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THRIFT INSTITUTION COMPETITION WITH
COMMERCIAL BANKS: EMPIRICAL EVIDENCE

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Introduction

Several banking law changes have been proposed "to increase" competition between commercial banks ("CB"), mutual savings banks ("MSB"), and savings and loan associations ("SLA"). This paper will examine the empirical evidence concerning thrift institutions' effects on financial conditions generally, and particularly on CB activity, to determine the results of existing interindustry competition. If MSB and SLA are presently important CB competitors, new analysis should reveal their influences, as an objective aid to proposed legislation. This issue is also related to the geographical and functional nature of banking "products," for if nonbanks influence CB, then they should be considered as actual or potential competitors when deciding "cases," both by bank regulators and by the courts.

Table 1, below, outlines these institutions' portfolio characteristics. The important markets served by SLA and MSB are clearly time and savings deposits ("TD") and mortgage loans. Thrift institutions generally do not offer demand deposits ("DD") nor do they normally offer nonrealty loans.¹

¹The usual exceptions to any such generalization exist. For example, Maryland MSB can offer DD, and Texas SLA can provide consumer loans. MSB generally can hold corporate securities. Statistically, such legalities have had little effect on financial competition.

Table 1. Selected Portfolio Ratios, 1972.

<u>Institutions</u>	<u>Home Mortgage Loans/TD, 12/31/72</u>	<u>Other Mortgage Loans/TD, 12/31/72</u>	<u>Mortgage Loans/TD 12/31/72</u>	<u>Increase In Mortgages/Increase in TD, 1972</u>	<u>Total Loans/Total Deposits, 12/31/72</u>
CB	17.84%	13.34%	31.18%*	39.23%	71.58%
SLA	80.85	18.71	99.56	97.47	100.67
MSB	45.46	28.28	73.74	54.84	76.99

* 18.54% of DD and TD

Source: Computed from [20].

Theories of Nonbank Competition

MSB and SLA are assumed, in the literature, usually to increase the effective supply of both TD and mortgage loans (hence, total loans) where they are present. Their rate or convenience competition may increase the attractiveness of, and hence raise the total of, an area's savings. MSB and SLA may also attract funds from locations outside of their service areas, through effective deposit rate competition.² If a downsloping demand for financial services exists, their competition should thus raise TD rates and lower mortgage loan rates for an area and thus for its CB. Alternatively, some have assumed that nonbanks divert funds away from CB through nonprice competition without necessarily altering the volume of an area's financial activity.

Changes in related "product markets" may occur, such as CB diversion of liabilities into DD, CB asset shifts into nonrealty loans and investments, and CB asset size being smaller than otherwise, if nonbank competition is effective. In behavioral terms, nonbank activity may cause CB to "give up" competition in the TD and/or mortgage markets (e.g., California). Conversely, CB may believe that customers prefer to deal with a "one-stop" financial company for all of their transactions. Thus, CB managers may be forced to become more aggressive, seeking to maintain or increase their firms' activity and market share relative to all of their competitors, under nonbank competition.

²California SLA and Massachusetts MSB are examples of such interregional flows of TD funds.

The relationships between banks and nonbanks may also flow in a reverse direction. For example, Baxter, McFarland, and Shapiro [2] suggest that:

"Nonbank competition arises from the inability or unwillingness of commercial banks in an area to meet the needs of the consuming public adequately."

A more "rigorous" approach to this issue, that of Carson [4], is extremely obscure. He suggests that nonbank TD competition diminishes the TD/total deposit ratio of CB. Since this ratio depresses CB earnings, he believes that if nonbanks capture TD funds and lend them as mortgage loans, whose proceeds return to CB as DD, CB as a group will benefit. Yet Carson's individual bank faced with nonbank competition may suffer a declining financial position.

Indeed, by substituting SLA and/or MSB as competitors in differing theories of the firm as a bank, it can be shown that almost any CB portfolio or price change can result from nonbank activity. See [13] and its bibliography. A brief examination of empirical studies of nonbank competition would thus appear to be highly relevant as a policy basis.

Aggregated Studies

Several historical studies of CB, MSB, and SLA interactions are built upon a "demand for financial asset" foundation. They examine possible substitutability between various deposits and/or money, as extensions of the Gurley-Shaw hypothesis, Baumol-Tobin inventory theories of transactions balances, or other externally-based concepts. These studies generally find that thrift institutions' liabilities are highly liquid substitutes for each other, DD, TD, and other possible near money assets. [5] is an example of, and [22] is a summary of, such studies. This type

of indirect evidence for interindustry interaction is typified by Cohen and Kaufman's [6] 1951-61 income elasticities of demand for DD (.84), commercial bank TD (.80), and nonbank savings deposits (.98). Hence, they conclude that great interindustry competition must exist. [2, 6, 7, 10, and 17] examine such measures as deposit growth, total savings, etc., within similar philosophical foundations, to arrive at similar conclusions.

Other studies, examining interindustry competition more closely, also find that interindustry rivalry exists. Jung [15] finds that Chicago bank and nonbank interest rates on similar mortgages tended to converge in the five years after 1960. Bloch [3] examines several proxies for competition at the national level. His CB and SLA asset growth, market share, profit, and profit margin figures suggest that a "new competition" between SLA and CB arose during the 1960's. Bloch attributes such results to CB initiative, in contrast to part of Friend's [8] study emphasizing SLA aggressiveness. Dhrymes and Taubman's [7] analysis of SLA activity, including some CB effects, is unfortunately unable to shed any light on the extent of interindustry competition.³

Micro Studies

The more relevant studies of interindustry competition attempt to directly relate CB price and quantity variations to nonbank activity by using microeconomic theory. Their initial assumption is that nonbanks may be direct bank competitors. Such research is worth a closer examination.

³This is because a one-period lagged dependent variable seems to capture the overwhelming majority of their equations' explanatory power.

Phillips [18] reports an earlier study finding that savings account interest was slightly higher when SLA were "large" relative to CB in the area studied. Horvitz and Shull's [12] regressions find that isolated towns' unit banks have lower TD interest rates and lower TD/total deposit ratios when other savings institutions are present (0-1 dummy variable). But thrift institutions do not affect Horvitz and Shull's CB loan interest rates or their loan/asset ratios. Kaufman's [16] Iowa county regressions find that the ratio of SLA assets to CB deposits stimulates CB loan interest, depresses the ratio of bank TD to total TD, but is not significantly related to bank TD interest rates, CB earnings/assets, or to bank loans/assets. Ware's [21] analyses use the number of SLA in Ohio nonSMSA counties to define nonbank competition. This measure does not influence CB DD service charges, CB profitability, or CB thrift account interest. Conversely, SLA numbers stimulate Ware's CB loan interest rates and price-spread monopoly power proxy (loan interest rate minus TD interest rate). Aspinwall [1] treats CB, MSB, and SLA as homogeneous sources of mortgage funds. His analysis groups all three legal forms into numbers and concentration ratios of firms in SMSA's. These structural variations influence mortgage interest rates in the expected direction. Friend's [8] first regressions seeking nonbank influences on CB TD deposit rates, using "market area" figures, are so "unimpressive" that these results were not published. His 1960 regressions, however, using state-level figures, show that TD interest rates are positively related to SLA and MSB competition. But such effects do not appear in his regressions for 1966 or 1967. Neither do they appear in his mortgage interest rate analyses at either the market or state level. Most recently, Stuhr [19] uses unity minus an area "market share" of each of 25 New York banks as a competition variable, measured with respect to CB,

SLA, and MSB activity. Stuhr shows that while CB-only competition does not affect TD interest, MSB and particularly SLA competition is positively related to CB performance in this product market. Similarly, SLA and MSB competition in the mortgage market seems to lessen CB mortgage interest rates.

Evaluation of Published Studies

Taken as a whole, both the micro and macro-oriented studies seem to refute the hypothesis that thrift institutions do not alter either CB behavior or financial activity generally. But these analyses use 1950s and 1960s data, whose validity may have declined since the effective imposition of interest ceilings on thrift institutions during the tight money period of recent years. Moreover, new financial influences of a behavioral, legal, or technological nature, extending both banks and nonbanks' product and geographical markets in recent years, suggest that new analysis of their competition is needed.

Empirical Analysis of Nonbank Competition

MSB and SLA competition with CB can be directly examined within the framework of a larger study of the sources of American CB allocational efficiency [13]. Nonbank competition is defined as the ratio of time and savings deposits held by MSA and SLA divided by these deposits plus CB time and savings deposits in a state.⁴ This ratio directly measures the effectiveness

⁴MSB and SLA were combined to lessen the regional bias of MSB concentration in a few states. State levels were utilized for theoretical reasons, as there appears to be a wide range of statewide linkages affecting the financial structure in recent years, to a greater extent than in the past. Moreover, no delineation of banking "markets" is available to cover 44 states.

of nonbank competition for funds with CB. (The assumption is made that recent historically high interest rates have lured as large a portion of interest-sensitive M_1 out of DD as would be likely to shift into interest-bearing accounts in the near future.)⁵ Moreover, the high mortgage loan/TD ratios of MSB and particularly SLA (Table 1) suggest that this measure may also rather directly measure competition in the mortgage loan market. Less directly, as shown above and by [13], this ratio may represent nonbank competition's effect on CB output or prices generally, to the extent that CB portfolio decisions relate various "single-product" deposit and loan markets to each other.

This study's dependent and many independent variables are balance-sheet and income-statement data for 1644 CB in 44 states for the 1969-71 years, as provided by the FDIC. These firm-level figures are combined with appropriate state-level banking and socioeconomic traits in three forms of analysis, whose results appear below.⁶

Correlation Analysis

Table 2, below, shows Pearsonian correlation coefficients between nonbank competition and bank-firm variables. These correlations (except for multibank holding company affiliation and adjusted loan interest) are

⁵"NOW" accounts, which were not significant during the period studied, may alter the realism of this assumption.

⁶The data are group averages of three very highly similar banks combined to prevent "disclosure". No apparent selection or grouping biases are present in this data. Ray Gobble programmed these analyses, using programs BMD08M and BMD02R.

Table 2. Correlation Coefficients of Banking Variables
With Nonbank Competition

Unit-type Bank, 0 or 1 branch*	-0.17
Small Branch Bank, 2-5 branches*	0.07
Large Branch Bank, 6 or more branches*	0.15
Multibank Holding Company Bank*	-0.01**
Time and Savings Deposits/Total Deposits	-0.28
"Investments"/Assets	-0.25
Cash Items/Assets	0.09
Agricultural Loans/Total Loans	-0.30
Commercial and Industrial Loans/Total Loans	0.27
Consumer and Individual Loans/Total Loans	0.10
Trust Revenue/Total Revenue	0.23
Equity/Assets	0.11
Labor Expense/Revenue	0.36
Occupancy Expense/Revenue	0.31
Dividends/Net Income	0.08
Bank Asset Size	0.13
Operating Revenue Less Demand Deposit Service Charges/Assets	0.08
Net Income/Equity	-0.13
Loan Interest Minus Loan Loss Provisions/Loans	0.03**
Time and Savings Deposit Interest/Time and Savings Deposits	-0.09
"Monopoly Power" (Adjusted Loan Interest Rate Minus Time and Savings Account Interest Rate)	0.09
Loans and Discounts/Total Deposits	0.23

*Dummy Variable (0 if no, 1 if yes)

**Not highly significant.

highly significant (at the 0.01 level of a two-tailed test). Yet they are rather weak. The strongest of these upward-biased relationships (0.36) leaves over 87% of variation in labor cost unexplained. Some coefficients, such as those of the TD ratio, the commercial loan ratio, the trust/total revenue ratio, and the net income ratio, are very plausible. The positive cost coefficients (labor expense/revenue, occupancy expense/revenue) suggest somewhat that nonbanks cause CB to raise costs, a presumptive sign of nonprice competition. And nonbank competition does not seem to be associated with smaller banks, as measured by either branches or assets. But the hazards of generalizing from these coefficients may be illustrated by the investments and agricultural loan ratios' coefficients, which have the opposite signs from those expected.⁷ Other influences such as regulation may be at work to mask the true, separate, effects of nonbank competition on CB.⁸

Factor Analysis

Hence, factor analysis, combining nonbank competition with 52 regulatory, structural, managerial, demand, and time trend variables, should reveal if nonbank competition is strongly related to other forces. (Factor relationships are not necessarily "causal.") In fact, it finds [14] that 13 patterns of common influence appear among the 53 variables analyzed.

⁷Competition in realty loans should raise the relative profitability of other earning assets, hence their ratios to loans or assets.

⁸This difficulty is the "multicollinearity" that infests financial data generally. [2, 13, 14].

Nonbank competition appears in two of these factors. One of them groups it with statewide "demand" forces: financial employment, population density, urbanization, per capita income, and population growth. This pattern also associates nonbank competition with limited holding company states, new bank entry, large (state) average bank size, and CB deposit inequality ("Gini coefficient"); but oppositely from CB agricultural loans and agricultural employment. Additionally, this factor associates nonbank activity with many households per CB office, as would be expected if interindustry "convenience" competition is effective. This pattern does not support the hypothesis that SLA and MSB activity causes CB size to decline.

A second factor relates nonbank activity to CB firm-level traits. It groups SLA and MSB competition with equity capitalization, high labor expense/revenue, and low CB time and savings deposit capitalization. This factor again associates thrifts' activity with limited holding company states. It captures some agricultural loan activity, however, in contradiction to the first factor.

Thus, nonbank competition accompanies many exogenous "demand" forces, which should be associated with financial institutions' output generally. But it is also associated with a few forces that should depress individual CB activity, such as new entry, equity capitalization, and labor expense.

Even factor analysis cannot completely resolve this issue's complexity. Thus, nonbank competition is directly regressed on CB performance ratios, controlling for other plausible causes of CB activity as suggested by a similar factor analysis [13]. A stepwise regression process is used to lessen any remaining multicollinearity. No nonlinearities appear in plots of residuals.

Flow-Output Regression Analysis

Table 3, below, explains a typical CB's flow-output proxy (operating revenue less demand deposit service charges/bank assets). The dependent variable measures a bank "activity" dimension which is roughly comparable to GNP and industrial firms' output, relative to available CB resources. This equation contains both "production" and price-related variables.

Sixteen variables influence this output proxy. Nonbank competition is a highly significant stimulant of adjusted revenue/assets. An increase of 25% in the ratio of nonbank TD to total TD (relative to the sample's mean value of about 0.41) in a state would raise the typical bank's flow-output by 0.76% (relative to output's mean value). This result seems to reflect CB portfolio shifts into loans when forced with thrifts' competition (since nonbank competition is not significantly related to loan interest by either Table 1 or by later regression analysis).

Yet this results' absolute size is rather small. Other forces have generally more significant effects in Table 3. Their influences are worth brief coverage.

The time trend of higher adjusted revenue/assets may reflect both tight money and managerial improvements. A high cash ratio reduces output, reflecting financial "excess capacity." Herfindahl concentration (the sum of squared deposit shares and thus the oligopoly proxy) raises adjusted revenue through its probable influence on average price. Population growth (demand) stimulates this measure, as would be expected. Both unit-type and 2-5 branch banks have lower flow-output than extensively branching firms. Since the two other multibank holding company laws bear

Table 3. Stepwise Regression for Flow-Output

<u>Variable</u>	<u>Coefficient</u>	<u>Standard Error</u>	<u>F Statistic</u>
1970	3.58804	0.23272	237.71 ^a
Cash/Assets	-42.59164	4.09341	108.26 ^a
1971	2.07157	0.23551	77.37 ^a
Herfindahl Concentration Index	1.79993	0.23253	59.92 ^a
Population Growth	9.96616	1.42138	49.16 ^a
0-1 Branch Bank	- 1.94767	0.30403	41.04 ^a
Non-Multibank Holding Company State	2.26478	0.39063	33.61 ^a
Labor Cost/Revenue	17.39389	3.11130	31.25 ^a
Multibank Holding Company State	1.70967	0.36509	21.93 ^a
Equity/Assets	- 3.57043	0.76509	21.78 ^a
Nonmember State Bank	1.31274	0.30784	18.18 ^a
2-5 Branch Bank	- 1.36441	0.32155	18.01 ^a
Per Capita Income	- 9.38876	2.32187	16.35 ^a
Time and Savings Deposit Ratio	- 6.50513	1.75102	13.80 ^a
Nonbank Competition	4.31324	1.31665	10.73 ^b
National Bank	0.64256	0.27702	5.38 ^c
Adjusted Revenue/Assets Ratio (Mean)	58.94061		
Intercept	63.36482		
R ²	0.3628		
F(16, 1627)	57.90 ^a		
Standard Error of Estimate	3.8388		
Standard Error of Estimate/Mean	0.0651		

^a Significant at the 0.001 level.

^b Significant at the 0.01 level.

^c Significant at the 0.025 level.

Variables are 0-1 dummy variables, or cardinal values scaled to have means comparable to those of the dummy variables (0.10 to 0.90). The dependent variable is multiplied by 1,000 for technical reasons.

positive coefficients, limited multibank holding company states seem to have low output.⁹ Labor cost is associated with high adjusted revenue/assets, as high cost must be reflected in high average price. The equity capitalization ratio lowers output, behaving as a liability analogue of liquidity in restraining CB activity [13]. Nonmember state banks, and to a lesser extent national banks, appear to generate larger output than state members do. Per capita income seems to lower output, perhaps reflecting regional traits.¹⁰ The TD capitalization ratio, finally, is negatively related to this measure, so that it alone may not indicate banking "competition."

Stock-Output Regression Analysis

Table 4, below, further explores nonbank influences on CB output, this time defined as the traditional loan/deposit ratio. Nonbank competition is the most significant influence on this stock-output proxy.

An increase of 25% in nonbank competition would raise the typical bank's loan/deposit figure by 4.23% relative to its mean (an 0.0245 absolute increase). Hence, MSB and SLA again stimulate bank output generally.

Briefly, thirteen other influences also explain CB stock-output. Both unit-type banks and 2-5 branch banks lend less of their resources than do extensively branching ones. The holding company laws' coefficients imply that limited holding company states have lower output than other ones do. Larger banks tend to lend more of their resources, partly supporting the

⁹Changing CB holding company regulation has made these variables' effects less important than they have been in the past.

¹⁰[1] gives theoretical reasons why per capita income may not be a true "demand" proxy.

Table 4. Stepwise Regression for Stock-Output

<u>Variable</u>	<u>Coefficient</u>	<u>Standard Error</u>	<u>F Statistic</u>
Nonbank Competition	236.56052	24.30205	94.75 ^a
0-1 Branch Bank	- 55.68581	6.30470	78.01 ^a
Multibank Holding Company State	54.21399	7.51935	51.98 ^a
Non-Multibank Holding Company State	55.80005	8.08032	47.69 ^a
Bank Asset Size	34.64708	5.83978	35.20 ^a
1971	- 19.33206	3.99363	23.43 ^a
Cash/Assets	-274.41821	57.04234	23.14 ^a
Labor Cost/Revenue	-274.81299	58.87668	21.79 ^a
Per Capita Income	177.50931	44.74142	15.74 ^a
Equity/Assets	- 57.85732	14.58771	15.73 ^a
2-5 Branch Bank	- 23.37730	6.50762	12.90 ^a
State Deposit Coefficient of Variation	50.28008	15.20710	10.93 ^b
Herfindahl Concentration Index	14.22313	4.58251	9.63 ^b
5-Banking Organization Concentration Ratio Change	9.55523	3.24929	8.65 ^b
Loan/Deposit Ratio (Mean)	580.98193		
Intercept	532.32544		
R ²	0.2557		
F(14,1629)	39.97 ^a		
Standard Error of Estimate	75.5979		
Standard Error of Estimate/Mean	0.1301		

See Table 3's Footnotes.

existence of "economies of scale." A time effect shows that 1971's loan/deposit ratio was lower than that of previous years. As would be expected, cash holdings depress output. Similarly, high labor cost has a strong negative effect on output. In this equation, per capita income behaves as a demand proxy. Low leverage (high equity capitalization) again depresses output. A large coefficient of variation in CB deposit sizes stimulates this ratio. Somewhat surprisingly, both Herfindahl concentration and a long-term increase in the 5-banking organization concentration ratio have positive, not negative, effects on output. This result is consistent with CB lending more of their assets when oligopolistic conditions allow higher gross loan yields. ([13] finds several such effects.)

Price, Profit, and "Monopoly" Regression Analyses

Other regressions (reported by [13]) similarly consider the effects of nonbank competition and eighteen banking and socioeconomic forces on CB profitability, adjusted loan interest, TD interest, and "monopoly power." Nonbank competition does not appear to significantly (0.05 level) influence these banking ratios, when other traits' effects are included in the regressions.¹¹ Rather, regulatory, managerial, etc., variations determine these price-related CB characteristics. Nonprice competition, rather than direct price competition, may thus characterize CB-MSB-SLA interaction, at this study's level of abstraction [11].

¹¹Its near-zero partial correlations with these measures, controlling for all significant variables, are:

Profitability	-0.023	11 variables significant
Adjusted Loan Interest	-0.028	13 variables significant
TD Interest	-0.033	13 variables significant
Monopoly Power	-0.029	11 variables significant

Conclusions

Efficient CB evidently need not fear SLA and MSB activity, for nonbank competition does not affect CB firm-level profitability, contrary to [4]. In a broad sense, MSB and SLA seem to actually stimulate CB output, measured both as a flow ratio and as a stock ratio. Moreover, nonbank competition seems to be associated with high financial activity on the state level. (Although the causal relation may flow from demand to nonbank activity rather than in reverse.) The separate existence of these thrift institutions thus seem to be desirable from a financial activity viewpoint. Hence, this study suggests that SLA and MSB be considered as relevant competitors when regulatory decisions involving mergers and CB holding company acquisitions are being made. Finally, these results suggest that allowing CB bank holding company acquisition of existing thrift institutions, in states where the holding company is already represented, may have anti-competitive effects.

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