" imposed on bank earnings by requiring banks to hold a fraction of their assets in noninterest bearing form. This work implies that banks adjust the deposit rate quickly to match changes in market rates in order that deposit rates remain competitive. However, the reserve requirement tax partially frustrate this effort. As interest rates rise, the basis point spread between market rates and the deposit rate widens.

Figure 6
Estimates of the Implicit Interest on Demand Deposits



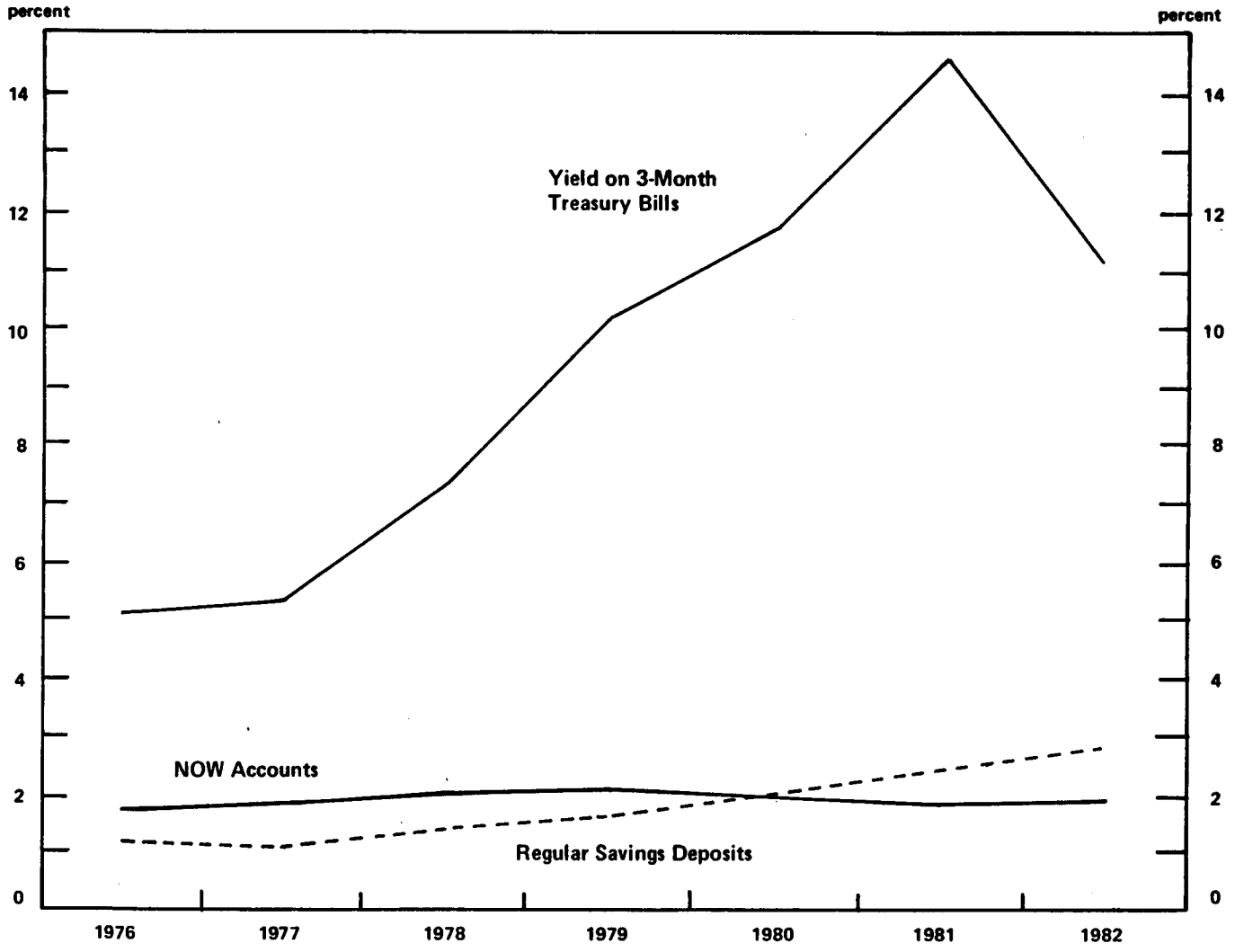
estimates shown in Figure 6 are constructed from estimates of the costs to banks of maintaining demand deposit accounts, aggregated across households and business. These costs, after deduction of service charges are taken as the value of in-kind transfers made to depositors in lieu of explicit interest. The Startz (1979) estimates use aggregate expense data for all banks. Cross sectional data are used to allocate these expenses among demand deposits and time and savings deposits. Startz's estimates suggest that implicit rates have been lower than competitive rates, averaging only 40 percent of those rates.

The remaining two sets of implicit interest rates estimates--those of Barro-Santomero (1972) and Taylor (1984)--are for household demand deposits only. Both draw on survey data: the former on a survey of the nation's 23 largest banks who were asked to report the average rate on remission of service charges and the latter on the Federal Reserve's functional cost analysis (FCA) survey which includes data on expenses attributable to demand deposits. Both of these estimates suggest that implicit returns to households were about 65 percent of competitive levels.

As shown in Figure 6, before the mid-1960s, all estimates of the implicit rate were extremely sticky, hardly changing at all even when the competitive rate moved around. Although evidence after 1970 suggests somewhat more flexibility, even in this later period, implicit rates appear to be quite rigid.

Recently, Taylor (1984) has attempted to quantify the dimension of implicit interest rates on household NOW accounts and regular savings deposits using FCA data. Figure 7 shows there estimates of the implicit rates of interest. The implicit deposit rates were calculated by deducting annual service charge income per account from expenses per account and dividing the

Figure 7
Taylor's Estimates of the Implicit Interest Rates on NOW Accounts and Regular Savings Deposits Commercial Banks



remainder by the average dollar balance per account. The estimates, shown in Figure 7, suggest that implicit deposit rates on interest-bearing NOW accounts and regular savings deposits have been much lower than those on noninterest-bearing checking accounts, averaging only 24 and 19 percent, respectively. There has been a steadily rise in the implicit interest rate on regular savings deposits, which contrasts with the relatively flat performance of the implicit interest rate on NOW accounts.

Taylor's implicit rate estimates on regular savings deposits differ significantly in average levels from those obtained for Illinois and Wisconsin S&Ls, with the former averaging about 40 percent of the latter on average during 1976-1982. How did Illinois and Wisconsin S&Ls manage to pay such a higher implicit interest rate on passbook savings deposits? It is important to understand that the FCA data takes into account of only one easily quantifiable method of circumventing Regulation Q interest rate ceiling: the remission of service charges. The true implicit return to savings deposits probably includes a sizeable component for the convenience of networks of branch depository institutions, which presumably is not captured in the FCA estimates. In addition, it is well known that banks use devices other than the remission of service charges to compensate depositors. A wide variety of cash management services at subsidized rates is made available by banks to depositors.

In addition to the provision of deposit services, depositor-borrower may be given preferential lending treatment in the form of reduced loan interest rates or superior nonrate lending turns. These and other elements of the complex relationship between a bank and its depositors may be more difficult to quantify but are not, for that reason, any less important than the more easily quantifiable remission of service charges. The statistical cost

accounting model used to estimate S&L implicit deposit rates is able to allocate overhead, losses, revenues, and costs to savings deposits in a manner not easily accomplished with traditional accounting methods.

The evidence presented in this section appears to shed some light on the importance of the implicit deposit rate estimates for Illinois and Wisconsin S&Ls. First, it is clear that Regulation Q interest rate ceilings have not been completely effective. Indeed evidence from S&Ls in Illinois and Wisconsin suggests that in the last decade climate of volatile interest rates, interest rate ceilings may hve been deleterious to all deposit market participants. The evidence suggests that both banks and S&Ls adjust implicit deposit rates in step with money market interest rates, although the evidence for S&Ls suggests somewhat more flexibility. Even though savings deposits as a percentage of deposit liabilities have declined to low levels, these S&Ls have suffered very little long run damage from the elimination of interst rate ceilings begun in 1980.

VII. Summary

This paper has reported empirical estimates of net rates of return earned on various assets and liabilities held by a sample of S&Ls. The results for savings deposits over the 1976-1983 period indicate that imposition of deposit rate ceilings led S&Ls to attempt to attract deposits by means other than the payment of explicit interest rates. Engaging in nonrate competition for savings deposits led to a steady increase in the implicit interest rate. The sharpest increases appear to have occurred over the 1980 to 1981 period when market interest rates rose unexpectedly. The estimates of the full cost of savings deposits provide strong evidence that money market interest rates have

an important influence on the level of the implicit deposit rate. The conclusion is that Illinois and Wisconsin S&Ls could have paid substantially higher explicit rates without an additional squeeze on profits, because some of the increased interest expense would have been offset by lower operating expenses.

APPENDIX

LEAST SQUARES COST ACCOUNTING ESTIMATES

Table A.1

Glossary of Symbols

V_1	=	Mortgage loans and contracts/Total assets
V_2	=	Mortgage-backed securities/Total assets
V_3	=	Consumer loans/Total assets
V_4	=	Investments (including cash assets)/Total assets
V_5	=	Real estate owned through default/Total assets
V_6	=	Real estate held for development/Total assets
V_7	=	Other assets (excluding fixed assets)/Total assets
V_8	=	Negotiable order of withdrawal accounts (including noninterest earning accounts)/Total assets
V_9	=	Savings deposits/Total assets
V_{10}	=	Large certificates of deposits/Total assets
V_{11}	=	Other time deposits/Total assets
V_{12}	=	Federal Home Loan Bank advances/Total assets
V_{13}	=	Other borrowed funds/Total assets
V_{14}	=	Other liabilities/Total assets
TA	=	Total assets
Dum	=	Dummy variable - defined as 1 - if Wisconsin S&L 0 - otherwise
Diff1	=	The ratio of savings deposits to total assets in 1978 less the ratio of savings deposits to total assets in 1977.
Diff2	=	The ratio of savings deposits to total assets in 1981 less the ratio of savings deposits to total assets in 1980.

Table A.2

Imputed Net Rates of Return For the Years 1976-1981

	1/TA	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8
1976 -	11.5827	0.0729	0.0776	0.0750	0.0600	0.0085	-0.0441	0.0690	0.3359
	(7.26)*	(8.85)*	(8.84)*	(4.62)*	(6.47)*	(0.19)	(0.54)	(3.54)*	(1.91)**
1977 -	9.0700	0.0770	0.0780	0.0854	0.0613	-0.0321	-0.0221	-0.0049	-0.0861
	(5.74)*	(10.49)*	(10.25)*	(6.36)*	(7.32)*	(0.71)	(0.32)	(0.20)	(1.34)
1978 -	8.6706	0.0760	0.0742	0.0024	0.0596	-0.1943	-0.1407	0.0695	-0.1359
	(4.20)*	(9.22)*	(8.71)*	(0.06)	(6.01)*	(2.96)*	(1.67)**	(5.21)*	(2.93)*
1979 -	9.8041	0.0938	0.0898	0.0936	0.0998	0.0505	0.0702	0.0498	0.0218
	(4.07)*	(10.70)*	(9.68)*	(5.48)*	(10.10)*	(0.63)	(0.81)	(1.95)**	(0.56)
1980 -	9.6769	0.0849	0.0791	0.1194	0.0926	0.0182	0.2785	0.0565	0.0023
	(2.02)**	(6.40)*	(5.57)*	(2.03)**	(6.79)*	(0.19)	(2.00)**	(2.35)*	(0.05)
1981	9.9208	0.1339	0.1316	0.1536	0.1616	0.1563	0.0154	0.1603	-0.0299
	(1.98)**	(10.24)*	(9.27)*	(6.53)*	(11.53)*	(2.08)**	(0.14)	(7.26)*	(0.86)

(1) R^2 is the coefficient of determination corrected for degrees of freedom, S.E.E. is the standard error of estimates, F is the F-test for the R-squared statistic and N is the number of observations.

(2) Numbers in parentheses beneath regression coefficients are the absolute value of corresponding t-ratios. One star indicates that the regression coefficient is significant at the 1 percent level. Two stars indicate significance at the 5 percent level.

(3) Intercepts have been suppressed in all regressions.

Table A.2

Imputed Net Rates of Return For the Years 1976-1981
(Continued)

V_9	V_{10}	V_{11}	V_{12}	V_{13}	V_{14}	V_1X Dum	Diff1	Diff2	R^2 S.E.E. F N
-0.0682 (7.75)*	0.0731 (4.62)*	-0.0654 (7.55)*	-0.0700 (6.61)*	-0.0609 (3.10)*	-0.0564 (4.22)*	0.0018 (2.68)*			0.732 0.0049 88.50* 515.00
-0.0694 (8.93)*	-0.0812 (6.18)*	0.0689 (8.95)*	-0.0694 (8.04)*	-0.0649 (5.96)*	-0.0379 (3.41)*	0.0013 (2.47)**			0.847 0.0039 173.42* 501.000
-0.0666 (7.48)*	-0.0691 (5.09)*	-0.0669 (7.67)*	-0.0812 (8.90)*	-0.0927 (7.98)*	-0.0387 (3.14)*	0.0015 (2.68)*	-0.0119 (1.57)		0.855 0.0042 171.56* 494.00
-0.0882 (9.29)*	-0.0868 (7.85)*	-0.0903 (9.77)*	-0.1098 (11.44)*	-0.1134 (7.54)*	-0.0485 (3.14)*	0.0024 (4.00)*			0.786 0.0046 113.09* 490.00
-0.0906 (6.32)*	-0.1032 (6.06)*	-0.0893 (6.44)*	-0.1118 (7.35)*	-0.1080 (2.02)**	-0.0314 (1.13)	0.0054 (5.10)*			0.223 0.0076 9.40* 473.00
-0.1536 (10.86)*	-0.1361 (8.56)*	-0.1619 (11.88)*	-0.2006 (14.71)*	-0.1764 (9.17)*	-0.0601 (2.16)**	0.0050 (4.77)*		-0.0457 (2.75)*	0.707 0.0071 85.99* 441.00

Table A.3

Imputed Net Rates of Return For the Years 1982-1983

	1/TA	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8
1982	- 4.5026	0.1450	0.1900	0.1605	0.1794	-0.0802	-0.2735	0.1673	-0.0303
	(0.54)	(6.78)*	(8.56)*	(4.79)*	(8.07)*	(0.83)	(1.01)	(5.31)*	(0.83)
1983	- 10.4645	0.1255	0.1177	0.1613	0.1284	-0.1912	0.1081	0.1090	-0.1028
	(1.49)	(7.66)*	(7.19)*	(6.23)*	(7.87)*	(2.60)*	(2.96)*	(4.92)*	(5.76)*

(1) R^2 is the coefficient of determination corrected for degrees of freedom, S.E.E. is the standard error of estimates, F is the F-test for the R-squared statistic and N is the number of observations.

(2) Numbers in parentheses beneath regression coefficients are the absolute value of corresponding t-ratios. One star indicates that the regression coefficient is significant at the 1 percent level. Two stars indicate significance at the 5 percent level.

(3) Intercepts have been suppressed in all regressions.

Table A.3

Imputed Net Rates of Return For the Years 1982-1983
(Continued)

V_9	V_{10}	V_{11}	V_{12}	V_{13}	V_{14}	V_1X Dum	R^2 S.E.E. F N
							0.493 0.0112
-0.1585 (6.76)*	-0.1413 (5.72)*	-0.1758 (7.98)*	-0.1271 (5.67)*	-0.1208 (3.78)*	-0.0829 (1.21)	0.0056 (2.87)*	23.92* 379.00
							0.339 0.0089
-0.1217 (7.17)*	-0.1018 (6.07)*	-0.1348 (8.00)*	-0.1152 (5.96)*	-0.1178 (4.84)*	0.0272 (0.48)	0.0045 (2.56)*	12.43* 360.000

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