ECONOMIES OF SCALE IN FINANCIAL INTERMEDIATION:
A STATISTICAL INVESTIGATION OF
CALIFORNIA SAVINGS AND LOAN ASSOCIATIONS

A DISSERTATION

SUBMITTED TO THE DEPARTMENT OF ECONOMICS

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FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

By

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April 1971

I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Edward S. Shaw

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PLEASE NOTE:

Some Pages have indistinct print. Filmed as received.

UNIVERSITY MICROFILMS

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ACKNOWLEDGEMENTS

A review of the ledgers in closing my first attempt at a major research project reveals an enormous number of intellectual and sundry other debts: I am way in the red. Listing the names of my benefactors, needless to say, in no way absolves me of responsibility for errors.

My advisor, Professor Edward S. Shaw, has always given freely of his scarce time. Over the years he continually marshalled the gentle encouragement and scholarly advice that enabled me to persevere in my original aims. In fact, this project began as a seminar paper several years ago in Dr. Shaw's Money and Income Workshop. The model benefitted from his critical study, as well as that of John Wise and G. S. Madalla.

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The State Commissioner's office was very helpful in answering questions and providing me with data on state-licensed savings and loan associations. Unfortunately, I spent over a year in an abortive attempt to dislodge the comparable data on federal mutual associations from the San Francisco District Bank of the Home Loan Bank System. Because of a rather strict confidentiality rule, the Bank here requested a formal

FHLBB ruling before they would release any dissaggregated data to me. The Board in Washington, D. C. denied my access to the individual associations' balance sheet data.

The bottleneck was broken by Dr. Bruce Ricks, Director of Research of the Federal Home Loan Bank Board. I was hired as a staff consultant to the research department, and in the Summer of 1970 was given a virtual carte blanche for the use of the Washington, D. C. facilities of the FHLBB. This is testimony to the sincere interest the present Board and staff has in promoting research material (as long as they can insure via employment oath the confidentiality of the data). I was able to acquire balance sheet, cost, and specific data on all insured California associations, both federally- and state-chartered, in a comparable reporting format. I would like to acknowledge the invaluable assistance provided by the Data Processing Division of the Washington office. With their technical assistance, particularly Mr. Nathanson's, I was able to build a data tape with complete internal operating information for all California associations for 1965 - 1969. The Board also contributed substantial computational expenses, for which I am grateful.

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CHAPTER I

INTRODUCTION

The objective of this study is to investigate those factors which determine the cost behavior of California savings and loan associations. There are two questions of prime consideration. First, what are the important variables that influence cost behavior? Since savings and loans are considered a highly differentiated financial intermediary, do the same types of variables that play a role in the cost function of the larger and more diversified financial institutions, commercial banks, play a similar role for the savings and loan? Second, positing various measures of S&L output, what is the cost-output relationship? Is it possible to resolve the conflicting evidence on whether financial firms in this industry experience significant economies or diseconomies of scale? Over what asset size range are economies most significant? Do the long-run cost curves of mutual associations differ from those of stock associations? I explore the properties of the long-run cost function in the California S&L industry for reasons other than mere curiosity about the size of statistically estimated scale parameters. Like those who have delved into this problem before me, I shall attempt to clarify several important issues of public policy.

The empirical section of this paper is inspired by recent techniques developed in studies of the commercial banking industy. Cost functions developed are implicit in the specification of an appropriate Cobb-Douglas-style production function for financial firms. All estimates will be based on least-squares, multiple-regression techniques using complete cross-section data.

The choice of California for analysis

It is reasonable to single out California as an appropriate market area for a statistical cost analysis of the S&L industry. There are enough uniformities present--namely, factor prices, regulatory constraints, pressures from competing financial intermediaries, per capita income, and so on--to make a state study less suspect than a study using cross-state data. Also, a larger cross-section of firms such as a nation-wide study would encompass over 6,000 associations, most of which are very small. Nationally 56% of associations have assets less than $10 million. In attempting to determine the presence or absence of economies over a large range, statistical biases can be avoided by concentrating the empirical examination on a state in which all size ranges are present, from smallest to the largest groups in existence, over a more normally distributed function. Rightly or wrongly, the relevant unit for regulatory purposes is, in large measure, the state. The California S&L industry may be a pace-setter or a laboratory for its counterparts in the rest of the country. California associations certainly account for a large portion of the business done by the industry nation-wide. $30.8 billion, or about 20 percent of all association assets in the country are held by California S&Ls. In several respects, the California industry is unique, although its uniqueness--especially its dynamic capacity to grow, absorb shocks, and innovate--may portend future evolution for associations elsewhere. The diversity of the industry here provides all the ingredients for a laboratory experiment. Both stock and mutual forms of association exist on a significant scale; branching is permitted. It was in California that the holding company movement began. There are possible conflicts between the two regulatory

agencies, state and federal. The vicissitudes of the building cycle or tight money are particularly felt in this state. With these points in mind, we turn now to a discussion of what this study attempts to do.

Importance of the industry cost function

It is well known that the shape of the industry's long-run cost curve is a crucial element in determining the dynamics of change in the industry's market structure and competitive posture. If there are increasing returns to scale until a very large output relative to total demand is reached, then an efficient industry structure implies oligopoly. Left to their own devices, firms gravitate toward larger and larger size to capture both economies and a greater market share. Alternatively, constant returns implies that smaller firms may survive and prosper in the long run.

The shape of the long-run cost curve is especially important in regulated financial industries. The presence of absence of significant economies of scale, and the range over which they persist, must be ascertained before state or federal regulatory agencies can make decisions that will affect industry structure. Students of industrial organization have stressed that if scale economies exist, a conflict between operating and allocative efficiencies arises. Regulatory authrities are charged with the responsibility for serving the public interest, which implies, in the case of the savings and loan industry, providing home ownership at the lowest price consistent with a fair rate of return to lenders. In a case of significant economies, a regulatory regime that encourages a proliferation of small unit S&L associations will be fostering inefficiency and high operating costs. In the case

where there is no limiting point of diminishing returns--where the cost curve continues to decline even for the giants--then the criterion of least operating cost is not the only proper criterion for the appropriate size of the financial intermediary. Now regulators must balance the social gains of operating economies against the danger that a large firm will abuse its market power and engage in predatory policies. Thus market behavior becomes the prime consideration. Shoud scale economies be mythical, then the same set of policies will not sacrifice operating efficiency to any degree; and a fortiori will enhance allocative efficiency by stimulating industry competition.

Of course there are other reasons, which do not fall neatly into the allocational versus operating efficiency dichotomy, compelling regulating agencies to encourage entry and persistence of small S&L firms. These arguments involve justifying small business per se, as the "American way." This is outside the scope of the present work. Infant-industry arguments may also be applicable in the case of small, black-capitalism enterprise. (There are about 45 black-managed firms in the S&L industry nationally, many of which have assets around $1 million.)

The above discussion should give some clues about the regulatory problems based on knowledge of the cost structure of the industry. Industry spokesmen, it should be emphasized, do not exactly see the problem in the same perspective. Managers of large California S&L view the relevant market as extremely competitive for the saver's dollar. The competitors they face are commercial banks, credit unions, mutual funds, insurance companies, etc. Moreover, their asset portfolio is limited in its diversity by law. The industry is agitating for broader lending and deposit transfer services to achieve competitive par with commercial banks.

Tuus, from an individual S&L's perspective, there is no important allocation problem inherent in attaining large scale. Bankers, among others, counter that large savings and loans engage in promotional gimmicks and differentiation of their product. Also, S&L associations are specialists in real estate loans and time deposits; therefore, they can operate on higher loan-to-value ratios. This specialization gives them certain competitive advantages. Substantial governmental subsidies also accrue to the industry.

Regulatory agencies aim to foster cost efficiency in two ways: first, by pressuring management of firms of given size to reduce costs, and second, by encouraging an industry structure made up of firms of optimal size relative to the market and compatible with competitive pricing. Both objectives are interrelated. If economies of scale are siginificant, it is undesirable to grant new charters, but desirable for existing firms (if they are presently efficient for their size) to grow larger, for instance, by merging or branching. An appropriate policy guideline would then be: if the requests for mergers and branching (in a given market area) are numerous, only those existing firms in a given size class with lower than average costs, ceteris paribus, for that class may merge or branch. This was the recommendation of the Shaw Report; and it was put into practice by the Commissioner's office. Fostering cost economy in this way is worthwhile from a regulatory standpoint:

> It strengthens capital adequacy. At any given spread between the mortgage rate of interest and share rate, it increases the volume of intermediation that the industry would find appropriate for any given rate of return on assets and net worth. It reduces the industry's demand for FHLB credit at each level of intermediation and lowers the inter-market barriers that regulatory authority might consider important for the industry's stability. It has come as a

surprise that the regulatory authority concerns itself relatively little with operating efficiency among savings and loan associations.[1]

In recent years, the California Savings and Loan Commissioner's office has been more sensitive in applying operating cost criteria and scale economy evidence in its considerations of merger and branching petitions.[2]

Previous Studies of California savings and loans and unresolved questions

In studing the properties of the savings and loan industry's long-run cost function, the present paper retreads some of the literature's familiar territory. I believe this to be justified; and indeed, my ambition is to fill the notable remaining gaps in our evidence on performance in this industry. At least eight years have elapsed since publication of three major California savings and loan industry studies. These early studies were remarkable in their dissimilarities. Using 1959 data, the SRI Report[3] examined various components of expense as a percent of assets by asset size and found evidence of opportunities for economies of scale for state-chartered stock associations, but a lack of economies for federal mutual associations. The Grebler-Brigham study found "an apparent absence of major scale economies" for a large sample

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[1]Edward S. Shaw, Savings and Loan Market Structure and Market Performance: A Study of California State-licensed Savings and Loan Associations, A Research Study prepared for the California Savings and Loan Commissioner, 1962, p. 105.

[2]Savings and Loan Commissioner, Seventieth Annual Report, 1963, p. 8.

[3]Stanford Research Institute, California Savings and Loan Associations, Pasadena, Calif.: Stanford Research Institute, 1959.

of state and federal associations. The estimated cost curve was horizontal.[4] But Shaw found, for state-licensed associations, significant empirical evidence for economies of scale with "no evidence to indicate that economy of scale disappears within the size ceiling of $1 billion."[5] The controversy concerning this evidence and the explicit policy prescriptions raged on and apparently was never adequately resolved. There were two problems: i) the models they tested were not comparable, and ii) neither model was properly specified.

Two recent additional studies focus on nation-wide data in an analysis of the S&L industry; they contain sections that report results for California associations.[6] Using a sample (1962 - 1966) of Los Angeles associations, Brigham and Pettit find evidence of economies of scale. Benston relies on a sample of all California associations and reports economies for 1963 and 1964. He does not devote particular attention to these results, except to note that California associations have greater apparent economies than elsewhere in the United States. Both studies will be discussed and contrasted with the present study in a section below. It suffices now to point out that I utilize more recent,

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[4]Leo Grebler and Eugene F. Brigham, Savings and Mortgage Markets in California, Pasadena, Calif.: California Savings and Loan League, 1963. In addition, Brigham published the results from the joint study in the Western Economic Journal, Vol. 3, 1965, pp. 7-20, without modification of the major conclusions.

[5]Shaw, op. cit., p. 106.

[6]Eugene F. Brigham and R. Richardson Pettit, "Effects of Structure on Performance in the Savings and Loan Industry," Irwin Friend (ed.) Study of the Savings and Loan Industry, Vol. III, prepared for the Federal Home Loan Bank Board, Washington, D.C., 1969.; George F. Benston, "Cost of Operations and Economies of Scale in Savings and Loan Associations," Irwin Friend (ed.), Ibid. Vol. II, pp. 677-761.

complete data on all federally- and state-chartered California associations for 1969. Some use is also made of analogous data for 1965, 1966, 1967, 1968. With the aid of this data, I attempt to clear up the remaining clouds of confusion surrounding the existence and size of scale economies for California S&Ls. Among other factors, the need for the present study is substantiated on the basis of some statistical refinements of former models, and the allowance for institutional elements not included in the previous investigations. With the addition of this recent data and analysis, we can begin to get a completed picture of the permanent, underlying characteristics of the industry.

Many previous studies acknowledge that the presence of holding-company combinations[7] may have an impact on operating performance, but the direction of the impact remains controversial. With the exception of one study, no effort has been made to quantify statistically this holding-company cost effect. Yet 77 percent of S&L assets in California are controlled by holding companies. The Grebler-Brigham study[8] combined holding-company affiliates to test for their cost influence, but found no benefits accruing to holding company combinations. Brigham-Pettit tentatively claim that, nationally, holding companies produce economies of scale; they emphasize that their statistical results (not presented) were too weak for conclusive judgment.[9]

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[7]Corporate holding companies are those that hold more than 50% of the guarantee stock of an association. They may be public or private, and are regulated by various state and federal laws.

[8]Grebler and Brigham, op. cit., pp. 153-155.

[9]Brigham and Pettit, op. cit., p. 1107.

Shaw examined operating ratios and concluded that "economy in the industry has not gained from holding company domination."[10] Since these studies, new holding-company regulatory legislation has passed the California Legislature and been enacted into law. There is ample room for further analysis of holding companies and cost efficiency in order to resolve this controversy. I single out affiliates for separate study and test the hypothesis that holding company affiliation or acquisition garners special scale economies.

The existing empirical studies of California S&Ls have fallen prey to the standard criticism leveled at studies for a single year. Results from single-year data are suspect as non-representative or atypical. An important bias is introduced when cost data is taken from periods of exceptionally high annual growth rates. The total increase in assets held by California associations from 1959 to 1963 was 231 percent. Rapid growth increases costs disproportionately at first, but may pay off later. During the individual years examined by SRI, Shaw, and Grebler-Brigham, the managements of S&Ls were heavily oriented to growth. Many associations had become infatuated with growth per se as their primary goal. Much of the activity was a frantic attempt to gain or maintain a given market share and capture the fruits of a booming real estate market, combined with an over-optimistic appraisal of its sustainable quality. This led to many imprudent, risky loans and unsound expansion decisions by management. Moreover, a long period of large profits on the growing portfolios permitted sloppiness in operating-cost control. Observers of the period noted enormous ranges of operating

[10] Shaw, op. cit., p. 109.

costs among associations in the same asset size range. Mainfestly, scale economies may have been largely obscured by managerial inefficiencies.[11] If this analysis is accurate, a study conducted after an interlude of more stable, peaceful growth is certainly in order. Since 1961 associations have become efficiency-minded. The 1960s were unique in other ways. For one thing, there was a rapid and widespread adoption of innovations in control devices and managerial techniques--particularly in medium and large institutions. These new techniques include the adoption of a proliferation of specially-designed electronic computers which perform all routine accounting functions, store data, and print out relevant calculations. Information storage improved and there was application of operations research. Over this period it is expected that direct production costs, such as processing and servicing loans and accounts have declined as management has improved its ability to control large orgainzations more efficiently. Against these developments is the background of "operation twist" in 1963 and the severe credit "crunch" of 1966, and a subsequent period of tight money.

I settled on the most recent year for which data is available, 1969, in the hope of hitting upon a more typical year as far as permanent conditions are concerned. S&L managers have acquired new knowledge--perhaps the hard way--about plant and firm efficiency in the past eight years, and the presumption is that this knowledge will continue to be put to use in S&L management.

This study also employs the same analytical framework to examine returns to promotional (or advertising) expenses. There has been

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[11] Shaw, op. cit., pp. 103 ff.

considerable controversy surrounding this topic, particularly in the studies of California associations, whose promotional outlays loom large in their total expenses. Economy of scale affects advertising as well as technical operating costs. Small firms complain continually about the advertising advantages possessed by their larger rivals, be they banks or other S&Ls. The two contrasting views of promotion differ on whether, via advertising, it is possible to increase (or prevent the loss of) financial inputs into the production functions of i) individual S&Ls, ii) S&Ls taken as a whole, iii) the aggregate of all financial intermediaries. One argument[12] states that promotion degenerates into advertising wars; these expenses neutralize one another in the aggregate, and ultimately total costs are raised and a smaller volume of savings is consequently applied to housing markets. And manifestly, promotion is evidence of imperfect competition. The other argument[13] is that promotion is rational, it increases share demand in a less costly way than raising the deposit rate (marginal cost of funds rising, and above the average rate), and it disseminates crucial information to the public. I will analyze this debate and measure promotional economies.

Other questions which the present study reports on are, for example, the relative efficiency of unit or branch operations. Is it less costly to produce and service 20,000 mortgage loans out of a single office, or out of a head office and three branches, each with 5,000 loans being serviced? I also examine the issue of whether the FHLB Board moratorium on conversion from federal to a state-stock charter should be

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[12] Shaw, op. cit., pp. 26 ff.

[13] Grebler and Brigham, op. cit., pp. 109 ff.

lifted to permit capturing of extra operating efficiencies of non-mutual organizational form.

Summary statement

This study on returns to scale in the California savings and loan industry seeks to extend and enhance existing research by providing:

1. A theoretical specification of the underlying production and cost functions of the S&L based on the pioneering research on commercial banks by Bell and Murphy.[14]

2. Alternative specifications of cost and output. Lacking functional cost data, certain modifications of the bank model are in order to reflect this deficiency. The result is less satisfactory than better data would have allowed, but superior to the S&L studies of the early 1960's.

3. The use of more recent (1969) data, allowing for the possibility that abnormal industry growth rates, market conditions, technological change, or periods of consolidation of weak firms tended to bias former cross-section studies.

4. A sounder basis for statistical inference. The study does not rely on a sample of associations. Statistical reports are made on the same firms with the same instructions for all associations, and a larger degree of comparability results.

5. A new approach in partioning S&L data by asset size class and re-estimating each cross-section model to obtain scale parameters for the small, medium, and large size ranges. A comparison of the resulting

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[14] Frederick W. Bell and Neil B. Murphy, Costs in Commercial Banking: A Quantitative Analysis of Bank Behavior and its Relation to Bank Regulation, Research Report No. 41 to the Federal Reserve Bank of Boston, April, 1968.

scale parameters is vital for certain policy questions. Statistical biases inherent in aggregation are at the same time avoided.

6. Separate tests of the observation that mutual S&Ls have a cost function that always lies above that of stock firms. Reliance is not placed solely on the use of dummy variables.

7. Statistical tests of holding company influence. This is a major flaw in earlier works.

8. Separate tests of promotion economies.

9. An evaluation of recent public policy controversies, decisions, new industry regulations, both state federal, in light of evidence on scale economies.

Chapter II defines certain industry characteristics pertinent to model formulation and then develops the cost model to be estimated. Properties of the model are elaborated. Chapter III presents the data, the data sources and discusses the criteria for introducing homogeneity variables to normalize the various output variables singled-out for inclusion. Necessary adjustments in the data are clarified and notation defined. Finally, the estimation technique is given. Chapter IV gives the results of overall estimation and interprets the evidence for scale economies by institutional group and asset size class. Example calculations of average and marginal cost are included. Chapter V elaborates evidence on branching and holding company effects. Chapter VI reviews some recent policy recommendations on questions of merger, branching, and conversion. Directions for further research and an overall summary of the findings conclude the study.

CHAPTER II

FEATURES OF THE INDUSTRY AND DEVELOPMENT OF THE MODEL

This section will provide a description of the model to be estimated. First, it is necessary to outline those technological and institutional aspects of the S&L industry that are relevant to the development of the model.

The production process

The production process of the savings and loan firm is less complex than that of its cousin, the commercial bank. The S&L intermediaries acquire funds from budget surplus units and purchase earning assets from deficit units. In the process, they create their own debt instruments, investment certificates or shares.[1] Both the commercial bank and the S&L are multi-product firms engaged in administering various loan accounts and serving deposit accounts. These operations can be catalogued by functions, with each function being defined as an output, the total output being a vector of services. The main difference is, banks are the supermarkets of intermediation, providing many ancillary services to the account servicing function. S&Ls are more specialized, dealing almost solely in real estate paper. The phenomenal degree of specialization encountered in the S&L industry is obvious in the combined balance sheet below (Table II - 1).

At the end of 1969, almost 87 percent of total assets were held in mortgage loans, and nearly 77 percent of liabilities and net worth

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[1] In 1969, for the first time, associations received statutory permission to refer to their investment certificates as "deposits."

TABLE II - 1[a/]

ASSETS, LIABILITIES AND RESERVES OF
ALL CALIFORNIA SAVINGS AND LOAN
ASSOCIATIONS, YEAR-END, 1969

(Percent of Total Assets or Resources)

Assets	Percent of total
Cash on hand	.53
U.S. Government and other Securities	6.60
Mortgage Loans	86.96
FHLB Stock	1.16
Real Estate Owned	1.94
Other	2.84
	100.00
Liabilities and Reserves	
Savings balances	76.19
FHLB advances and other borrowing	13.45
Loans in process	1.37
Other Liabilities	1.43
Reserves	7.58
	100.00

[a/] Sources: Combined Financial Statements, Member Savings and Loan Associations of the Federal Home Loan Bank System, FHLBB, Washington, D.C., 1969; California Savings and Loan Commissioner, 1970 Report.

were represented by savings balances. The liability structure has become slightly more differentiated since 1965, when the FHLBB granted insured institutions the power to issue a variety of savings certificates and offer other special accounts at rates higher than on regular passbook accounts. On the asset side, until 1968 the only non-mortgage credit that generally was allowed by regulatory agencies was loans secured by the borrower's savings account (passbook loans), property improvement loans, and college education loans. For most associations, this "other loans" category rarely exceeds 1 percent of total assets. Recent legislation has permitted some portfolio broadening in the form of loans on mobile homes.

Associations have traditionally been limited in their diversification due to regulatory emphasis on home financing and local mortgage lending. S&Ls have always been limited in mortgage investment on property other than one- to four-family homes. Savings and loan associations insured by the Federal Savings and Loan Corporation are required by present regulations to make the bulk of their real estate loans on the security of property located within their normal lending territories--generally within one hundred miles of their principal office (formerly 50 miles). Recently, Chairman Martin of the FHLBB announced proposed regulatory changes that liberalize several lending regulations.[2] If adopted, associations could invest up to 10 percent of their assets in certain loans secured by real estate located in any Standard Metropolitan Statistical Area in the United States. Furthermore, associations would be permitted to lend within 50 miles of their branch offices.

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[2]FHLBB, Press Release, Wednesday, November 11, 1970.

This would permit a desirable geographic diversification of funds. A degree of geographic diversification is already possible, mainly through the loan participation program initiated for insured S&Ls to sell and acquire participating interests in mortgage loans. California has been primarily a seller of participations.

Savings and loans also employ out-of-state savings brokers and "foreign" advertising to import savings balances from capital surplus areas of the country. This increases the mobility of investment funds and improves market efficiency, although this source of funds is volatile and costly. Regional differences in deposit rates and interest differentials generally have narrowed in recent years; hence, this source has diminished in importance as Table II - 2 reveals.

Many of the S&L's cyclical problems are attributed to the regulatory constraints placed on their portfolios; they must deal in long-maturity assets, but their liabilities are responsive to short-run interest changes. Typically, S&Ls suffer in periods of rapidly rising interest rates: they experience a deposit outflow unless rates are raised on all share accounts, while they are able to adjust rates upward on only approximately 1 percent of their earning assets per annum. But for our purposes, this specialized nature of the savings and loan firm makes a cost function analysis easier.

Miscellaneous aspects of the industry

The number of firms in the California S&L industry is constrained by regulatory agencies in branching, merging, or chartering policy. As mentioned above, their lending area is delimited. This tends to create localized oligopolies and limits market size. There is, to varying

TABLE II - 2

IN-STATE AND OUT-OF-STATE SAVINGS ACCOUNTS

CALIFORNIA

1967 - 1970

Quarter Ending December	Percent Savings in Out-of-State Accounts
1967	22.49
1968	20.51
1969	15.14
1970*	13.52

December to December	Percent Change in Out-of-State Accounts***
1967-68	-6.4
1968-69	-22.9
1969-70*	-10.2
1967-70**	-36.3

*For 1970, March 31 is the end of the relevant period.

**(June 31, 1967, to March 31, 1970)

***Includes dividends credited to accounts.

Source: Compiled from data supplied by the Commissioner's office and the FHLBB.

degrees, competition from other thrift institutions, namely banks. Banks deal in mortgages, provide advantages of one-stop service, and offer checking accounts. Needless to say, S&L industry spokesmen emphasize this in developing a definition of product" and "market" that is sufficiently broad to be reminiscent of the ancient "infant industry" argument for protection or other favorable treatment. Academicians are less sanguine about the degree of competition in S&L markets. Promotion expenses loom large in the typical S&L's budget, and this is taken to be indicative of monopolistic competition.

Factor inputs

The technical processes of the S&L industry are remarkably simple. The industry is labor-intensive. The major component of saving and loan associations' cost is labor expense--varying between one-fourth and one-half of total operating costs. This includes loan officers, appraisers, tellers, and lavish home offices. Often they own more space than required for operations, the excess being rented to other parties. Until recently not much mechanical processing of deposit and loan transactions was utilized, with the exception of mechanical bookkeeping machines. The present use of computers and mini-computers on a wider scale has led some observers to conclude that a major shift in the cost function (due to embodied technological change) has occurred of late. Lastly, materials used consist primarily of paper, postage, and miscellaneous office supplies.

Factor costs

Since this study is confined to California, the labor market is taken to be fairly homogeneous, competitive, and employees reasonably

mobile. This is not to deny that there are localized labor markets. Large S&Ls tend to be located in large cities where wage rates and rentals of office space are higher. Banking studies[3] bear out the hypothesis that average salaries and wages paid to employees are higher at large banks than at small ones; the same would seem to be so for S&Ls. In the wages-per-loan identity, $W/L \equiv (w \times N)/L$; if the wage rate, w, is increasing for large firms, but the ratio (N, the number of employees required per loan) is still falling in the cross section, labor economies represent a real rather than a pecuniary economy. This argument assumes, however, that all labor involved is of the same skill--i.e., large associations might require a greater proportion of skilled clerks. Also, a manager in a large S&L goes a long way. There is a much higher proportion of officers to total employees at small associations than at large ones. This makes the average of wages plus salaries (W + S) larger, but indicates the possibility of economies of scale: as the firm grows, S need not grow at the same rate. In California S&Ls the ratio (W + S)/L varies erratically from .44 percent for $0 - 50 million size firms to .30 percent for $1 billion plus size firms. See Table II - 3.

It would be difficult to isolate whether wage rates paid by S&Ls in large, urban areas are due mainly to exogenous factors embodied in labor market conditions, or if they represent higher average skills required for given job categories in (larger) S&Ls so located. Even allowance for wage indices between standard metropolitan areas may not solve the problem to the extent that factor prices are as likely

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[3]Gramley, op. cit., and Horwitz, op. cit.

to differ within an area as large as Los Angeles, as between L. A. and, say, San Francisco.

TABLE II - 3

Asset Size ($ millions)	(W + S)/L ($)
0 - 50	.437
50 - 100	.570
100 - 150	.555
150 - 200	.434
200 - 250	.486
250 - 300	.509
300 - 350	.397
450 - 550	.463
550 - 1000	.496
over 1000	.301

Source: Calculated from records on file in Commisioner's office (1968 data)

Capital costs, computer costs, etc., are presumed to be uniform over region or locality, since suppliers are few and quote nation-wide prices.

The quantatative measure of firm and industry output

An intermediary interposes itself between ultimate debtors and ultimate creditors by offering its own homogeneous debt instr ments to ultimate lenders (depositors). It then acquires the debt instr ment of ultimate debtors. The payment for the service performed (e.g. pooling risks, loan-evaluation specialization) is measured by the difference between the deposit and loan rates times the volume of intermediation. For a given volume of socially optimal savings and investment, efficient intermediation by the industry requires that the spread between the deposit and loan rates be minimized. A competitive industry would insure this. Viewed thusly, it follows that a S&L is producing units of "intermediation", so that the output measure chosen should be an index of the

joint product, deposits (plus other borrowing) and loans. The trouble with this approach is that the "products" can be produced in varying proportions, depending on the managerial objective function (which includes building up capital adequacy, dividend policy, etc.) and local demand conditions.

If we treat the S&L as a multi-product firm, what is the specific output vector of services--the measure of output functions? Ideally, a proxy for the precise level of services being performed by the i^{th} S&L could be devised. This would break down the activity into set-up services and maintenance services. Process one would include the number of times per annum that loans were set up (investigated and written). Process two would record the total times per annum that debits or credits were made to the loan account. The same procedure would be repeated for savings accounts, and the overall number of physical transaction units would be an adequate proxy for the output of the intermediary. Unfortunately, such information is nonexistent. It is not even possible to measure directly the "turnover" of accounts.

The approach here adopted is one recently developed in the standard literature on the bank industry.[4] My output measure in this study is patterned after that suggested by the Bell-Murphy bank study:

> ...in many respects banking is quite similar to a manufacturing industry. For example, the servicing of demand deposit accounts is a distinct "production line operation." Associated with this function is the receiving and processing of checks, involving sorting, tabulating, and other detailed operations. Tellers, bookkeeping machine operators, and many kinds of equipment are employed to process or produce a demand deposit account. Therefore, the basic unit

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[4] Recently, the problem of defining bank output has been approached by treating bank operations as a series of physical production processes. For each process, a measure of output is related to cost data. See Benston, op. cit., Bell and Murphy, op. cit., and Murphy, op. cit.

> of physical output is the account. This, of course, is largely a physical view of the production process, but is the only germane one when considering a production function. All resources are tied to the number of accounts handled or processed. It is especially difficult to understand why previous approaches to the problem of defining bank output did not consider the account. Perhaps the lack of data deterred researchers from considering this measure.[5]

The basic output variable I employ in the production function will be the physical number of mortgage loans serviced. For the deposit function, the corresponding measure will be the physical number of accounts handled.

Some students of financial firms object to the measure on theoretical grounds.[6] They prefer the dollar volume of loans (weighted approximately) or total assets as the output surrogate. Thus Brigham and Pettit argue:

> ...the level of assets appears to be the definition of output that most closely measure the relevant social product... a larger mortgage is more valuable to society than a smaller mortgage, and making $100,000 of savings available to borrowers would seem to be approximately 10 times as valuable to society as transmitting $10,000 of savings to the mortgage market. The $100,000 mortgage finances a larger, more costly structure--perhaps a 10-unit apartment building-- and surely in an enterprise economy a more costly item must be judged to be more valuable than a less costly item. It is the volume of intermediation, therefore, and not the number of transactions, that measures the social product produced by savings and loans.[7]

There is, of course, (at least) one glaring fallacy in this reasoning. Briefly, and avoiding the measurable-utility controversy, (Is "value to society" meaningless in the above context?) the difficulty in the argument is demonstrated in the counter-question: Are ten $10,000

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[5] Bell and Murphy, op. cit., pp. 12 - 13.

[6] For instance, Greenbaum, op. cit. and Brigham-Pettit, op. cit.

[7] Brigham and Pettit, op. cit.

loan more socially valuable than one $100,000 loan? Based on the above passage, the force of logic would impel Brigham and Pettit to say no. But this does not necessarily follow a priori, as they themselves confess in an earlier paragraph. I conclude that Brigham and Pettit avoid the problem by pretending to solve it.

Greenbaum attempts to account for the multiproduct nature of a bank by defining output as the operating earnings of a bank had it earned at a standard (regression-estimated) rate on each earning asset class in the portfolio. The major criticism leveled at this work is that it might well be measuring different degrees of monopoly power.

I can sympathize with the observation that failure to define output correctly can only mean that one is deriving something other than cost functions. On the other hand, much of the discussion of this problem, and the ultimate choice of the measure, seems to be dictated by data accesibility. There is also the question of the theoretical validity of using a stock variable, e.g. assets, to measure output and relate to costs, both flow variables. There will always be conceptual or operational problems in defining a single-valued output measure for a multiproduct firm--especially banks or S&Ls, which produce "intermediation". The problem is analogous to that faced by those hearty souls charged with constructing an index of national product. Fortunately, in a more homogeneous industry like the S&L, empirical estimates of cost parameters are less apt to be as seriously sensitive to output definition as apparently is the case in banking studies. To be safe, I have reported the results of experiments with the dollar volume of loans and accounts. It appears that my results are not contingent on the flow-stock dilemma: physical units versus dollar volume as the measure of output. Happily,

there is a high correlation between the number of transactions and dollar volume of those transactions. Concerning the output mix, I consider it widely established that multiple regression techniques, combined with proper choice of variables and data, make it possible to hold constant the differences among firms. This final point is discussed more fully in a section to follow.

Ownership form and managerial objective functions

The California industry is composed of both stock and mutual firms. All federally-chartered associations are mutual; that is, legally they are owned by their "depositors." A stock type charter means that the S&L is owned and controlled by a group of stockholding investors, who may or may not also be depositors. The question is, do stock and mutual S&Ls have similar goals and motives? Stock associations' managers have been treated as profit motivated. But Hester claims that the principal weakness of studies of mutual behavior is that "investigators do not know what mutuals attempt to maximize."[8] Nichols states that, whatever else, mutual managers are not wealth or profit maximizers.[9] I will discuss this issue more completely below. Meanwhile, I assume that, as a first approximation, mutual and stock S&L managers do have similar objective functions; they are motivated by a direct concern for making entrepreneurial "gains," be they defined as wealth, rate of return, growth, additions to reserves, etc. A mutual of today bears only

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[8] Donald Hester, Stock and Mutual Associations in the Savings and Loan Industry: A Study of the Economic Implications of Conversions, prepared for the Federal Home Loan Bank Board, Washington, D. C., 1968, p. 10.

[9] Alfred Nichols, "Stock Versus Mutual Savings and Loan Associations: Some Evidence of Differences in Behavior," American Economic Review, May, 1967, pp. 337 - 346.

remote similarities to the old benevolent societies described in some literature. There are certainly differences in compensation form, notably the absence of capital gains in mutuals, but the management group shares directly in the profits of the association in the form of salary increases. Stock associations may be more aggresive, though, and mutuals more risk aversive, without contradicting the maximizing assumption.

For both stocks and mutuals, the gross operating income is determined by yields and the availability of mortgages in the market areas in which they operate--variables which are outside management control. The concern for association "gains" is reflected to a large degree in the attempt to operate efficiently--i.e., minimize costs. Different managements may vary in their expertise and abilities, but this does not vitiate the hypothesis of similar objective functions. Thus, I conclude that, if the neoclassical cost-minimization (wealth-maximization) assumptions apply to banking or other intermediaries, they may be applied to mutual and stock firms alike in the savings and loan industry.

Given the assumptions necessary to investigate the cost-output relationship with the use of cross-section data, it is possible to relate the cost function to an implied production function. If savings and loans are wealth maximizing institutions that are risk constrained, the standard cost-minimizing combination of factor inputs is implied, and the theoretical model chosen is appropriate.

I proceed from this background of institutional material and the output question to the development of the model.

The theoretical model

It is a well-known result that a cost function can be derived from a Cobb-Douglas production function, assuming that output is determined exogenously so that the supply function is identified. The parameters of the cost function indicate the presence of increasing, constant, or decreasing economies. In the following derivation,[10] let:

N = number of (alternatively) loans serviced, loans made, accounts serviced per annum.

K = capital used in servicing loans.

L = labor services used in servicing loans.

M = materials, supplies used in servicing loans.

w = wage rate.

r = rental rate on capital.

m = price of materials used.

C = operating costs.

Alternative output variables:

TNA/C = total number of accounts serviced.

TNLM = total number of loans made.

First, we specify the production function:

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[10]This derivation is based on Bell and Murphy, op. cit., pp. 15 - 20. For the classic treatment of this symmetry between cost and production function, cf. A. A. Walters, "Production and Cost Functions: An Econometric Survey," Econometrica, January - April, 1963, 31:1 - 66. Also, see Marc Nerlove, "Returns to Scale in Electricity Supply," in Measurement in Economics: Studies in Mathematical Economics and Econometrics in Memory of Yehuda Grunfeld, Carl F. Crist, et. al., eds., Stanford University Press, Stanford, 1963.

[1] $N = A K^{\alpha} L^{\beta} M^{\gamma}$

Next, the cost identity:

[2] $C = (wL + rK + mM)$

And costs are assumed minimized subject to the production function:

[3] $F = (wL + rK + mM) + \theta(N - A K^{\alpha} L^{\beta} M^{\gamma})$

where the term θ is a non-zero Lagrange multiplier. We set the partial derivatives of F with respect to K, L, M, and θ equal to zero:

[4] $\partial F/\partial K = r - \theta\alpha A K^{\alpha-1} L^{\beta} M^{\gamma} = 0$

[5] $\partial F/\partial L = w - \theta\beta A K^{\alpha} L^{\beta-1} M^{\gamma} = 0$

[6] $\partial F/\partial M = m - \theta\gamma A K^{\alpha} L^{\beta} M^{\gamma-1} = 0$

[7] $\partial F/\partial \theta = N - A K^{\alpha} L^{\beta} M^{\gamma} = 0$

Next, move factor prices to the right and divide [4] by [5], [5] by [6], and [4] by [6]:

[8] $r/w = \alpha L/\beta K$

[9] $w/m = \beta M/\gamma L$

[10] $r/m = \alpha M/\gamma K$

When combined, the above three equations yield the traditional marginal productivity conditions:

[11] $rK/\alpha = wL/\beta = mM/\gamma$

Now we insert [8], [9], and [10] into the cost equation [2] and solve for the factor inputs in terms of cost:

$$[12] \qquad K = \frac{\alpha C}{r(\alpha + \beta + \gamma)}$$

$$[13] \qquad L = \frac{\beta C}{w(\alpha + \beta + \gamma)}$$

$$[14] \qquad M = \frac{\gamma C}{n(\alpha + \beta + \gamma)}$$

There values for K, L, and M, are put into the production function to derive the reduced-form Cobb-Douglas cost function:

$$[15] \qquad C = \frac{\nu}{A^{1/\nu}\ \alpha^{\alpha/\nu}\ \beta^{\beta/\nu}\ \gamma^{\gamma/\nu}}\ N^{1/\nu}\ r^{\alpha/\nu}\ w^{\beta/\nu}\ m^{\gamma/\nu}$$

where

$$[16] \qquad \nu = \alpha + \beta + \gamma$$

Estimates of the parameter ν will give a measure of returns to scale. If:

$\alpha + \beta + \gamma < 1$, decreasing returns

$\alpha + \beta + \gamma = 1$, constant returns

$\alpha + \beta + \gamma > 1$, increasing returns

I will write equation [15] in the following way:

$$[17] \qquad C = aN^{1/\nu}\ w^{\beta/\nu}\ r^{\alpha/\nu}\ m^{\gamma/\nu}$$

where

$$[18] \qquad a = \frac{\nu}{A^{1/\nu}\ \alpha^{\alpha/\nu}\ \beta^{\beta/\nu}\ \gamma^{\gamma/\nu}}$$

Expression [17] is simplified via the following assumptions regarding factor prices. The assumptions are generally acknowledged to be valid in a cross-section study. Materials and supplies used are more or less the residual cost item in S&L total expenses, and the effect of price variations on the amount spent for postage, paper, typewriter ribbons, etc., is assumed insignificant. If the prices of capital equipment are quoted nationally by a few major firms, then this factor cost will be constant across all firms in the state. And if the prices of labor services purchased at each skill level tend to vary only slightly within the state, equation [17] can be further modified:

$$[19] \qquad C = \mu N^{1/\nu}$$

The constant a_1 becomes

$$[20] \qquad \mu = \frac{\nu}{A^{1/\nu}\,\alpha^{\alpha/\nu}\,\beta^{\beta/\nu}\,\gamma^{\gamma/\nu}}\, w^{\beta/\nu}\, r^{\alpha/\nu}\, m^{\gamma/\nu}$$

Now estimates of [19] will give us $\alpha + \beta + \gamma$ from a transformation of the parameter estimate of the cost-output relationship. Though the scale parameter can be estimated by simple least-squares, after a suitable log transformation of equation [19], to do so without introducing other variables as arguments would be naive. If all firms' asset portfolios contained only a single, homogeneous type loan, with given risk, acquired from the same class of deficit units; if they provided no other ancillary services; and if the composition of, or activity in, their liability portfolios were identical, then equation [19] would provide a valid empirical relationship in predicting cost variations. As explained in detail below, once the primary output variable is specified, asset and liability portfolio mixes must be held constant in order to isolate the

pure relation between output and costs. The choice of particular variables is justified in the next chapter. They are introduced into equation [19] in multiplicative form, as there seem to be no logical reasons why any other form should be used, and this simplifies future estimation and interpretation. The multiplicative form means merely, e.g., that a greater number of branch offices should be reflected in higher costs by some percentage of the level of costs rather than an absolute increment independent of the amount of costs incurred. With these points in mind, define:

$X_1, X_2, X_3, \ldots, X_n$ = homogeneity variables, institutional dummy variables, etc.

For instance, X_1 might be the average size of loan serviced, X_2 the percent of risky construction loans in the portfolio, and so on. Now equation [19] appears as:

[21] $$C = \mu N^{\lambda_0} X_1^{\lambda_1} X_2^{\lambda_2} \ldots X_n^{\lambda_n}$$

or

[22] $$C = \mu(TNMS)^{\lambda_0} X_1^{\lambda_1} X_2^{\lambda_2} \ldots X_n^{\lambda_n}$$

where

μ = constant defined in [20].

TNMS = total number of mortgages serviced per annum.

λ_0 = output scale parameter = $1/\nu$.

$\lambda_1 \ldots \lambda_n$ = miscellaneous parameters.

The parameter λ_0 in expression [21] indicates constant returns ($\lambda_0 = 1$),

increasing returns ($\lambda_0 < 1$), and decreasing returns ($\lambda_0 > 1$). Analogous interpretations are afforded cost elasticity parameters λ_i, allowing for changes in a given X_i holding TNMS constant.

Other output measures are employed for the same set of X_i. Two other possibilities present themselves:

$$[23] \qquad C = \mu(TNMM)^{\lambda_0'} X_1^{\lambda_1'} X_2^{\lambda_2'} \ldots . X_n^{\lambda_n'}$$

and

$$[24] \qquad C = \mu(TNA/C)^{\lambda_0''} X_1^{\lambda_1''} X_2^{\lambda_2''} \ldots . X_n^{\lambda_n''}$$

where

TNMM = total number of mortgage loans made during the year.

TNA/C = total number of savings accounts serviced during the year.

After adding the additional explanatory variables, expressions [22], [23], and [24] are transformed into common logarithms in order to employ OLS techniques and to obtain direct estimates of cost elasticities:

$$[25] \qquad \log C = \mu + \lambda_0 \log N + \lambda_1 \log X_1 + \lambda_2 \log X_2 + \ldots + \lambda_n \log X_n$$

More on this technique, and discussion of potential bias present in cross-section cost function estimates, is presented in the chapter which follows.

It is also worth noting that the equation for average cost (AC) and marginal cost (MC) associated with loans serviced can be obtained directly from [22], [23], or [24]. For instance:

$$AC = \frac{C}{N} = N^{(\lambda_0-1)} \bar{X}_1^{\lambda_1} \bar{X}_2^{\lambda_2} \ldots \bar{X}_n^{\lambda_n}$$

and

$$MC = \frac{\partial C}{\partial N} = \lambda_0 \mu N^{(\lambda_0-1)} \bar{X}_1^{\lambda_1} \bar{X}_2^{\lambda_2} \ldots \bar{X}_n^{\lambda_n}$$

or

$$MC = \lambda_0 (AC)$$

where $\bar{X}_i$ = the geometric mean of the other n independent variables.

Transforming:

[26] $$\log AC = \mu + (\lambda_0-1)\log N + \lambda_1 \log \bar{X}_1 + \lambda_2 \log \bar{X}_2 + \ldots + \lambda_n \log \bar{X}_n$$

[27] $$\log MC = \log \lambda_0 + \log AC$$

I will make use of these latter two equations in the sample derivations of average and marginal cost based on the estimated equations presented in Chapter V.

Next, I discuss the data and data sources.

CHAPTER III

DATA, VARIABLES, AND VALIDITY OF STATISTICAL ESTIMATING TECHNIQUE

The data utilized was drawn from Federal Home Loan Bank Board Semiannual Reports, which included balance sheets, statements of operations, profit and loss statements, loan activity, and other pertinent information. Data was obtained for all insured California associations, both stock and mutual, for the years 1967-1969. A breakdown of the observations obtained is given in Table III - 1 below. Expense data was taken from the end-year "Statement of Operations". Other output and balance sheet data are from the "Report of Selected Financial Data" that is filed monthly by associations. The latter report contains a wealth of monthly figures on number of mortgages made and serviced, number of savings accounts held, and the respective dollar amounts. It was possible to obtain the total number of loans made by summing all twelve months. To arrive at the average number of accounts or loans serviced per month during the year, month-end figures were summed and divided by twelve to get simple arithmetic averages. A computer coding indicated whether the observation was from a state stock, federal mutual, or state mutual association. Other information, such as number of branches, date of incorporation, and holding company control was drawn variously from the Board or the California Commissioner's office. Finally, the Data Processing Division of the FHLBB in Washington, D. C. constructed a single data tape from their tape library of the above reports, statements and additional sources. A check of the printout from that tape indicated that a small number of observations

TABLE III - 1

ALL CALIFORNIA INSURED S&Ls, 1969 DATA OBSERVATIONS: NUMBER BY CLASSIFICATION, AND BREAKDOWN BY ASSET SIZE CLASS

Classification of Association*	Class (million) $0 - 24	(percent)	$25 - 99	(percent)	$100 +	(percent)
Stock	54	(69%)	55	(65%)	42	(63%)
Mutual	24	(31%)	30	(35%)	25	(37%)
	78		85		67	
Stock-Controlled by Holding Companies	3	(6%)	22	(40%)	28	(67%)
Stock-Non Controlled by Holding Companies	51	(94%)	33	(60%)	14	(33%)
Total	54		55		42	

All Associations Reporting to the FHLBB = 243

omitted from analysis = 13

230

In addition, there were 4 uninsured California Stock Associations not reporting.

* All stock associations are state licensed. All federally chartered associations are required to be of mutual form. There were 9 state-chartered mutuals operating in 1969.

should be dropped for reasons of inconsistency.[1] No association was excluded on "arbitrary grounds" such as a recent merger.

Specification and discussion of variables

In this section I present the explanatory variables of the model to be estimated. Chapter II derived only the general form of the cost-output model; it remains to justify the final list of variables thought to be primarily responsible for explaining cost variation between firms. Data problems, along with methodological or theoretical aspects of variable selection, are also treated. The final form of the equations to be estimated is discussed, and a brief survey of the pitfalls encountered in cross-section industry cost studies concludes this chapter.

Dependent variables

The cost variables used include (1) total operating cost (adjusted), (2) "technical" or pure operating costs, and (3) advertising expense, all for a single production period, namely, a year. Technical cost is merely total operating costs less advertising. Even though each S&L reported to the FHLBB on standard forms, under uniform reporting conditions, there are important problems inherent in the use of accounting costs. Uniform instructions for preparing reports do not eliminate all the problems, as will be noted below. The major components of total operating costs are compensation, office occupancy expense, advertising, and other operating expenses. These represented respectively

[1]For example, if total assets or total mortgage loans = 0, something was obviously drastically amiss. Spot checks of the data with original hand-written statements indicate that the coding, programming, and tape storage was accurate. I am very confident in the quality of the tape construction.

43, 13, 10 and 34 percent of total operating costs for 1969.[2] Compensation includes pension, retirement and other employee benefits. Occupancy expenses include depreciation, and "other" includes commissions, expense accounts, furniture, equipment, etc. There is also the question of whether an amount representing annual default losses net of recoveries on loans made should be included in operating expenses.[3] It is generally treated as a form of capital loss to be covered from bad loan reserves, a form of deduction from profits rather than addition to technical operating costs. Losses on bad loans are not treated as costs in this paper.

Ideally, costs should measure economic or opportunity costs. Problems arise if profit distribution appears incognito in expenses. Different valuation techniques of depreciation on premises owned are inevitable. And some S&Ls rent out part of their buildings to others, recording the cost of operating the entire building (income goes to a separate account). The various deficiencies in reported costs cannot be entirely eliminated. There is no way to adjust costs downward for

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[2]Dividends and all interest charges are excluded as non-operating costs; these amounts are determined by market forces which may cause costs to vary in a manner unrelated to output levels. Differences in dividends paid may not be due to differences in firm efficiency. Other researchers have included interest paid to institutional lenders as a factor cost. Cf. Stuart Greenbaum, "A Study of Bank Costs," op. cit.. However, the S&L is merely facilitating the acquisition of earning assets exactly as it does when selling shares to members. Consistency would require treatment of all interest payments, including dividends, as part of costs.

[3]There is very little treatment of this in the literature. In another paper, I included this as a part of operating costs, and the results were not materially affected - I assume the same would be the case for S&Ls. See: Thomas Cargill and C. Daniel Vencill, "A Study of the Cost Behavior of Credit Unions," Working Papers, Department of Economics, University of California, Davis, 1971.

associations that own and maintain large office buildings and rent out excess space. Since this practice is mainly confined to large S&Ls, the industry cost curve will tend to be biased upward at that end of the size scale. Should economies still be found to exist over the whole range, the source of this bias should not be considered serious. Depreciation accounting is a notoriously bad indicator of the loss in present value incurred by building utilization each year. This flaw in cost data is assumed to be less serious than it would be for other industries in which depreciation looms large in the total budgets.

Some deductions from the cost data improve comparability. Recorded costs differ between associations when one performs legal work or does appraising of property for fees, and another refers borrowers to third parties for these services. Thus, "other charges and fees" are subtracted from total operating costs to get "adjusted" operating costs.

In summary, adjusted operating costs (COST) include salaries, wages, miscellaneous expense, occupancy, advertising, but excludes all interest or dividend costs, non-loan fees, and bad debt losses. For analysis, I rely on a measure of costs, technical expenditures, which is:

$$TEXP = COST - ADV$$

where ADV is reported promotional expenditures, namely advertising, gifts to customers, fees to savings brokers, etc. It would be desirable to analyse separate components of costs by individual regressions, except there is the danger present that associations may misclassify expense items.

Advertising cost is analysed separately, but part of this outlay may be concealed in miscellaneous operating expenses. These "other expense" items include collection expenses, examination, insurance and

license fees, furniture, supplies, equipment, telephone, etc., and officer expense accounts. The latter might include considerable promotional efforts to woo clientele.

The prime reason for treating both COST and TEXP involves the controversy surrounding the role of advertising. One view is that advertising outlay is a pure cost of production, and lines of media exposure are factor inputs. The other view is that they are not a legitimate production expense; promotion attempts to differentiate a perfectly homogeneous product and often degenerates into promotion wars. This outlay has very little to do with output. There is a further, eclectic view which is espoused by Telser.[4] He treats advertising as an input supplied jointly with the physical product. Advertising may give kinds of information about the product that consumers value, and may signal a level of quality. Further, advertising serves to identify sellers and sometimes becomes a part of the product. He finds no empirical support for the alleged inverse association between advertising and competition.

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[4]Lester G. Telser, "Advertising and Competition," Journal of Political Economy, December, 1964, pp. 537-562. His major empirical finding is that there is no correlation between advertising outlays as a percentage of sales and the level of seller concentration. There is a negative correlation between the change in concentration and the change in advertising intensity in industries studied from 1947-1958. Market share is no more stable for heavily advertised goods. On the other hand, Telser ignores the possible impact of advertising on profit rates.

This is remedied by Comanor and Wilson, who find "advertising has a statistically significant and quantitatively important impact upon profit rates which provide a measure of market performance as well as indicate the existence of market power." They tend to treat the role of advertising as Shaw (in op. cit.) does. Namely, these expenditures are both a symptom and a source of differentiated oligopoly. William S. Comanor and Thomas A. Wilson, "Advertising, Market structure and Performance," Review of Economics and Statistics, November, 1967, pp. 423-440.

My own position will be elaborated in the discussion of the advertising cost regression results. I am concerned in the empirical section with the sensitivity of the returns to scale parameter to the cost variables specified in the literature, so I use both COST and TEXP in my cost models. Alternatively then

C_1 = COST

C_2 = TEXP

C_3 = ADV in equation [21] of Chapter II.

Independent variables

It seems to be the consensus of industry people that S&L costs are determined by the number of account transactions and the number of loans made and serviced, as opposed to the dollar amounts of the transactions involved. The primary output variables, then, will be expressed in numbers of transactions, although I will experiment with dollar volume measures. It has been emphasized that mortgage loan acquisition makes up most of the activity in the asset portfolio. All associations make a limited number of passbook loans, improvement loans, and unsecured college loans, as well as manage a portfolio of government securities. Data limitations forced me to exclude these subsidiary operations from the model. On the liabilities side, the number of accounts serviced is the output. The variations over size in the costs of debiting or crediting passbook accounts, receiving mortgage payments, and setting up loans--including investigation of borrower and credit worthiness--are to be explained by the model. Since costs are not allocated by S&Ls to various "departments", no functional cost analysis is possible, and some improvisation is in order. Therefore, separate

regression will be used for three alternative formulations of output: 1) total number of mortgages on the books (average monthly figure), 2) total number of mortgages made during the year, and 3) total number of accounts serviced during the year (average monthly figure). Obviously, not all S&Ls make exactly the same size loans, or the same types. Nor are savings balances all the same size. A $50,000 loan might not be five times as costly to make as a $10,000 loan, but surely some appraisal or borrower investigation costs may increase with loan size. These and other factors are to be held constant to attain a constant output mix. They are discussed below.

Homogeneity variables

Systematic information about certain additional factors that on a priori grounds would influence costs, given the number of loans serviced or made, is simply not available. Such a factor is savings or loan account activity or "turnover." This is partly reflected in the number of loans re-written or modified. Turnover might be proportional to account size, in which event that variable will reflect this influence of activity. Industry people indicate that two associations with the same number of accounts on the books may experience significantly different degrees of activity in those accounts. Variation might depend on community characteristics, or on such factors as the proportion of out-of-state accounts, income position of the S&L's clientele, and so on. This can be depicted (Figure III - 1) in a firm's cost curve for e.g. account turnover where T_1, T_2, and T_3 equal progressively greater accounts' activity. If account-holders tend to treat their share holdings as demand deposits, and these are debited and credited

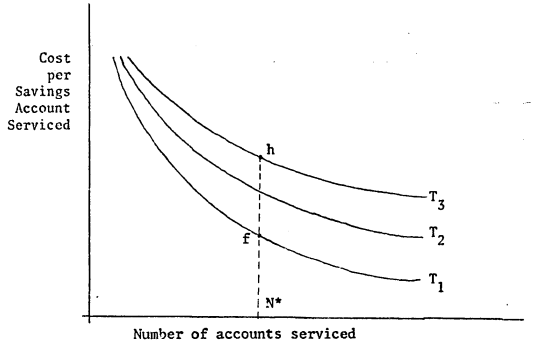

Figure III - 1

a large number of times for a given total number of accounts, N*--or if many account closings are matched by many account opening (another dimension of turnover)--then the S&L's operation will be more costly (h) than, say, another firm's (f). The aggregate results will not be different if firms with greater than average account activity are randomly distributed in all asset-size ranges. One hypothesis is that associations with high turnover per account tend to be concentrated in the small size class. If so, this is one explanation for any evidence of appreciable scale economies that may emerge. Without data on T, the influence of this factor will be submerged in one or another of the other explanatory variables, with no way of isolating the magnitude of its independent effect.

In order to collapse a diverse vector of services into a single output measure, certain homogeneity variables are introduced with the aim of standardizing the mix across associations. These variables,

X_i, may also accomplish the additional feat of standardizing for activity in account items, if, e.g., a larger average deposit implies more passbook activity, or a larger loan must be modified more often (requiring greater clerical costs per loan). Larger savings account holders and bigger borrowers may be accorded special treatment and better services, presumably at higher cost.

For these reasons, average deposit size, average size of mortgage serviced, and average size of loan made are introduced into the model. Costs are expected to be higher the larger is:

SIZEA = average size of share of certificate account

SIZES = average size of mortgage loan serviced per month

SIZEM = average size of loans made during the year.

The task of specifying output mix variables is still not completed. Some associations are said to be notably risk aversive in their portfolio decisions. Stock associations, or associations attempting rapid growth, are often said to seek out riskier construction loans. These are more costly to make than purchase loans due to constant supervision, inspection, and finally re-writing the loan as required for the ultimate purchaser.

Governmentally insured VA and FHA loans are similarly thought to involve greater administration costs than conventional mortgages because of the red-tape and reporting that accompany these accounts. Loans on dwelling units greater than 1-4 family homes, such as large apartment complexes, involve more investigation and higher set-up costs. Finally, if a S&L buys a participating interest in mortgages from associations with deficit funds relative to their new lending demand, it will not show in the "number of loans outstanding" total, but it does show up in the

dollar volume. The originating institution services the loan, so using the dollar volume of loans would bias cost upward for a firm selling a participation, and downward for one purchasing. Since I use the number of loans, this is not a problem.

In view of the discussion above, costs are expected to be higher, ceteris paribus, the larger the following ratios:

TNLM/TNMM = number of construction loans made to total mortgage loans

FHAM/TNMM = total FHA and VA mortgage loans to total mortgage loans made

ONEFOURM/TNMM = 1-4 family unit loans made to total mortgage loans made.

Associations may choose to make a more costly loan, as in the case of construction loans, if they are rewarded with higher interest income. Therefore, higher costs pay off later in greater returns and do not reflect inefficiencies. This operating characteristic reflecting as it does managerial policy factors in portfolio choice, along with differences in managerial abilities in evaluating sound bo rowers, is reflected in another item which can be introduced--namely, the influence of "scheduled items," SCHI. PSCHI is partly a descriptive measure of portfolio quality: the ratio of scheduled items to risk assets. The numerator of this ratio consists of the dollar sum of long-term delinquent loans, plus loans in foreclosure, plus real estate owned after foreclosure, plus loans to facilitate the resale of that real estate. The denominator is the dollar size of the loan portfolio, plus some minor items.

PSCHI is indicative of portfolio problems--it tells us a certain percentage of portfolio dollars is in troubled status, and regulators

place great store in this as one of the critical indexes of performance. PSCHI definitely reflects past managerial portfolio decisions to undertake risky loans; it may reveal poor management. Scheduled items are averred to be costly assets for the S&L to carry because of high collection costs on delinquent loans and those disposal costs related to legal foreclosure. In short, a higher PSCHI implies higher operating costs and must be held constant in the cost-output analysis.[5]

Another variable is introduced in an attempt to capture and standardize an activity rate. This is the ratio of mortgages made per year to the average number serviced per month. Converted into a percentage, this is defined as PTMS. The expected influence on costs of factors measured by this variable depends on which of several disparate effects predominate. To the extent that PTMS measures the ability of the S&L to turn over mortgage funds rapidly, a larger ratio should be associated with higher costs. The association may be located in an area of growing loan demand, and a higher than average number of new loans are being written relative to those on the books. But this variable is also correlated with the age of the association--a firm getting started within recent years, or with newly opened branches, will be attempting to build up an asset portfolio. An old, established firm will have a larger volume of loans already on its books relative to new loans written. For both these reasons, large PTMS ratios should be identified with higher operating costs.

To balance this, the ratio PTMS may reflect capacity utilization

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[5]Many of the scheduled items have their total impact on operating costs only with some lag. Therefore, the ratio used was for mid-year (June figures).

rates. A very low PTMS might indicate that excess capacity exists in the firm's ability to write and investigate a much larger volume of new loans (the number of employees are already on the job as a result of past loans written which must now be maintained). Thus a high PTMS may result in some cost savings for given volumes of total loans made.

Branch variable

In estimating the industry cost function some allowances must be made for methods of expansion of the firm. Two ways of firm expansion are possible: 1) a unit S&L may expand output or one with several branches in existence may expand with the number of these plants fixed, and 2) a firm amy expand by adding more branches or plants. Returns to scale will arise from the increase in size of existing facility or by enlarging the plant network. By adding a branch variable, organizationall structure will be accounted for and, importantly, I can measure the cost due to expanding size by branching versus the costs associated with the expansion of the firm holding plants constant. This is an important distinction for the California industry. There were over 525 branches operating in California as of 1969. In some years regulatory authorities receive hundreds of requests for new branches. Approximately 60 percent of associations operate branch offices, including mobile offices. One association operated over 30 branches.

The following relationship is expected to exist: with branches held constant, increasing firm size reduces average cost, but holding firm size constant and increasing the number of plants increases average cost. If a certain level of assets is spread over more branches, higher costs result from increased fixed costs, the need for more supervisory

personnel and bureaucratic control, and coordination problems. If there are diseconomies of branching, given firm size, why would a S&L ever seek to open additional plants. The answer is illustrated in Figure III - 2 below. Suppose a unit S&L had expanded to size a with 5,000 loans. To get larger and attain potential economies along aa" may be impossible without additional plants. It simply may not be possible to grow within the confines of the market territory in which the S&L exists. Reaching point a may have involved extensive depletion of savings and lending opportunities in the surrounding market. There is evidence that the cost-asset ratio for a S&L will rise with penetration of its share and mortgage markets. "The more intensively the markets are mined, the more expensive operations become. The firm's growth rate diminishes, and its marginal costs of growing increase in relation to average cost. Branching can ease restraint on growth"[6] and hence allow potential economies to be captured. I interpret cost in the above context to apply mainly to costs of attracting funds and promoting loan demand. Out-of-state deposits might be attracted to permit further growth, but only at a cost in the form of commissions or bounties to savings brokers. Moreover, this increases the risk exposure of the S&L on the liabilities side as these accounts are highly volatile (interest sensitive). This imposes a form of cost. Another alternative is to lower loan standards and work into the high-risk fringes of development and construction loans. This increases potential losses and the riskier asset portfolio is another "cost" of growth.

New territory is opened by acquiring a branch office and, by

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[6] Shaw, op. cit., p. 107.

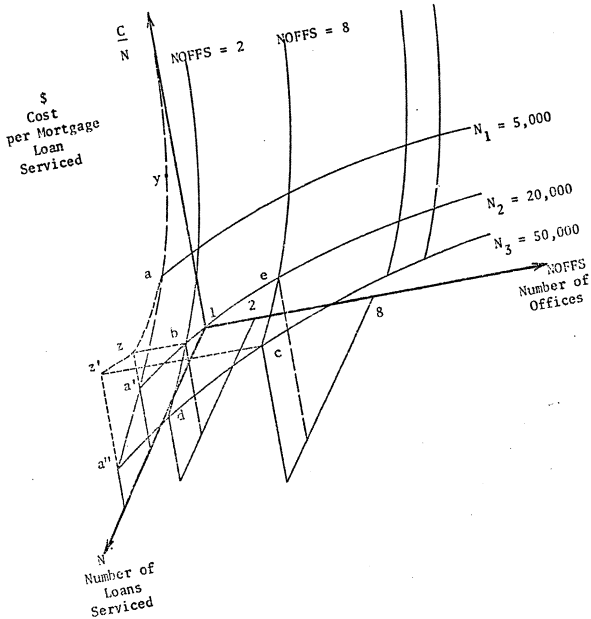

Figure III - 2

offering convenience and services to a new clientele, together with increasing the market area, the level of output grows to N_2 at point b in the figure. Analogously, to attain loan portfolio size N_3 at point c requires 8 branches. In each case the diseconomies of more plants at a given firm size is more than offset by economies to the greater overall operation. C/N is lower at c than at a. The firm's expansion path is along a ray a, b, c, ... An interesting result of this hypothetical exercise should be noted. If it is assumed that no firm can enlarge its output and grow beyond point a without branches, the industry long-run cost curve is yaz', instead of yaa". The latter curve would only apply to an industry comprised of a few very large unit S&Ls. As this is not the case, the industry average cost curve should tend to have the former shape:

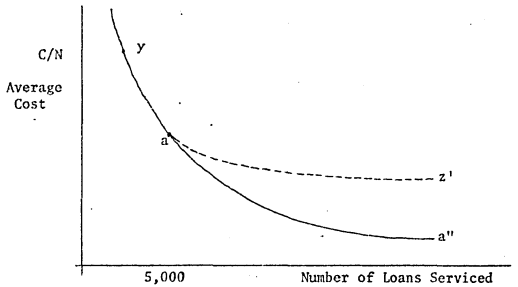

Figure III- 3

Alternative devices to test the distinction between facility growth with and without branching are available. Greenbaum used five dummy variables for up to five branches. The number of branch dummies to employ is arbitrary, and to have a dummy for each plant would require

many dummies and considerable extra effort. I saw no reason not to merely specify instead the number of offices, NOFFS; this is the number of branches plus the home office.

Institutional differences within the industry

A number of other, institutional, effects must be treated in the model. Mutuality versus stock ownership has been mentioned. If mutuals are characterized by nepotism, fewer performance incentives, etc, they will have higher costs. If they provide non-mortgage-related services at nominal or zero price, as alleged by the SRI Report, they will be more costly than stock forms, and their output higher (but not as measured by "sales"). Mutuals might provide more Christmas Club Accounts, more travelers' checks, cash more checks, etc. To the extent that many of these services are provided without charge, they should be treated as promotional. Many industry spokesmen claim that any differences between stocks and mutuals which once existed in customer service departments has diminished greatly in recent years.

The stock-mutual distinction, as well as the impact of holding company control is treated by dummy variables, STK and HELDCO. The data is also partitioned by organizational form, and the model tested separately to check for dummy bias in the results.

Miscellaneous variables

Allowance must also be made in the model for the possibility that individual firms observed are not in short-run equilibrium. An industry characterized by very rapid growth may find many firms, given adjustment leads or lags, with non-optimal factor combinations; this will vitiate

the cost-minimization model.[7] The growth rate of firms in the industry has settled down considerably since the credit "crunch" of 1966. (See Table III - 2.) There does not seem to be any systematic growth differential among size classes for 1969. (See Table III - 3). I experimented in the model with rate of change of assets, but in no case did this variable attain significance, so it is omitted.

A recently incorporated firm might have atypically higher (start-up) costs compared to other associations in the same small size class. It takes time to break in new staff, extra services may be provided at no charge to attract depositors, and new record files must be developed. For 1968 and 1969 this problem is absent because virtually no new associations were chartered. To test the impact on costs of a relative newcomer, I introduce the dummy variable POST60, indicating whether the S&L entered the industry before or after 1960. About 15 percent of the firms in California were chartered between 1961 and 1968. It is expected that this variable will reflect higher costs for firms included in this group.

Summary of the variables

The specification of the variables is now complete, and a brief summary is in order. Table III - 4 summarized these variables and the notation. There will be three output models estimated as indicated in the discussion earlier. These are the total number of loans made (TNLM), the average total number of loans serviced per month (TNLS), and the average total number of accounts serviced per month (TNA/C). The

[7] A complete discussion of this is contained in the last section of this chapter.

TABLE III - 2

GROWTH RATE OF CALIFORNIA STOCK S&Ls

1957 - 1969

Year	Percent change in assets over previous year
1957	21.5
1958	21.8
1959	20.5
1960	22.2
1961	29.1
1962	27.5
1963	31.3
1964	18.2
1965	9.7
1966	3.0
1967	5.4
1968	5.4
1969	4.5

Source: Calculated from data supplied by California Commissioner of Savings and Loan.

TABLE III - 3

GROWTH RATES FOR CALIFORNIA ASSOCIATIONS, 1969

BY ASSET SIZE CLASS

Class ($ millions)	Rate of Increase in Assets
1 - 10	5.1
10 - 25	4.7
25 - 50	4.9
50 - 100	3.9
100 - 200	5.2
200 - 400	3.8
400 - 1 Billion	4.1
1 Billion	4.0

Source: Calculated from data supplied by California Commissioner of Savings and Loan.

S&L as an intermediary performs these various services in varying proportions, but no way was devised to construct an output index of the "units of intermediation" performed. Also, it is obviously impossible to include all three output measures in the same equation to be estimated (because of the serious intercorrelation between these variables). If it is assumed that loans serviced and accounts serviced are always a constant ratio within each asset class, then the output variable TNLS may be considered an index of total output when the effect of the other omitted variable is accounted for via PLMS, percent loans made to serviced. Likewise, TNLM and TNA/C are indices of output, holding PTMS constant. The general statistical model to be estimated, then, is:

$$C = \mu N^{\lambda_0} \left(\begin{matrix}\text{output pro-}\\ \text{portionality}\\ \text{variable, PTMS}\end{matrix}\right)^{\Sigma\lambda_1} \left(\begin{matrix}\text{output}\\ \text{homogeneity}\\ \text{factors}\end{matrix}\right)^{\Sigma\lambda_i} \left(\begin{matrix}\text{organiza-}\\ \text{tional}\\ \text{factors}\end{matrix}\right)^{\Sigma\lambda_j} \left(\begin{matrix}\text{miscel-}\\ \text{laneous}\\ \text{factors}\end{matrix}\right)^{\Sigma\lambda_k} \cdot U_t$$

where

C_1	= TCOST	N_1	= TNMS
C_2	= TEXP	N_2	= TNMM
C_3	= ADV	N_3	= TNA/C

and where

Homogeneity variables	= SIZES, SIZEM, SIZEA, PCLM, PSCHI
Organizational factors	= STK, HELDCO, NOFFS
Miscellaneous factors	= POST60

U_t is the disturbance term assumed to satisfy the classical statistical assumptions,[8] and be normally distributed. If this is so, least-squares

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[8] U_t is random for every t; the variance of U_t is homoskedastic ($\sigma^2 U_t = k$); U_t is not autocorrelated, Cov (U_t, $U_{(t+n)}$) = 0; and U_t is independent of exogenous variables (x), cov ($\bar{x}$, U_t) = 0.

TABLE III - 4

LIST OF VARIABLES IN REGRESSION MODEL

Dependent Variables

COST	Total operating cost less fees, per annum.
TEXP	Technical operating expenses (COST - ADV).
ADV	Total advertising expenditures, per annum.

Output — Independent Variables

TNMS	Total number of mortgages serviced (monthly average) during the year.
TNMM	Total number of new mortgage loans made during the year.
TNA/C	Total number of deposit accounts serviced (monthly average) during the year.

Homogeneity or Institutional X_i

SIZEM	Average size of mortgage loan made during the year.
SIZES	Average size of mortgage loan serviced during the year.
PCLM	Percent of construction loans to total mortgage loans made during the year.
PSCHI	Percent of "scheduled intems", midyear, to total association risk assets, end year.
PTMS	Percent of total mortgages made during the year to mortgages serviced (output proportionality variable).
SIZEA	Average size of deposit account balances serviced during the year.
NOFFS	Total number of branch offices plus head office.

TABLE III - 4 (cont.)

Dummy Variables

POST60	= 10	If association incorporated or was licensed after 1960.
	= 1	If association incorporated or was licensed before 1960.
HELDCO	= 10	If (stock) association controlled by a corporate holding company, public or private.
	= 1	If (stock) association is not so controlled.
STK	= 10	If association is owned by stockholders; includes only state-licensed S&Ls.
	= 1	Otherwise.

Experimental Variables

T$LM	Total dollar volume of loans made per year.*
T$LS	Average dollar volume of loans serviced per month.*
T$A/C	Average dollar volume of accounts serviced per month.*
(FHAM/TNMM) x 100	Percent government guaranteed VA, FHA loans made to total loans made.**
(ONEFOURM/TNMM) x 100	Percent 1-4 family home loans made to total loans made.**
GROWTH	Rate of change in Assets, December 1968 - December 1969.**

*Limited reporting on results of using these as measures of output (independent variables) is presented in Ch. IV.

**Insignificant, or no impact in the stepwise regressions reported in Ch. IV.

TABLE III - 5

DERIVATION OF REGRESSION VARIABLES:

NOTATIONAL FORM

Expression	Definition or derivation
T$MM	Total dollar volume of mortgages made per annum.
SIZEM	T$MM/TNMM
T$MS	Total dollar volume of mortgages serviced (monthly average) per annum.
SIZES	T$MS/TNMS
TNCLM	Total number of construction mortgages made per annum.
PCLM	(TNCLM/TNMM) x 100.
$SCHI	Total dollar volume of "scheduled items" as of June 30.
RASS	Total risk assets.
PTMS	(TNMM/TNMS) x 100.
T$A/C	Total dollar volume of accounts serviced (monthly average) per annum.
SIZEA	T$AC/TNAC
PSCHI	($SCHI/RASS) x 100.

estimates will be identical to maximum likelihood estimates.

The above expression was tranformed into common logarithms in order to employ OLS estimation techniques and to obtain direct estimates of the cost elasticities. Before the cost function was estimated, the data was partitioned into three asset sizes, a breakdown corresponding to what industry observers believe to be small, medium, and large associations. This asset-size breakdown will supplement estimates using aggregate data; it will highlight the operating characteristics of these three size classes. This practice gives two important advantages: (a) the samples from which the cost function is estimated are made more homogeneous, and (b) interesting patterns in the cost elasticities over asset-size ranges can be revealed of they exist. This partitioning amounts to fitting a discontinuous industry long-run average cost function.

Before discussing the statistical results, a quick review of the caveats which apply to cross-section studies is in order. The question is, how well does the present study avoid standard criticisms of this methodology?

Problems with cross-section cost studies

As Friedman has pointed out in a classic paper,[9] cross-section cost studies are subject to the possibility of a "regression fallacy." There are two ways a fallacy can creep into cost studies of this sort. It is necessary to assume that all cross-section forms in the industry deviate randomly from a long-run cost function, whereas it is possible

[9]Milton Friedman, "Comment," Conference on Business Concentration and Price Policy, Princeton, 1955.

that small firms--hoping to grow--produce with too large a plant while large firms tend to produce with too small a plant. Friedman's other caveat is that cost output observations may lie off both the short- and long-run cost function. This would occur if recorded depreciation and upkeep costs are estimated by managers on the basis of expected output levels. Recorded costs are too low in relation to actual costs in the event estimated sales fall short of realized sales. Thus, if large firms in the sample systematically underestimate actual sales, while those in the small size category are overly optimistic, the recorded cost figures indicate fictitious economies of scale.

Friedman's latter point would not be an important source of bias in cost studies of S&Ls; depreciation and maintenance of fixed capital and equipment is a low proportion of their total operating costs.

His other component of the regression fallacy could pose a hazard in our analysis. In this regard, other researchers have provided a clear statement of the problem. Johnston[10] and Meyer-Kraft[11] point out that the ordinary cross-section least-squares estimate of the long-run industry cost function suffers from a bias because the observations in the cross-section normally vary by a transient short-run component. In contrast to Friedman, they emphasize the bias at the opposite end of the size scale. Thus, if the larger firms in particular are not in short-run equilibrium because growth is concentrated at this end of the size scale, they have "excess capacity" (in terms of office space,

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[10] Johnston, op. cit.

[11] John R. Meyer and Gerald Kraft, "The Evaluation of Statistical Costing Techniques as Applied in the Transportation Industry" American Economic Review, Proceedings, Vol. LI 1961, pp. 313-338.

managerial manpower--arising essentially from indivisible resource inputs); and the estimated long-run cost function is biased upward, implying constant returns to scale. But if growth is not correlated with absolute size of assets, and occurs randomly in all size groups, then the long-run estimated curve will merely be displaced upward and its shape left undisturbed. Grebler-Brigham[12] found a high correlation between large associations and rapid growth. As emphasized above, the year of their data, 1961, was characterized by exceptionally rapid S&L growth (Table III - 2). They found that higher costs are strongly associated with rapid growth. Should observed economies be present in spite of this bias, then presumably as the industry settles down to its equilibrium rate of change in output, greater economies than indicated by the regression would be forthcoming. It was not surprising that Grebler-Brigham found constant returns, given the growth per se binge that characterized the industry in that period. The past few years have been ones of stable or low growth for the industry, with considerable consolidation of past gains. Growthmanship does not seem to present a serious statistical bias in the present study. And as Table III - 3 shows, growth is not concentrated in any asset size class during 1969.

Another problem concerns the range of data--a wide range of observations on output levels is needed to estimate the cost function parameters. This is available in time series studies as the firm's demand curve shifts. Friedman has pointed out a theoretical conundrum in cross-section studies of firms operating under conditions of perfect competition. To get a range of observations on output and cost requires

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[12]Grebler and Brigham, op. cit.

differences in output for each firm; this must be due to "mistakes" or special "firm-specific" resources, because each firm presumably has access to the same technology and faces the same demand curve.

Johnston[13] concurs but argues that this is not generalizable to imperfectly competitive markets where the size of firms is determined by the distribution of demand. The California S&L industry is charcterized by Shaw[14] as imperfectly competitive or one of differentiated oligopoly, so that all firms do not face the same demand curve. The number of firms in the S&L industry is determined by federal or state regulatory agencies, as is the limit of the size of the market area they may serve. Licensing creates local markets. These factors are more important in determining S&L output than cost conditions. It is likely that the cross-section model will be valid and free from the identification problem. The data observed will trace cost functions rather than successive inter-sections of demand with supply (cost) curves.

I turn now to a presentation and discussion of the statistical findings.

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[13]Johnston, op. cit., pp. 186-187.

[14]Shaw, op. cit., Ch. II.

CHAPTER IV

EMPIRICAL ESTIMATES OF THE COST-OUTPUT RELATIONSHIP REPORTED AND DISCUSSED

The regression results reported in the summary tables below indicate a systematic presence of scale economies in California S&L associations. In both the aggregate and disaggregated results, the coefficients of determination are adjusted for the degrees of freedom and indicate that the variables included in the cost function account for an important portion of the total variation in costs. The unexplained variation in each estimate may well be the result of imperfections in the data and differences in the caliber of the S&Ls' management, since the cost function is based on a cost-minimization model. Also, S&Ls produce other minor miscellaneous customer services besides mortgage loans and accounts, and variations in these services are not reflected in the present data. The model does in fact consistently explain about 90 percent of the variation in costs for combined data, and generally more than 75 percent for firms by asset size class.

Output variables

Table IV - 1 to IV - 4 present the parameter estimates for the three output models and two cost measures used. These results cover all S&Ls (230) for 1969. The cost elasticities for output, range from .70 to about .85 for total operating costs, and from .76 to .90 for technical expenses. The meaning of this parameter is that, e.g., a 10 percent increase in the number of mortgages serviced per month means on average an 8.4 percent increase in total costs. Similar interpretation holds for the coefficients of the other output variables, each of which

TABLE IV - 1 [a/]

REGRESSION RESULTS FOR ALL CALIFORNIA S&Ls, 1969--COMPARISON OF THREE OUTPUT INDICES. DEPENDENT VARIABLE: TOTAL OPERATING COSTS, INCLUDING ADVERTISING (TCOST).

Independent Variables	Coefficients for Alternative Output Models (TNMS)	(TNMM)	(TNA/C)
Output variable: TNMS, TNMM, or TNA/C	.841**	.841**	.696**
	(.042)	(.042)	(.054)
SIZEM	.157**	.157**	.078
	(.051)	(.051)	(.066)
SIZES	.792**	.792**	.080
	(.053)	(.053)	(.051)
PCLM	.035	.035	.187**
	(.042)	(.042)	(.052)
PSCHI	-.007	-.007	-.018
	(.019)	(.012)	(.016)
PTMS	-.076**	-.065**	-.097**
	(.025)	(.023)	(.031)
SIZEA	-.055	-.055	-.218**
	(.039)	(.039)	(.048)
STK	-.074*	-.071*	-.042*
	(.032)	(.022)	(.021)
POST60	.047*	.047*	.024
	(.020)	(.022)	(.029)
NOFFS	.147**	.146**	.126**
	(.041)	(.041)	(.053)
CONSTANT	-.123	1.557	.583
	(.207)	(.223)	(.268)
$\bar{R}^2$	.957	.958	.930
F-Statistic	546.60	546.58	328.63
No. Observations			

[a/] Notes: Standard errors of the regression coefficients are reported in parentheses. Coefficients displaying a double (single) asterisk are significant at the .01 (.05) confidence level. The $\bar{R}^2$ is adjusted for degrees of freedom.

TABLE IV - 2 [a]

REGRESSION RESULTS FOR ALL CALIFORNIA S&Ls, 1969
COMPARISON OF THREE MODELS. DEPENDENT
VARIABLE: TECHNICAL EXPENSES (TEXP)

Independent Variables	Coefficients for Alternative Output Models (TNMS)	(TNMM)	(TNA/C)
Output variable: TNMS, TNMM, or TNA/C	.897**	.888**	.756**
	(.037)	(.096)	(.063)
SIZEM	.053	.049	.041*
	(.031)	(.035)	(.019)
SIZES	.686*	.655*	.402**
	(.352)	(.301)	(.110)
PCLM	.010	.014	.020
	(.096)	(.078)	(.021)
PSCHI	-.037	-.038	-.037*
	(.026)	(.029)	(.015)
PTMS	-.041*	-.038*	-.115*
	(.018)	(.015)	(.052)
SIZEA	-.065**	-.060**	-.433
	(.013)	(.010)	(.351)
STK	-.054*	-.049*	-.047*
	(0.25)	(.021)	(.021)
POST60	.084*	.077*	.051*
	(.038)	(.031)	(.022)
NOFFS	.122**	.119**	.119**
	(.036)	(.025)	(.027)
CONSTANT	-.153	-.172	.408
	(.054)	(.066)	(.225)
$\bar{R}^2$	.897	.901	.714
F-Statistic	548.34	537.66	460.89
No. Observations	230	230	230

[a] Notes: Standard errors of the regression coefficients are reported in parentheses. Coefficients displaying a double (single) asterisk are significant at the .01 (.05) confidence level. The $\bar{R}^2$ is adjusted for defrees of freedom.

TABLE IV - 3 [a/]

REGRESSION RESULTS FOR ALL CALIFORNIA STOCK S&Ls, 1969.
DEPENDENT VARIABLE: TECHNICAL EXPENSES (TEXP). OUTPUT
MODEL: TOTAL NUMBER MORTGAGES SERVICED PER MONTH

Independent Variables	1969	1968	1967
Output variable: TNMS	.863**	.861**	.855**
	(.017)	(.033)	(.023)
SIZEM	.106*	.099*	.111*
	(.053)	(.039)	(.051)
SIZES	.844**	.795**	.838**
	(.044)	(.041)	(.039)
PCLM	.031	.029	.038
	(.016)	(.031)	(.042)
PSCHI	-.016	-.023	-.024
	(0.15)	(.021)	(.017)
PTMS	-.015*	-.096*	-.091*
	(.006)	(.009)	(.030)
SIZEA	-.105*	-.096*	-.091*
	(.079)	(.041)	(.030)
NOFFS	.136**	.132**	.140**
	(.051)	(.049)	(.051)
POST60	.033	.030	.021
	(.025)	(.031)	(.020)
CONSTANT	-1.291	-1.340	-1.299
	(.333)	(.488)	(.392)
$\bar{R}^2$	.963	.951	.956
F-Statistic	560.15	549.61	530.48
No. Observations	151	151	151

[a/] Notes: Standard errors of the regression coefficients are reported in parentheses. Coefficients displaying a double (single) asterisk are significant at the .01 (.05) confidence level. The $\bar{R}^2$ is adjusted for degrees of freedom.

TABLE IV - 4 [a/]

REGRESSION RESULTS FOR ALL CALIFORNIA MUTUAL S&Ls, 1969
DEPENDENT VARIABLE: TECHNICAL EXPENSES (TEXP). OUTPUT
MODEL: TOTAL NUMBER MORTGAGES SERVICED PER MONTH

Independent Variables	1969	1968	1967
Output variable:			
TNMS	.910**	.901**	.912**
	(.032)	(.046)	(.020)
SIZEM	.213*	.199**	.189*
	(.103)	(.055)	(.091)
SIZES	.215*	.254**	.233**
	(.100)	(.009)	(.013)
PCLM	.002	.011	.005
	(.024)	(.056)	(.038)
PSCHI	-.028	-.044	-.032
	(.076)	(.037)	(.059)
PTMS	-.219**	-.243**	-.230**
	(.048)	(.059)	(.072)
SIZEA	-.144**	-.139**	-.128*
	(.034)	(.044)	(.037)
NOFFS	.108**	.091**	.113**
	(.023)	(.012)	(.038)
POST60	.071	.066	.081*
	(.044)	(.052)	(.033)
CONSTANT	.982	1.007	.991
	(.042)	(.612)	(.445)
$\bar{R}^2$	.961	.958	.962
F-Statistic	280.38	244.71	257.02
No. Observations	79	79	79

[a/] Notes: Standard errors of the regression coefficients are reported in parentheses. Coefficients displaying a double (single) asterisk are significant at the .01 (.05) confidence level. The $\bar{R}^2$ is adjusted for degrees of freedom.

indicates increasing returns to scale. These first tables do not include partitions of the data by asset size, but they do focus attention on the cost differences between mutuals and stocks, other factors constant. This is accomplished by a stock-mutual dummy variable in Tables 1 and 2, and by segregating the observations and making separate regression runs in tables 3 and 4. The results are discussed in a section below.

It was established early in the statistical investigation that the two measures of output TNMS and TNMM provided virtually identical coefficients for each independent variable in the model. Since nothing substantial was added by the dual indices of the mortgage output, I arbitrarily dropped TNMM from further use, for economy of computer time and reporting, and retained TNMS. Also evident was that greater economies prevail when the cost measure included advertising, indicating the presence of increasing returns to promotion. This, too, will be discussed in more depth in a later section. For the sake of brevity the major portion of the analysis in this section will probe the technical cost models, with TNMS as the primary output variable. Other regression results are reported in an appendix. It should be noted that the mortgages serviced model and the accounts serviced model fit the data about equally well. The R^2s for the savings accounts model are slightly lower, but in each model the size of the coefficients of the output variables relative to their standard errors is about the same.

Table IV - 3 and IV - 4 compare parameters for one of the output models for the years 1967, 1968, and 1969, for stock and mutual associations. No substantial coefficient differences between years was encountered; nor was there any striking evidence of trends in efficiency over

these three years on a cross-section basis. I concluded that computer expenses could be saved by conveniently assuming that 1969 is a fairly representative year, and dispensed with the estimation of each model and each specification of costs for earlier years.

It was apparent from the step-wise regression results that, in each case, the primary output variable, the size of loan serviced variable, and the number of offices accounted together for about 90 percent of the variance in cost explained by the model. The other variables, some significant and some not, explained only small fractions of the variation in costs.

Results from partitioned and non-partitioned data

The results of this experiment emerge from a comparison of Tables 1 and 2 with Tables 5 and 6. To my knowledge, no S&L study has investigated statistical cost functions by asset size group, yet this knowledge is important in specific policy decisions. Benston alleges that the findings of economies of scale holds with equal magnitude over the entire range of his 1966 U. S. data. "Economies of scale do not appear to be proportionately greater for larger associations than for smaller associations."[1] He bases this conclusion on the fact that "the residuals from the regressions are of virtually the same magnitudes and signs for large and small associations." I am not convinced that a visual examination of the scatter of residuals sufficiently precludes a kinky or discontinuous cost function, even if the log-linear form of the variables does "well" fitting the data. My results contradict Benston's conclusions, possibly because of differences in data,

[1] Benston, op. cit., p. 705.

TABLE IV - 5 [a/]

REGRESSION RESULTS FOR ALL CALIFORNIA S&Ls, 1969, BY ASSET SIZE CLASS: SMALL, MEDIUM, LARGE. DEPENDENT VARIABLE: TECHNICAL EXPENSES (TEXP)

(millions)

Independent Variables	$0 - 24	$25 - 99	$100 +
Output variable: TNMS	.622** (.053)	.849** (.052)	.906** (.035)
SIZEM	.239** (.086)	.066 (.087)	.038 (.029)
SIZES	.577** (.073)	.917** (.117)	.888** (.066)
PCLM	-.030 (.029)	.010 (.018)	.034 (.022)
PSCHI	.066 (.016)	-.019 (.019)	-.107** (.031)
PTMS	-.065* (.032)	-.036 (.035)	-.006 (.043)
SIZEA	-.104** (.031)	-.052* (.027)	-.078 (.056)
STK	-.005 (.018)	-.055* (.025)	-.094** (.032)
POST60	.053** (.026)	.036 (.059)	n.a. [b/]
NOFFS	.171 (.181)	.143** (.040)	.111** (.037)
CONSTANT	-.109 (.016)	-1.405 (.481)	-1.331 (.507)
$\bar{R}^2$	.766	.838	.927
F-Statistic	53.08	60.31	51.75
No. Observations	78	85	67

[a/] Notes: Standard errors of the regression coefficients are reported in parentheses. Coefficients displaying a double (single) asterisk are significant at the .01 (.05) confidence level; $t \geq 2.64$ ($t \geq 2.01$). The $\bar{R}^2$ is adjusted for degrees of freedom.

[b/] This size group not affected by the POST60 variable.

TABLE IV - 6 [a/]

REGRESSION RESULTS FOR ALL CALIFORNIA S&Ls, 1969, BY ASSET SIZE CLASS: SMALL, MEDIUM, LARGE. DEPENDENT VARIABLE: TECHNICAL EXPENSES (TEXP)

(millions)

Independent Variables	$0 - 24	$25 - 99	$100 +
Output variable: TNA/C	.644** (.034)	.756** (.083)	.923** (.071)
SIZEM	.178 (.107)	.032* (.013)	.023* (.011)
SIZES	.460** (.178)	.531** (.190)	.484** (.128)
PCLM	.041 (.055)	.021 (.033)	.038 (.022)
PSCHI	-.003 (.021)	-.022 (.030)	-.130 (.061)
PTMS	-.119* (.047)	-.096 (.054)	-.168 (.082)
SIZEA	-.060 (.092)	-.046 (.067)	-.264* (.105)
STK	-.009 (.008)	-.031* (.014)	-.108* (.034)
POST60	.074** (.021)	.028 (.035)	n.a. [b/]
NOFFS	.165** (.053)	.091** (.030)	.099** (.025)
CONSTANT	.569 (.011)	.422 (.466)	1.142 (.201)
$\bar{R}^2$	.754	.571	.720
F-Statistic	75.11	57.20	59.28
No. Observations	78	85	67

[a/] Notes: Standard errors of regression coefficients are reported in parentheses. Coefficients displaying a double (single) asterisk are significant at the .01 (.05) confidence level; t≥2.64 (t≥2.01). $\bar{R}^2$ is adjusted for degrees of freedom.

[b/] This size group not affected by the POST60 variable.

methodology, or the year of the study. Tables IV - 5 and IV - 6 show, for two measures of output, that technical expense elasticities, highly significant in each case, increase substantially between small, medium, and large firms. The smallest size firm, with less than $25 million in assets, has enormous potential to realize scale economies as its number of mortgages serviced increases. (λ^{S}_{0} = .66) By the time a firm arrives in the large, mature asset size group, many sources of scale economies are perforce exhausted (λ^{L}_{0} = .91). This is not to deny that economies prevail throughout all size ranges; indeed, Shaw's observation that "we have no evidence to indicate that internal economy of scale disappears within the size ceiling of $1 billion "[2] seems eminently confirmed by the results reported here. Why should there be substantially greater economies for small S&Ls? One reason might be that operations can be mechanized and routinized, employees specialized, and managerial services spread only up to a given output level beyond which additional advantages of continued firm expansion are small. A more plausible reason was given in the discussion of branching in Ch. III. Figures III - 2 and III - 3 indicated that progressively larger association size might be attainable only via plant expansion (branching). In this event, there is a distinct possibility that economies of operations level may be partially offset by diseconomies of growth by branching. Small firms might be able to grow to medium size mainly by expanding operations without any (or many) branches. It must be pointed out that the cost variable in Table 5 and 6 is technical expenses. Large-asset-class S&Ls may have additional advantages in economies of promotion.

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[2]Shaw, op. cit., p. 106.

The finding of varying economies by size group accords with many of the bank studies. A number of these investigations have found that substantial economies exist for small size banks. Horvitz[3] found that cost generally fell with increased size, but that the amount was small, and that over a wide range, costs appeared constant. Schweiger-McGee's study[4] indicated that banks of less than $50 million in deposits experienced substantial economies and that cost savings from banks larger than $50 million in deposits were sharply reduced. Gramley[5] found economies throughout the operating range of member banks in the Tenth Federal Reserve District, but found most important economies in the smallest banks.

I turn now to a discussion of the other independent variables that account for i) product mix and ii) the omitted output variable, and iii) institutional or miscellaneous factors. Comparisons are made to see how well last Chapter's a priori expectations regarding these variables accord with the statistical results.

Average size of mortgage made

The coefficients on SIZEM were consistently positive and often significant at the .05 level. It was not expected that the cost of writing a $20,000 loan would be much less than that of writing a $40,000

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[3]P. M. Horvitz, "Economies of Scale in Banking," in Private Financial Institutions, Commission on Money and Credit, Englewood Cliffs, N. J., 1963.

[4]Irving Schweiger and J. S. McGee, "Chicago Banking," Journal of Business, July, 1961, 34: 203-366.

[5]L. Gramley, A Study of Scale Economies in Banking, Federal Reserve Bank of Kansas City, Missouri, 1962.

one. This appears to be the case; a 100 percent increase in average size mortgage implies anywhere from a 2 percent to a 20 percent increase in cost, all else constant. This is a wide variation, but in most cases the parameter is small. In Tables 5 and 6, this coefficient drops markedly between the small-asset group and the other two. A plausible explanation is that the medium and large firms handle a wide range of loan sizes and are thus geared to handle wide variations in loan size with great facility. Small firms with one or no branches are less accustomed to accomodating large borrowers, and thus perhaps take more man-hours (or more care) in investigating and negotiating because of inexperience. Large firms have a decided advantage in economies of writing large loans as compared with medium firms; medium firms in turn can produce larger loans more cheaply than can small firms. But there are considerable economies of scale accruing to all S&Ls as they make larger loans.

Average size of mortgage loan serviced

Once loans are written, there are cost savings in servicing larger average size loans, but not as substantial as for the loan-making function. This variable, SIZES, is highly significant (.01) in four of the six size groups in Tables 5 and 6. It is significant in Tables 3 and 4, mostly at the .01 level. The cost elasticity indicated varies widely, and it is difficult to generalize about this particular parameter. For instance, in the medium and large size groups (TNMS model), the coefficients are .92 and .89, respectively, indicating much smaller economies than in the other models or data groups. The parameter for stock associations is much smaller than for mutuals, implying that stock firms have, from some source, cost advantages over mutuals in servicing larger

loans. Whether this is due to the fact that mutuals grant more (and stock S&Ls fewer) loan-connected services, or whether stock S&Ls are merely more efficient is impossible to judge from the present model.

In each case the coefficient is positive as expected: there are extra costs due to handling, collecting, and posting larger (average) mortgage loans.

Percent construction loans made

The proportion of construction loans made to the total number of mortgage loans made per year is measured by this percentage. The sign on this coefficient was as hypothesized. Construction loans are supposed to be more difficult to set up and administer relative to purchase loans. This ratio varies substantially from association to association, with some associations making over 50 percent of their loans for construction, others with no construction loans. Surprisingly, the coefficient of this variable was very small, evidenced erratic sign changes, and never attained statistical significance. The conclusion is, if construction loans are more costly to make than purchase loans, this failed to show up in the data for 1969.

Percent scheduled items to risk assets

This variable is meant to reflect the additional costs imposed by the selection of a risky portfolio. Riskier lending practices tend, over time, to show up in more past-due accounts, collection attempts, and costly foreclosure proceedings.

Attempts by the S&L for rapid asset growth, or overpenetration of a given market, may be the initiating factor behind a high PSCHI. Regional shifts in demand or exogenous shocks, such as the closing of a

military base or cancellation of defense contracts in its market area may lead to asset portfolio trouble for the S&L. Or poor management judgment and ability could be the reason for a high level of scheduled items.

This variable turned out to have a minor, erratic impact on costs. It occasionally attained significance, especially for the large asset size group of S&Ls. The surprising result is: the parameter's negative sign in most regressions. This means that a 10 percent increase in PSCHI for e.g., large firms (with TNMS the output measure) implies a 1 percent decrease in TEXP, cet.par.. The negative sign is the reverse predicted by the earlier a priori analysis. This perplexing result may be explained according to an interpretation provided from interviews with regulatory agency people (who rely on PSCHI for certain policy decisions, i.e. branching applications). PSCHI is measured midyear, and could be indicative of an overall association laxness, e.g. cursory credit investigation of the loan applicants. If associations can turn out loans quickly with little labor spent in setting up those loans, they will "economize" and tend to have lower costs. Also, some firms may be understaffed, and have lower costs, while writing a normal volume of loans for their firm size. The presumption is, that with fewer S&L officers per loan serviced, more loans will go sour.

Percent mortgage loans made to serviced

This variable, (PTMS) was introduced to account for the omitted loan portfolio output variable, total number of mortgages made. There are several economic interpretations of PTMS. The coefficient of PTMS was expected to be positive, indicating that it is more costly if a

large proportion of the firm's mortgage portfolio was written in the current year. The size of this variable ranged from .5 percent to 4.5 percent in the observations. The estimated coefficient is consistently significant at the .05 level, but its sign is negative. I do not believe there exists a sensible economic justification--short of a blatant rationalization--for the negative sign encountered. There is a tentative hypothesis to be offered for the neutrality of this variable in explaining costs. The idea is, the higher is PTMS, the closer is the firm or plant to the output level for which factor combinations were designed. A S&L hires employees and purchases equipment in order to both secure and service loans and accounts. Servicing loans requires essentially clerical staff, and servicing accounts requires tellers; whereas making loans requires skilled management and loan officers in coordination with other employees. In a short-run situation, if new loan demand lags behind normal levels, loan officers are kept on, but with idle capacity in their function. As loan output expands, given TNMS, firms that can draw on this capacity will have lower costs than firms that must expand loan officer or managerial factor inputs by hiring. There is reason to believe that there exists considerable slack in capacity, or what might be termed elastic capacity, in loan-officer functions, enabling wide ranges of loan-making services for given years to be performed with existing staff. Thus, costs and loans made should not be closely related in the short run. This implies that the loans-made model explains costs mainly because variations in the level of loans made is highly correlated over time with total loans serviced. A more well-behaved coefficient is:

Average size of share account

This proved to be a significant explanatory variable, with a negative impact on total expenditures. Large accounts tend on balance to be related to lower operating costs. It was expected that debiting or crediting a large account is no more costly to the S&L than servicing a small account. The results show this to be the case. In addition, there are apparently desirable features of larger accounts that are actually associated with lower costs to the firm. SIZEA, significant usually at the .05 level, is correlated with deposit activity or turnover. Accounts with small balances are notoriously treated as demand deposits by their holders. Associations which must rely on classes of smaller savers, perhaps because of the characteristics of the community, are subject to more account openings and closings per average number of accounts held than other associations. They will tend to have higher bookkeeping and clerical costs. This was discussed and illustrated in Figure 1 of Chapter IV. It is seen from Tables 5 and 6 that small S&Ls ($0 24 million assets) can realize about a 1 percent decline in costs if accounts increase in average size by 10 percent, whereas medium and large firms can realize only about a .5 percent cost reduction for each 10 percent increase in their average account size. Mutual associations (Tables 3 and 4) can benefit more from an increase in SIZEA than can their stock association counterparts in each size group. This reflects the fact that mutuals have smaller average account sizes than stock S&Ls in producing a given output.

The new firm variable

In previous studies, data on recently-chartered S&Ls (as well

as very large firms) were excluded on the grounds they were atypical. For the years 1967-1969, virtually no new firms appeared in this industry. Instead, a consolidation via mergers was occurring. Experiments excluding data on stock associations that merged in the past two years show no substantial change in coefficients to reflect this trend. But the new firm variable, POST60 did prove significant (.01 level) for firms in the $0 - 24 million size range. This was a dummy variable defined as 10 for firms licensed within 9 years of 1969, and 1 otherwise. The choice of 1960 as the benchmark year was partly arbitrary; but it was chosen to include the burst of new S&Ls appearing in 1962 and 1963. For all associations, this variable was not significant for aggregated data. Small firms, however, had about 5 - 7 percent higher costs on average (depending on the model) than their older counterparts. It was not possible to attribute this to inexperience, set-up costs, or more rapid initial depreciation allowances; newly entering firms are possibly providing extra services or higher quality services at higher cost as a promotional effort in an attempt to establish good will.

Number of branches plus main office

This explanatory variable, NOFFS, was significant at the 1 percent level in virtually all models, and in all size groups--with the exception of the $0 - 24 million asset group for the TNMS model. The sign was positive, as anticipated. Figure 2 of Chapter III and the accompanying analysis is evidently a valid portrayal of the diseconomies associated with opening and operating branch offices. Additional costs of co-ordination and duplication of equipment, supervisory personnel, and loan officers (relative to handling the same volume out of a single

office) are obviously very important. Interesting patterns by asset class of this branching-cost elasticity are highlighted in Table 5 and 6. A 100 percent increase in the number of branches operated will, on average, increase costs 17, 14, and 11 percent for small, medium, and large S&Ls. Thus, though costly, branching is subject to economies. Small firms have a definite incentive to grow within a single office if they are able. It was hypothesied earlier that, beyond some total firm size (in terms of the number of loans serviced) a firm does not have the option of growing without setting up plants in new territory. The cost advantages of a larger scale of operation must be weighed against the added costs of branches. It is also noted in the aggregate results (Table IV - 3 and IV - 4), that it is more costly for a stock association to operate additional plants than for a mutual.

As a sample calculation, consider the following: For large firms, (100 + million assets), the average number of branches is 7.5, and the average cost per mortgage loan serviced is about $81.85 (Table IV - 9). The addition of one more branch for the typical firm in this size group implies an increase in average cost of about $1. An extra branch therefore increases average cost about 1.2 percent at the mean of this size-group data. On the other hand, an additional branch for the mean small S&L (they average .3 branches) will increase its average cost from $110.70 to $121.90, or by about 10 percent.

Suppose two medium unit S&Ls merge, each currently servicing the exact same number of mortgages--say, 7,677. The output of the resulting institution will then be doubled, and Table IV - 5 shows that its costs will only increase by about 85 percent. Thus total costs go up by 89 percent as output increases by 100 percent.

Another way to highlight the costs of branching is to consider what the average cost would be for the typical small, medium, and large S&L, had it operated as a unit association. (i.e., let NOFFS = 1). Below is a sample comparison of the cost per loan serviced, assuming i) the size-group average number of branches, and then, ii) that the same output level was handled under a single roof.

TYPICAL STOCK S&L

	small	medium	large
$ AC (with branches)	$110.70	$88.51	$81.85
$ AC (unit operation)	$105.65	$79.80	$64.42

These cost figures are dramatic in illustrating that the expansion path chosen or imposed on firms has been along the ray a,b,c, of Chapter III's Figure 2 above. The cost curve established empirically in the regressions resembles more closely the curve y,a,z,z' than y,a,a',a'' in the same figure. High costs of branching tend to flatten out the industry long-run average cost curve, indicating that eventually, constant costs may emerge for firms that can only continue to grow, and choose to do so, by branching.

In summary, S&Ls encounter a branch-cost phenomenon analogous to that revealed in bank studies. The duplicating of many operations which might be consolidated under one roof prove to have a significant cost impact. Problems of administration and communications are present in a branch network. These costs, by the way, do not include the initial capital set-up expenditures which are obviously higher under branch systems.

Mutual versus stock associations

This section reports on tests of the hypothesis that legal ownership or control has important cost ramifications. All federally-chartered S&Ls are mutuals, so this distinction also picks up any possible impact on costs of differences in regulatory guidance or constraint. A discussion in an earlier chapter presented the stock versus mutual question at a theoretical level, and enumerated various professional opinions on relative operating performance. These opinions are about equally divided as to what type S&L is more efficient in terms of costs, holding output mix constant. Brigham-Pettit concluded that, from their statistical model of Los Angeles firms, 1963-66, stock and mutual S&Ls have about the same operating costs.[6] Earlier I argued that these associations have similar motives and goals, but that differences in incentives, such as the possibility of capital gains for stock S&L managers, possible nepotism in mutuals, and the greater ability of stock firms to effect mergers, all might combine to produce differing operating results between these sectors of the industry. There is yet another factor, one generally overlooked. Much of any observed operating differences between stocks and mutuals may be due, not to the overt ownership form per se, but to the widespread holding company control of the former. This possibility is examined in Chapter VI below. Friedman has asked:

> ...what is a so-called mutual savings and loan company maximizing? If you are to be realistic, you have to talk in terms of the insurance companies associated with the savings and loans; you have to talk in terms of the nepotism associated with the manager of the savings and loan in making certain that the next person made

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[6] Brigham and Pettit, op. cit., p. 1180.

> manager is related to him. That is the class of things you have to speak about their maximizing. It is very hard to interpret mutual savings and loans in any simple way as maximizing institutions.
>
> Although self-dealing is a central principle of a free enterprise society and is indeed the central operative principle of every society, the problem is that savings and loan institutions are so structured as to require people to pursue their self-interest in underhanded ways. That seems to me to be a vary unfortunate feature of mutual institutions, and one of the reasons there is a great deal to be said in favor of having straight ownership institutions where one knows who owns an enterprise...

Homer Jones pointed out in this debate that within most corporations the people who are managing them do not own them, and there is as much possibility for self-dealing as in a mutual S&L. To which Friedman replied:

> No, not at all, because there is an identifiable class of owners who, if they believe the managers are mishandling things, can, in fact, get rid of them.

The debate continues:

> Jones: Is it a greater problem to get the savers at a savings and loan association to work to represent their interests than it is the stockholders of a giant corporation?
>
> Friedman: Yes, it is. The difference is that there is a free market in the shares of the corporation, and I can get votes in the corporation. If the shares go down in price, I can go into the market and buy them up and gain control. There is an indirect mechanism to enforce responsibility between ownership and management. In the case of the savings and loan institution, there is also an indirect mechanism, but it is more indirect and has less meaning.

Many of Friedman's observations are probably valid, but I believe it is still proper to treat the respective objectives of both S&L types as reasonably similar. The automatic signing of proxies--the fine print on the form filled out upon opening an account with a mutual--may make it easier for mutual management to retain control, but certainly not over all ranges of management behavior. Regulatory changes regarding reporting to mutual owners (share holders) are being considered. Jones

has also pointed out that:

> To a great degree the regulations since January 1, 1964, provide a more logical basis for an association's operation. As its risk assets increase, the association is required to add to its reserves a definite and specific amount. In a mutual association, reserve allocations become a proxy for profits. Thus, management goals are quite similar in a mutual and stock association.[7]

With the background of this controversy in mind, I contrast the statistical results for stocks and mutuals. This distinction was tested in two ways: first by separating stock and mutual data and reporting the results of the estimated parameters for both types, and second, aggregate and asset-partitioned data is utilized, allowing for ownership variation via a stock dummy (STK). This latter technique makes the assumption that the differentials between stock and mutual S&Ls can be measured by shifts in the entire least-squares regression line--i.e., that all differences are contained in the intercept term, and the slope coefficients on all the independent variables are identical between association classifications. The validity of this assumption, and the possibility of dummy-variable bias, is examined by allowing for interaction effects between independent variables in the segregated data. These separate regressions are reported, and the discussion focuses on Tables IV - 3 and IV - 4. (Other tables are included but not discussed expressly.)

Briefly, the results consistently indicate, in each regression run, that stock S&Ls have lower total operating costs or technical expenses than do mutuals. For aggregate data, separate regressions

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[7]All of the above quotations were taken from: Milton Friedman, Conference on Savings and Residential Financing, 1965, United States Savings and Loan League, Chicago, pp. 99 ff.

indicate that the mortgage serviced cost elasticity is .86 for stocks and .91 for mutuals. Both of these coefficients are significant at the .01 level. The separate estimates also provide interesting contrasts between economies present in sundry other independent variables, for instance stock firms have greater economies in SIZEM, size of loan made, but smaller economies for SIZES, size of loan serviced. The average size of account is significant for both types of S&L, and increases in this variable will have a slightly higher impact on costs for mutuals than stocks.

A comparison of the results from the separate estimations and the dummy variable estimations reveals scale economy differences of about the same magnitude; it is concluded that separate runs are called for if one is primarily concerned with the impact of other parameters, not just the cost-output impact. This is true because large differences are noted in the independent-variable coefficients between equations relying on the STK dummy and those relying on separate equation procedure. Thus, interaction effects are notable. For purposes of measuring and comparing overall operating cost performance, there are great advantages in using the STK dummy method of holding ownership control constant, and no significant change in measured economies results from this choice. The dummy variable approach enables me to partition the data by asset size and note stock-mutual performance differences in each class. Separate regressions for stock and mutual in each size group would force me to rely on a small number of observations for each run, with a sacrifice in explanatory power of the equation (small number of degrees of freedom).

Turning to the results of this partitioning, some interesting

facets of economies stand out in Tables IV - 5 and IV - 6. To begin with, the STK variable is negative in each case, indicating the presence of systematically lower costs for stock associations. The variable is significant only for the medium and large size S&Ls. The interesting pattern is, in both models reported, variations in technical expenses are not explained by a stock-mutual distinction. Both organizations in the small group tend to have similar costs. The major differences between operating expenses of stocks and mutuals appear to be found concentrated among very large S&Ls (100 million + assets). Here, apparently, stock associations enjoy important cost advantages. For example, a 10 percent increase in the number of mortgages serviced (number of accounts serviced) by a stock S&L implies a .9 (.11) less increase in total costs than is the case when a mutual in this size group expands by 10 percent. I conclude there are major systematic differences in the cost-output relationship between stock and mutual S&Ls in California, and the differences are concentrated solely among medium and large associations. A comparison of average and marginal costs of all associations is carried out in the next section. This will provide some comparative estimates of the actual per unit cost differences among S&Ls, and will serve to quantify some of the general relationships elaborated above. Other tables presented in the appendix report results for total operating cost, rather than technical expenses; the conclusions above are also confirmed by these additional regressions.

Discussion of average and marginal cost estimates

Each equation estimated confirmed the presence of economies of scale in the California S&L industry. The models used also provide a method for estimating actual average and marginal costs both by type

association and by asset size class. The estimates summarized in Tables IV - 11 and IV - 15 were calculated from equations [26] and [27] of Chapter II. A discussion of [26] and [27] was contained in that chapter and need not be repeated here. Sample AC and MC results were based on the TNMS and TNA/C models. The regression reuslts from asset-partitioned data made it possible to find three points (one each for the typical small, medium, and large firms) on the industry long-run average cost curve for both models. Table IV - 7 is a tabulation of the variable means to be held constant for each size group. These values are substituted into the estimated equations, one for each size group, to get AC and MC for the typical (i.e. average) firm in that group. To clarify this process, Table IV - 8 through IV - 14 present sample calculations of the cost figures. Figures IV - 1 and IV - 2 in turn provide a graphic presentation. For the typical small, medium, and large S&L, cost per mortgage serviced is $111, $89, and $82, respectively. The comparable figures for accounts serviced are $51, $46, and $41.

Figures IV - 1 and 2 illustrate the effect of partitioning the data in order to account for discontinuities in the industry long-run function, and to allow for a more homogeneous firm characteristics within the data. Evidently, there are pronounced differences in operating characteristics of the three firm sizes. There are wide differences among firms in the industry, and these differences are obscured by aggregating all associations, from the tiniest to the multi-billion dollar behemoth, into a single cross-section study. Some of these differences, of course, can be held constant via the output mix variables introduced into the model. But the others which remain can apparently

TABLE IV - 7

SELECTED VARIABLES FOR THE AVERAGE[a] S&L IN THREE ASSET SIZE GROUPS, 1969

Variable	(small) $0 - 24[b]	(medium) $25 - 99[b]	(large) $100 +[b]
TNA/C	5,213	12,509	45,560
TNMS	1,881	7,677	37,788
SIZEM	$22,721	$23,932	$36,170
SIZES	$14,307	$17,263	$19,423
PCLM	19.8%	15.6%	9.04%
PSCHI	3.89%	3.42%	4.68%
PTMS	3.59%	2.15%	1.62%
SIZEA	$2,657	$3,357	$3,389
STK	———	———	———
POST60	———	———	———
NOFFS	1.317	2.068	8.605
TNMM	67.7	162	615

[a] Value of these variables were computed from the geometric means (the anti-logarithm of the logarithmic mean) of the observations in corresponding asset-size classes.

[b] millions.

TABLE IV - 8

DEMONSTRATION OF METHOD FOR COMPUTING AVERAGE AND MARGINAL COST PER MORTGAGE SERVICED FOR A TYPICAL SMALL STOCK S&L, 1969

Variable	Logarithmic Value[a]	Parameter[b]	Parameter x Log value
CONSTANT	1.0000	.109	.109
TNMS	3.2744	-.338[c]	-1.107
SIZEM	4.3564	.239	1.041
SIZES	4.1556	.577	2.398
PCLM	1.2967	-.030	-.039
PSCHI	3.5902	.006	.022
PTMS	0.6021	-.065	-.039
SIZEA	3.4244	-.104	-.356
STK	1.0000	-.005	-.005
NOFFS	0.1195	.171	.020
log AC			2.044

AC = Antilog (2.044) = $110.70

MC = λ_0AC = (.622) (110.70) = $ 73.28

[a] Common logarithm of mean figures in Column 1, Table IV - 7.

[b] From Table IV - 5, Column 1.

[c] Parameter calculated: (λ_0 - 1) = .662 - 1.000 = -.338

TABLE IV - 9

DEMONSTRATION OF METHOD FOR COMPUTING AVERAGE AND MARGINAL COST PER MORTGAGE SERVICED FOR A TYPICAL MEDIUM STOCK S&L, 1969

Variable	Logarithmic Value[a]	Parameter[b]	Parameter x Log Value
CONSTANT	1.000	-1.405	-1.405
TNMS	3.885	-.151[c]	-.587
SIZEM	4.379	.066	.289
SIZES	4.237	.917	3.885
PCLM	1.708	.010	.002
PSCHI	0.534	-.019	-.010
PTMS	0.065	-.036	-.024
SIZEA	3.526	-.052	-.183
STK	1.000	-.055	-.055
NOFFS	0.316	.143	.045
log AC			1.947

AC = Antilog (1.947) = $88.51

MC = λ_0AC = (.849) (88.51) = $75.14

[a] Common logarithms of mean figures, Column 2, Table IV - 7.

[b] From Table IV - 5, Column 2.

[c] Parameter calculated: (λ_0 - 1) = .849 - 1.000 = -.151.

TABLE IV - 10

DEMONSTRATION OF METHOD FOR COMPUTING AVERAGE AND MARGINAL COST PER MORTGAGE SERVICED FOR A TYPICAL LARGE STOCK S&L, 1969

Variable	Logarithmic Value[a]	Parameter[b]	Parameter x Log value
CONSTANT	1.000	-1.331	-1.331
TNMS	4.574	-.094[c]	-.430
SIZEM	4.494	.038	.171
SIZES	4.288	.888	3.808
PCLM	0.956	.034	.033
PSCHI	0.670	-.107	-.072
PTMS	0.209	-.006	-.001
SIZEA	3.530	-.078	-.275
STK	1.000	-.094	-.094
NOFFS	0.935	.111	.104
log AC			1.913

AC = Antilog (1.913) = $81.85

MC = λ_0AC = (.906) (81.85) = $74.16

[a] Common logarithms of mean figures, Column 3, Table IV - 8.

[b] From Table IV - 5, Column 3.

[c] Parameter calculated: (λ_0 - 1) = .906 - 1.000 = -.094

TABLE IV - 11

ALL CALIFORNIA S&Ls, 1969, ESTIMATED[a] AVERAGE AND MARGINAL COSTS FROM LOANS SERVICED MODEL BY ASSET SIZE CLASS

Average Cost (AC) or Marginal Cost (MC) by type	(small) $0 - 24[b]	(medium) $25 - 99[b]	(large) $100 +[b]
Mutuals (licensed before 1960)			
AC	$110.95	$100.45	$101.60
MC	$ 73.45	$ 85.28	$ 92.05
Stock (licensed before 1960)			
AC	$110.70	$ 88.51	$81.85
MC	$ 73.28	$ 75.14	$74.16
Mutuals (12) (licensed after 1960)			
AC	$124.85	n. a.[c]	n. a.
MC	$ 82.65	n. a.	n. a.
Stock (43) (licensed after 1960)			
AC	$124.60	n. a.	n. a.
MC	$ 82.49	n. a.	n. a.

[a] Notes: Estimated in Tables IV - 8, IV - 9, IV - 10, and from additional parameters and variables in Tables IV - 5 and IV - 7.

[b] millions.

[c] n. a. = size class not affected.

TABLE IV - 12

DEMONSTRATION OF METHOD FOR COMPUTING AVERAGE AND MARGINAL COST PER DEPOSIT ACCOUNT SERVICED FOR A TYPICAL SMALL STOCK S&L, 1969

Variable	Logarithmic Value[a/]	Parameter[b/]	Parameter x Log value
CONSTANT	1.000	.569	.569
TNA/C	3.717	-.356[c/]	-1.323
SIZEM	4.356	.178	.775
SIZES	4.156	.460	1.912
PCLM	1.297	.041	.053
PSCHI	3.590	-.003	-.011
PTMS	0.602	-.119	-.072
SIZEA	3.424	-.060	-.205
STK	1.000	-.009	-.009
NOFFS	0.119	.165	.020
log AC			1.709

AC = Antilog (1.709) = $51.17

MC = λ_0AC = (.644) (51.17) = $32.95

[a/] Common logarithm of the geometric means, Column 1, Table IV - 7.

[b/] Parameter valued from Column 1, Table IV - 6.

[c/] Parameter calculated: (λ_0 - 1) = .644 - 1.000 = -.356

TABLE IV - 13

DEMONSTRATION OF METHOD FOR COMPUTING AVERAGE AND MARGINAL COST PER DEPOSIT ACCOUNT SERVICED FOR A TYPICAL MEDIUM STOCK S&L, 1969

Variable	Logarithmic Value[a/]	Parameter[b/]	Parameter x Log value
CONSTANT	1.000	.422	.422
TNA/C	4.097	-.244[c/]	-1.000
SIZEM	4.397	.032	.140
SIZES	4.237	.531	2.250
PCLM	1.708	.021	.036
PSCHI	0.534	-.022	-.012
PTMS	0.065	-.096	-.006
SIZEA	3.526	-.046	-.162
STK	1.000	-.031	-.031
NOFFS	0.316	.091	.029
log AC			1.666

AC = Antilog (1.666) = $46.34

MC = λ_0AC = (.756) (46.34) = $35.03

[a/] Common logarithms of geometric means, Column 2, Table IV - 7.

[b/] Parameter values from Column 2, Table IV - 6.

[c/] Parameter calculated: (λ_0 - 1) = .756 - 1.000 = -.244

TABLE IV - 14

DEMONSTRATION OF METHOD FOR COMPUTING AVERAGE AND MARGINAL COST PER DEPOSIT ACCOUNT SERVICED FOR A TYPICAL LARGE STOCK S&L, 1969

Variable	Logarithmic Value[a/]	Parameter[b/]	Parameter x Log value
CONSTANT	1.000	1.142	1.142
TNA/C	4.659	-.077[c/]	-.358
SIZEM	4.494	.023	.103
SIZES	4.288	.484	2.075
PCLM	0.956	.038	.036
PSCHI	0.670	-.130	-.870
PTMS	0.209	-.168	-.352
SIZEA	3.350	-.264	-.932
STK	1.000	-.108	-.108
NOFFS	0.935	.099	.093
log AC			1.612

AC = Antilog (1.612) = $40.92

MC = λ_0AC = (.923) (40.92) = $37.77

[a/] Common logarithm of the geometric means, Column 1, Table IV - 7.

[b/] Parameter values from Column 1, Table IV - 6.

[c/] Parameter calculated: (λ_0 - 1) = .923 - 1.000 = -.077

TABLE IV - 15

ALL CALIFORNIA S&Ls, 1969, ESTIMATED[a] AVERAGE AND MARGINAL COSTS FROM ACCOUNTS SERVICED MODEL, BY ASSET SIZE CLASS

Average Cost (AC) or Marginal Cost (MC) by type	$0 - 24[b]	$25 - 99[b]	$100 +[b]
Mutuals (licensed before 1960)			
AC	$ 52.24	$ 49.77	$ 52.49
MC	$ 33.64	$ 37.63	$ 48.45
Stock (licensed before 1960)			
AC	$ 51.17	$ 46.34	$ 40.92
MC	$ 32.95	$ 35.03	$ 37.77
Mutuals (12) (licensed after 1960)			
AC	$ 61.95	n. a.[c]	n. a.
MC	$ 39.90	n. a.	n. a.
Stock (43) (licensed after 1960)			
AC	$ 60.68	n. a.	n. a.
MC	$ 39.08	n. a.	n. a.

[a] Notes: Estimated in Table IV - 12, IV - 13, IV - 14 and from additional parameters and variables in Tables IV - 6 and IV - 7.

[b] millions.

[c] n. a. = size class not affected.

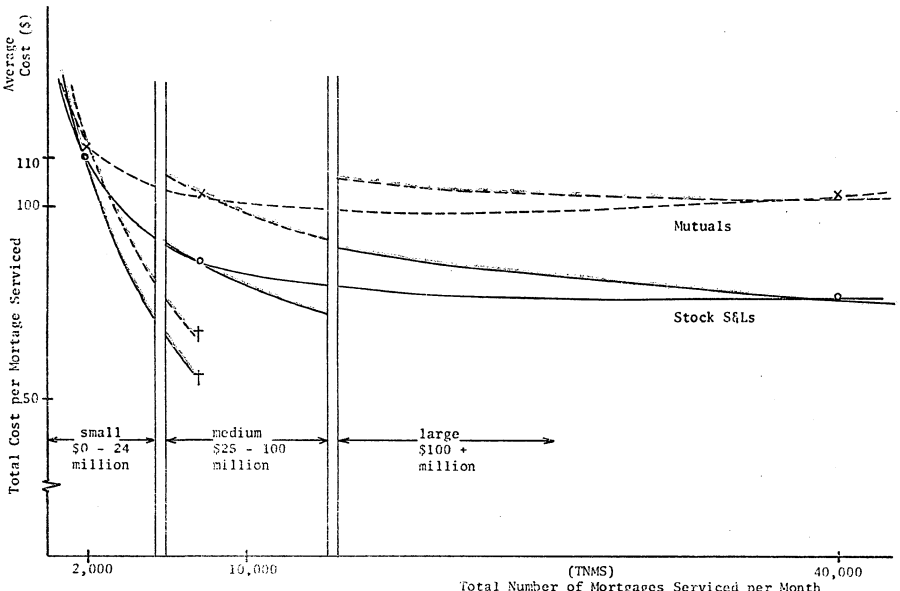

Figure IV - 1

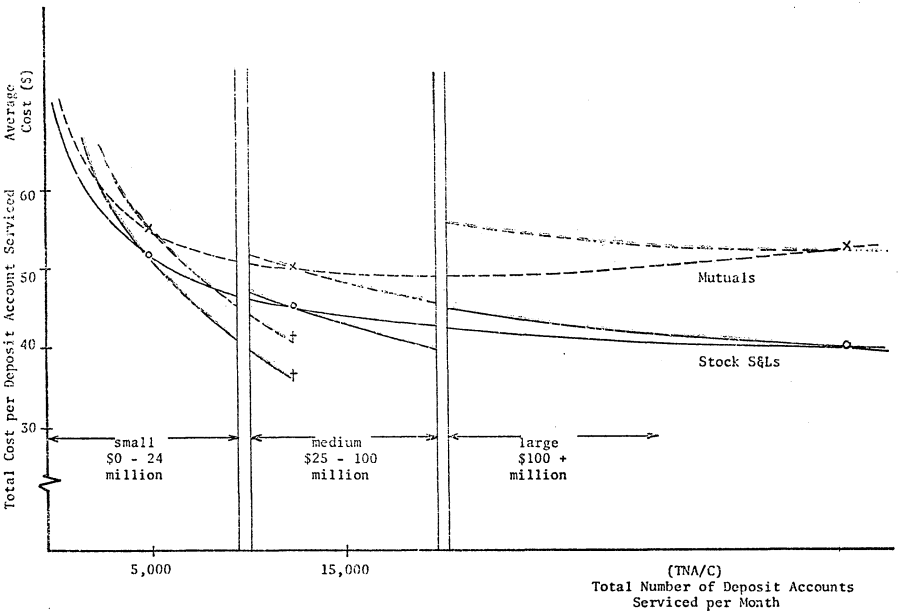

Table IV - 2

only be captured by treating large and small firms separately--almost as though they were in separate industries. Figures 1 and 2 show (red curves) what the AC of small firms would be if they were to produce the same output as the typical medium firm, while holding the small firm's structure constant (except for the provision of the requisite extra branch). The small firm's average cost, including the cost of operating an additional branch, is $59.02 at an output level of 7,700 mortgages serviced--compared with $88.50 for the typical medium firm. There is, of course, something amiss in projecting from an equation beyond the range of the data used in the equation's estimation. But this procedure is instructive in that it demonstrates the possibility of a cost function discontinuous over certain output ranges.

Returns to promotion

There are several reasons to expect economies in promotional expenditures as S&Ls get larger. If there is some absolute expenditure level per time period which will expose potential clientele to the desired amount and frequency of message lines or units in a given media, then as the firm grows this given absolute expenditure becomes a smaller proportion of its expenses. Another way to visualize economies is, if both large and small firms allocate 10 percent of their budget to advertising, the budget of the larger S&L permits access to expensive television space which reaches a wide audience. It is assumed that the small firm, allocating the same proportion of its total budget to advertising, lacks ability to purchase units in this medium. Thus, because of indivisibilities, the promotion expenditures of the big S&L are more efficient. With access to more efficient media, the large S&L can

afford the luxury of, say, only allocating 9 percent of its budget to promotion and still get more results.

There is also a dynamic dimension of advertising. Promotion-effectiveness may be a function of continued message exposure over a long period. As they have grown up, large associations have barraged their market area so long that they are well known and need spend, relative to small, newer firms, a smaller fraction per unit of output to maintain the special image of their products. There are, in short, many reasons why advertising expenses might increase proportionately less than output increases. Economies of large scale promotion pose special analytic problems. The effects of promotion may show up not only in the form of lower unit costs, but also, as Shaw finds, in the ability of S&Ls to charge prices higher (or pay lower dividends) than those of smaller rival intermediaries for comparable products. It is impossible to disentangle the resulting combination of price premiums and cost savings. Private benefits to scale in promotion are not reflected in public benefits, society loses when a firm gains oligopoly power by differentiating its product by a successful promotional campaign.

Another difficulty encountered in the economies of promotion is, if a large S&L mounts a new advertising campaign that is a monumental failure, it makes no sense to talk of economies of advertising scale.

There is also the theoretical point that promotional expenditures should be treated as a capital cost item, not a current operating expense. This is because advertising expenditures affect demand not merely in the current year, but also in future years. To treat promotional costs as capital costs means that they would be depreciated over a period of years, not 100 percent written off in the year they were

undertaken.

Also, if larger firms get advertising cheaper because they have monopsony power over suppliers, or get quantity discounts, this represents pecuniary economies (a wealth redistribution between the S&L and advertising industries) and is of little consequence in the analysis of technical economies.

The models tested in this study are not designed to tackle the questions and problems raised above. They do provide some indication of promotional advantages of scale as viewed by individual firms within the industry. S&L managers are convinced that advertising is essential, and a cheaper way to increase the inflow of savings capital (that increases in the share rate involve higher savings capital costs is implied by the fact that the marginal cost of funds curve lies above the rising average cost curve). Thus, an analysis of the promotion cost-output elasticity must be undertaken with the caveat that it measures benefits accruing solely to the industry, and these benefits are offset to the extent that enhancement of product differentiation results in an increase in the spread between share and deposit rates above what would prevail in the absence of promotion (the latter impact being impossible to measure).

The regression results show that, in each case, when total operating costs including advertising is the dependent variable, a greater degree of scale economies exists. For the TNMS model, a doubling of output results in an increase of 90 percent in technical expenses for all S&Ls. The same model indicates that this increase in output is associated with only an 84 percent increase in total costs. The significant difference reflects advantages of scale savings in the promotion

TABLE IV - 16[a/]

ALL CALIFORNIA S&Ls, 1969. ADVERTISING COST-OUTPUT RELATIONSHIPS SUMMARIZED DEPENDENT VARIABLE: ADVERTISING COST

Independent Variables	TNA/C	TNMS
TNA/C	.647**	.657**
	(.094)	(.113)
SIZEM	.221	.353
	(.229)	(.303)
SIZES	.008	-.203
	(.165)	(.223)
PCLM	-.120*	-.218**
	(.057)	(.074)
PSCHI	.045	.067
	(.079)	(.105)
PTMS	.141	.496**
	(.118)	(.155)
SIZEA	.783	1.002
	(.473)	(.622)
HELDCO	-.026	-.037
	(.064)	(.084)
POST60	.103*	.103*
	(.047)	(.032)
NOFFS	.007	.013
	(.009)	(.014)
CONSTANT	-1.192	-.369
	(1.187)	(1.580)
$\bar{R}^2$	.670	.427
F-Statistic	17.74	7.14
No. Observations	230	230

[a/] Standard errors of regression coefficients are reported in parentheses. Coefficients displaying a double (single) asterisk are significant at the .01 (.05) confidence level; t = 2.64 (t = 2.01). $\bar{R}^2$ is adjusted for degrees of freedom.

department. The elasticity figures for the TNA/C model are .69 and .76 respectively, again showing that total costs do not increase as much as technical costs when output rises.

Table IV - 16 reports regressions which use the model to explain advertising expenses, ADV. The models tested were able to explain 67 and 43 percent of the variation of advertising expenses. A 10 percent increase in the number of mortgages serviced is associated with a 6.6 percent increase in advertising, and a 10 percent increase in the number of accounts finds an increase of 6.5 percent in these promotional outlays. Many of the variables in these equations are not significant, but POST60 proved to be at the 5 percent level of confidence. Associations licensed in recent years tend to have higher advertising costs. The coefficient of this dummy variable is 0.10.

This concludes the discussion of the statistical findings of returns to scale. Measuring cost in two distinct ways enabled me to isolate promotional cost for separate treatment. The primary output models were compared, and an analysis of the results for the other individual independent variables was included. The next chapter singles out S&L holding company affiliates, and compares their performance with that of non-held S&Ls. Possible modifications of the contrast drawn in the present chapter between mutual-stock cost functions may be in order if differences in economies are due to the large number of stock companies in the data which are controlled. The analysis of holding company arrangements and the relationship between parent and affiliate may shed some light on the statistical characteristics uncovered in this chapter. Before adjourning to the next chapter, some indication is given of the statistical reliability of the results reported in this chapter.

Statistical problems and the efficiency of the estimates

There are a host of statistical problems that plague researchers using multiple regression techniques. A number of well-known sources of error, which bias or interfere with efficient parameter estimation, may creep into cross-section studies. Since this study draws many conclusions from the estimated coefficients, it is imperative that the validity of those coefficient be assured.

I have previously considered possible pitfalls in the selection of a cross-section approach, the preconditions for the appropriateness of the model selected, and the rationale for the variables ultimately included. I hope the proper theoretical treatment of the variables that influence cost, and the measures of output chosen, will eliminate specification error--the error introduced by erroneously omitting certain key endogenous variables.

There are two important sources of potential error common to the multiple regression technique employed in this study.[8] These are, i) nonnormally distributed error terms without constant variance (heteroscedastidity) and, ii) intercorrelation among the specified independent variables (multicollinearity). Other sources of error, such as serial correlation, are usually not critical in models estimated from cross-section data; therefore, the discussion of this problem is omitted.

Multicollinearity

When the independent variables chosen are correlated between

[8]This discussion is based on Chapter 8 of J. Johnston, "Miscellaneous Single-equation Problems," Econometric Methods, McGraw-Hill, New York, 1963, pp. 201 - 230.

themselves, there is no way to isolate the separate explanatory effects of these variables on the dependent variable, and the estimating method breaks down. For instance, the inclusion of both number of loans serviced and number of accounts serviced would have lead to meaningless estimates of the elasticity of cost with respect to either variable. These variables are nearly perfectly correlated.

In the case most often encountered in single-equation estimation, the values of the explanatory variables in the sample are correlated, but not highly or perfectly. Johnston[9] proves that "the standard errors should give ample warning of the imprecision attaching to the estimates of the separate effects of X_2 and X_3 when the two variables are highly correlated." Thus, moderate multicollinearity implies that the estimated regression coefficients will be unbiased coefficients, but will exhibit very high standard errors (low T-values). The results presented indicate the standard errors and the confidence levels attached to them. We have further reassurance in this problem: as a part of the standard computations in the regression analysis, the program utilized for this study printed out the calculations of the simple correlations for the pairs of the independent variables and formed the correlation matrix, $R = (r_{ij})$ where r_{ij} = sample correlation between X_i and X_j. If r_{ij} are large, say, .80 or greater, we have serious pairwise collinearity. But how high should r_{ij} be before it is intolerable? Klein[10] suggests a rule of thumb that multicollinearity is "tolerable" if

---

[9] Ibid., p. 204.

[10] L. Klein, Introduction to Econometrics, Prentice-Hall, Englewood Cliffs, N. Y., 1962, p. 101.

$$r_{ij} < R$$

where R is the square root ot the coefficient of multiple determination, R^2. Inspection of the correlation matrices of the various models estimated shows that the Klein test is met.

Heteroscedasticity

This problem is also discussed by Johnston.[11] One of the assumptions of the linear regression model is that.the disturbances are independently distributed variables with a constant variance. The condition of a nonconstant variance is called heteroscedasticity. Heterogeneous variances cause the estimated coefficients to not be minimum variance estimates--better ones can be obtained by transforming the original data to insure homoscedasticity of the error terms. If error terms are non-normally distributed, it hinders the ability to make probability statements about the true size of coefficient estimates. Heteroscedasticity is a particular nuisance in cross-section studies of financial industries, such as banking or savings and loans. There are usually many observations of small firms at one end of the range, while at the other end only a few extremely large firms exist. (For California S&Ls the asset size ranges from $1 million to $3.1 billion.) Thus, there is the danger that the extreme values of a few large observations will bias the overall results, making the regression coefficients worthless. One obvious solution is to delete all "abnormally" large firms (a dubious procedure). There is reason to believe that the methodology adopted in the present study avoided this statistical pitfall. First, a

[11] Johnston, op. cit. pp. 207 ff.

partitioning of the data by size class, as was done in many instances, certainly reduces possible heterogeneity. Second, the standard procedure in cross-section studies is to transform variables in a fashion so as to eliminate the non-normality in the original variables. Johnston demonstrates that if the standard deviation of the disturbance term is proportional to, say, asset size, then transforming the data by deflating each variable (dividing through) by assets will eliminate heteroscedasticity. When we transformed all the data into logs to achieve the characteristic shape of the total cost curve, we could have corrected any heterogeneity. Indeed, a scatter diagram of the residuals in selected equations indicated that they were approximately normally distributed.

Notes on the Chow test of equality between coefficients in partitioned and aggregate data

The asset-size partitioning led to the development of three sample sizes n_1, n_2, and n_3 corresponding to data for small, medium and large associations, and where $n_1 + n_2 + n_3 = n$. It is possible to use a generalized Chow test of the constancy of the coefficients of a linear regression equation involving k independent variables (including the constant term).[12]

Given the general regression model, the three samples satisfy

$$y_1 = X_1\beta_1 + u_1$$

$$y_2 = X_2\beta_2 + U_2$$

$$y_3 = X_3\beta_3 + u_3$$

[12] Johnston, op. cit., p. 136. See also a discussion in David S. Huang, Regression and Econometric Methods, "Testing for Structural Stability," Ch. 5, Wiley, N. Y., 1970, pp. 104 - 116.

where y_1, y_2, and y_3 are respectively $n_1 \times 1$, $n_2 \times 1$, and $n_3 \times 1$, and β_i, $i = 1, 2, 3$, is $k \times 1$.

The constancy test involves the null hypothesis that

$$\beta_1 = \beta_2 = \beta_3 \ (=\beta^*)$$

The following system is defined:

$$\begin{pmatrix} y_1 \\ y_2 \\ y_3 \end{pmatrix} \quad \begin{pmatrix} X_1 & 0 & 0 \\ X_2 & 0 & 0 \\ X_3 & 0 & 0 \end{pmatrix} \quad \begin{pmatrix} \beta_1 \\ \beta_2 - \beta_1 \\ \beta_3 \quad \beta_1 \end{pmatrix} \quad + \quad \begin{pmatrix} u_1 \\ u_2 \\ u_3 \end{pmatrix}$$

And,

Q_1 = $u_1'u_1$, which has a X^2 distribution with [n - k] degrees of freedom if $\beta_1 = \beta_2 = \beta_3 \ (=\beta^*)$

Q_2 = u'u, which has a X^2 distribution with [n - 3k] degrees of freedom if $E(uu') = I\sigma^2$

Q_3 = $Q_1 - Q_2$, which has a X^2 distribution with [(n - k) - (n - 3k)] = 2k degrees of freedom.

So the ratio is defined:

$$\frac{Q_3/2k}{Q_2/(n - 3k)}$$

which has an F distribution, with [2k, n - 3k] degrees of freedom. The above then is the appropriate test statistic ratio, where the interpretation of the Q's is:

Q_1 is the sum of squares of true residuals taken around the "common" regression plane - with all data grouped

Q_2 is the error sum of squares from the data - a measure of the discrepancy between what is observed in the form of the data y's (variability around individual regression lines, partitioned data)

Q_3 is the error sum of squares between the common regression plane and the value of y_i predicted by partitioned data regression coefficients. This is a measure of variability of the estimated regression planes using partitioned data from the common regression plane.

Using the test ratio indicated that data-partitioned results yielded significantly diiferent results from the aggregate results.

For instance, from Table IV - 5, a typical test statistic is given: n = 230; n_1 = 78; n_2 = 85; n_3 = 67; k = 11, and the Standard Error of the estimate from the computer print-outs = $u_i'u_i$/d.f., so F can be calculated:

$$F = \frac{[o.5611 - 0.4536]/22}{0.4586/197} = 1.99$$

The critical value for F[22, 197] at the .05 level is 1.57. Therefore, the null hypothesis is rejected. Conclusion: the most that can be said is that in the asset-partitioned results, the significant difference from the pooled results arises either from the scale parameters, or any of the other parameters. Further tests are required to show that the null hypothesis is rejected because of the sole impact of the scale parameters. Other calculations of the above F-ratio indicated that, in each case, partitioning the data made a significant difference in the coefficients obtained. See Table IV - 17 below for a summary.

TABLE IV - 17

CHOW TEST RESULTS

Regressions Reported in Table	Test Ratio	Calculated F-statistic	Critical F-value
IV - 5	$\frac{Q_3/2k}{Q_2/(n - 3k)}$	1.99	1.57*
IV - 6	(as above)	2.38	1.57*
V - 3	$\frac{Q_3/(k + 1)}{Q_2/(n - 2k - 2)}$	2.77	1.90**
V - 4	(as above)	2.51	1.90**
V - 5	(as above)	2.96	1.90**

*F[22,(230 - 330] at .05 = value indicated

**F[10,(151 - 20 - 2)] at .05 = value indicated

APPENDIX IV - A:

NEUTRAL VARIATIONS IN RETURNS TO SCALE

Professor Bridger Mitchell suggested that I employ Nerlove's test[1] whereby the degree of returns to scale is treated as a continous function of output. The empirical section of this chapter reported cost functions estimated from data partitioned by asset-size class; this technique of necessity yields a slightly discontinuous cost curve (e.g. Figures IV - 1, IV - 2.) An interesting question may be posited: suppose firms in the smallest ($0 - 25 million) size group could grow very large in the volume of their output (i.e., TNMS), while preserving intact the original output mix they began with. This approach holds portfolio mix constant, and treats the firm's expansion like the symmetrical surface of an expanding balloon. This is Nerlove's experimental concept of "neutral variations in returns to scale." By allowing, as in my formulation, for variations in output mix, size of average deposit, loan serviced, and riskiness, I implicitly utilized the hypothesis of non-neutral variations in scale. In my treatment, non-neutral variations in returns to scale means scale affects not only returns to scale but output mix and also marginal rates of substitution among factors.

In the familiar notation of Chapter II, with all variables in logarithms:

$$C = \mu + \frac{1}{\nu}(TNMS) + [\frac{\alpha}{\nu}R + \frac{\beta}{\nu}W + \frac{\delta}{\nu}M]$$

and

$$C = \mu + \lambda_0(TNMS) + \lambda_1 X_1 + \lambda_2 X_2 + \ldots\ldots \lambda_n X_n$$

---

[1] Marc Nerlove, op. cit.

where $\lambda_1, \lambda_2, \ldots, \lambda_n$ are constrained to the same value for all three asset-size groups by holding output mix identical to that of the $0 - 25 million class.

Nerlove tested a form analogous to

$$\lambda_0 = \frac{1}{\nu(TNMS)}$$

where

$$\nu(TNMS) = \frac{1}{\alpha + \beta(TNMS)}$$

or

$\lambda_0 = \alpha + \beta(TNMS)$ in my notation, so that the cost function becomes:

$$C = \mu + \alpha(TNMS) + \beta(TNMS)^2 + \lambda_1 X_1 + \lambda_2 X_2 + \ldots + \lambda_n X_n$$

But tests of this form did not yield results substantially different from those reported below. Moreover, this latter form is difficult to interpret in relation to my earlier regression runs.

Table IV - 18 shows that neutral variations in returns to scale enables me to conclude that the scale parameter shows greater economies than measured earlier for medium and large asset size groups taken separately. This procedure has provided an interesting indication of the extra expenses involved in the inability of S&Ls to preserve fixed factor proportions as they expand their portfolios.

TABLE IV - 18[a/]

REGRESSION RESULTS FOR ALL CALIFORNIA STOCK AND MUTUAL S&Ls, 1969. DEPENDENT VARIABLE: TECHNICAL EXPENSES (TEXP). OUTPUT MODEL: TOTAL NUMBER OF MORTGAGES SERVICED PER MONTH (NEUTRAL VARIATIONS IN RETURNS TO SCALE)

Independent Variables	Regression Coefficients
Output variable:	
TNMS	.775** (.061)
SIZEM	.239** (.053)
SIZES	.577** (.039)
PCLM	-.030 (.022)
PSCHI	.066 (.015)
PTMS	-.065 (.034)
SIZEA	-.104** (.028)
NOFFS	.171** (.052)
POST60	.053 (.052)
STK	-.005* (.002)
$\bar{R}^2$	.904
F-Statistic	529.44
No. of observations	230

[a/] Notes: Standard errors of the regression coefficients are reported in parentheses. Coefficients displaying a double (single) asterisk are significant at the .01 (.05) confidence level. The $\bar{R}^2$ is adjusted for degrees of freedom.

[APPENDIX IV - B]
TABLE IV - 19[a/]

REGRESSION RESULTS FOR ALL CALIFORNIA S&Ls, 1969 BY ASSET SIZE CLASS: SMALL, MEDIUM, LARGE. DEPENDENT VARIABLE: TECHNICAL EXPENSES. OUTPUT: DOLLAR VOLUME OF LOANS SERVICED PER MONTH

Independent Variables	$0 - 24	$25 - 99	$100 + (million)
Output variable T$MLS	.679** (.092)	.854** (.041)	.916** (.033)
SIZEM	.115* (.051)	.051 (.043)	.022 (.033)
SIZES	.563** (.048)	.900** (.112)	.871** (.073)
PCLM	-.018 (.010)	.011 (.013)	.033 (.018)
PSCHI	.008 (.019)	-.025 (.020)	-.111** (.041)
PTMS	-.059 (.033)	-.041 (.038)	-.001 (.081)
SIZEA	-.111** (.031)	-.048* (.027)	-.075* (.031)
STK	-.004 (.019)	-.060* (.030)	-.092** (.025)
POST60	.045** (.015)	.030 (.051)	n. a.[b/]
NOFFS	.158 (.144)	.147** (.057)	.109** (.027)
CONSTANT	-.097 (.015)	-1.002 (.499)	-1.606 (.519)
$\bar{R}^2$	.811	.883	.941
F-Statistic	51.04	67.22	64.71
No. Observations	78	85	67

[a/] Notes: Standard errors of the regression coefficients are reported in parentheses. Coefficients displaying a double (single) asterisk are significant at the .01 (.05) confidence level. The $\bar{R}^2$ is adjusted for degrees of freedom.

[b/] This size group not affected by the POST60 variable.

TABLE IV - 20[a/]

REGRESSION RESULTS FOR ALL CALIFORNIA S&Ls, 1969 BY ASSET SIZE CLASS: SMALL, MEDIUM, LARGE. DEPENDENT VARIABLE: TECHNICAL EXPENSES. OUTPUT: DOLLAR VOLUME OF ACCOUNTS SERVICED PER MONTH

Independent Variables	$0 - 24	$25 - 99	$100 + (million)
Output variable T$A/C	.638** (.044)	.789** (.091)	.935** (.083)
SIZEM	.182 (.141)	.028 (.022)	.024* (.010)
SIZES	.382** (.101)	.600** (.155)	.405** (.137)
PCLM	.022 (.039)	.029 (.035)	.033 (.019)
PSCHI	-.001 (.035)	-.017 (.024)	-.123 (.087)
PTMS	-.120* (.059)	-.091 (.088)	-.165 (.128)
SIZEA	-.044 (.071)	-.058 (.067)	-.206* (.100)
STK	-.007 (.007)	-.038* (.016)	-.119* (.042)
POST60	.081** (.011)	.025 (.027)	n. a.
NOFFS	.159** (.040)	.088** (.021)	.089** (.015)
CONSTANT	.801 (.029)	.775 (.420)	1.010 (.399)
$\bar{R}^2$	.681	.730	.751
F-Statistic	71.25	56.41	60.98
No. Observations	78	85	67

[a/] Notes: Standard errors of the regression coefficients are reported in parentheses. Coefficients displaying a double (single) asterisk are significant at the .01 (.05) confidence level. The $\bar{R}^2$ is adjusted for degrees of freedom.

[b/] This size group not affected by the POST60 variable.

CHAPTER V

CALIFORNIA HOLDING COMPANIES, SAVINGS AND LOAN SUBSIDIARIES, AND THEIR COST-OUTPUT RELATIONSHIP

California holding companies are corporations organized to own the capital stock of one or more firms. Under Section 408 (a) of the Savings and Loan Holding Company Act of 1967 (As an amendment to the National Housing Act), a holding company is one which controls directly or indirectly an insured S&L. Control is difficult to define a priori, but the Act specifies that control exists if the holding company owns or controls with power to vote more than 25 percent of the voting shares of the association, or controls the election of the majority of any S&L's directors, or exercises significant influence over management or policies of the S&L. The Commissioner's Reports, however indicate holding company control when 50 percent of the affiliate's stock is owned or controlled. Because patterns of control may be so subtle and varied, it is impossible to set up an all-inclusive standard; I hope to avoid this problem by taking the narrower definition, the 50 percent criterion of the Commissioner's office. To my knowledge, this includes virtually all important holding companies, since these universally own more than 50 percent. Holding companies may be unitary or multiple, with the latter controlling two or more state S&Ls. They may be public or private, depending on whether permission has been secured from the Securities Exchange Commission to announce the public sale of stock. There is no basis which would warrant any distinction between public and nonpublic companies in the matter of regulation of holding companies. Besides owning the guarantee stock of one or more S&Ls, the holding

company directly or through other subsidiaries conducts businesses whose functions are related to that engaged in by S&Ls. Examples of the non-S&L affiliates of the holding company are: insurance agencies, escrow companies, and trustee companies. In addition, other activities owned or engaged in by various holding companies include: land development, commercial banks, purchase and sale of trust deeds, investment in real estate, and construction companies.

The multiple holding company movement began in 1955 with the formation of Great Western Financial Corporation, and the acquisition rate increased unabated until, by 1961, these companies controlled 77.5 percent of stock-association assets in California. The growth flurry in 1959 took place in a race to beat impending holding company regulatory legislation. This remarkable growth was accompanied by active trading of holding company stocks, a trading which peaked in 1960-61. In that period, the big holding company stocks advanced 400 percent on the New York exchange. Holding companies nationally experienced phenomenal growth. In 1959, 44 holding companies controlled 93 S&Ls with $4.3 billion in assets; in 1966, 98 companies controlled $16.2 billion.

California has been the center of S&L holding company activity: more than 83 percent of the assets of controlled S&Ls nationally are in California.

By 1959, the FHLBB was able to obtain legislation, in the form of the Spence Act, which provided regulatory powers over holding companies. The main reasons for holding companies' growth relate to restrictions imposed on individual insured S&Ls, so naturally the Board was interested in extending its regulatory arm. The agency feared that

holding companies would bleed their S&Ls for profits and upset the pattern of local, independent S&Ls by concentrating power in the hands of a few people. The Board was especially concerned with California. The ways holding companies can abuse their power of controlled S&Ls are numerous:

> The most obvious method is to force the S&L to pay extraordinarily high dividends on stock, giving the holding company more money while draining the S&L. Another practice is to force the S&L to deal with other subsidiaries of the holding company, such as real estate firms and title insurance companies, at terms favorable to other subsidiaries but detrimental to the S&L.[1]

Both the SRI Report[2] and the FHLBB Report[3] pointed to the rapid growth and above-average earnings as the notable characteristics of state-chartered stock associations which are held. The guarantee stock of S&Ls is the main source of income of the holding company, and therefore the main burden for servicing any holding company debt--e.g. as was incurred to effect the initial purchase of controlling interest in the subsidiary S&Ls--falls upon S&Ls' borrowers. The requirements of the holding company debt structure, instead of prudent lending policies, can be expected to dictate lending practices, loan fees, and the character of mortgage loans made by the subsidiary. The average quality of loan portfolios may be reduced without necessarily making loans which are below standards enforced by supervisory agencies.

Shaw found that the holding company affiliate is not the low-

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[1] Thomas B. Marvell, The Federal Home Loan Bank Board, "Savings and Loan Holding Companies," Ch. X, New York: Praeger, 1968, p. 202.

[2] SRI, op. cit., p. 11.

[3] Federal Home Loan Bank Board, Report on Savings and Loan Holding Companies, as required by Public Law 86-374, Washington, D. C., May, 1960.

cost association in his sample data. He decided that:

> ...Ties with the infrastructure are not compatible with economy in operating savings and loan associations. Prices charged to associations for services of affiliates do not always appear to be competitive market prices. Rather they seem to be shadow prices for distributing revenues between associations and their affiliates according to the preference of the management.[4]

Shaw's informed judgment was "that the savings and loan industry has little to gain and much to lose from its development with the holding company form of organization."[5] Indeed, events subsequent to his Report and culminating in 1966 provided a plethora of evidence supporting this early warning. These events will be enumerated below. But first, I present a sketch of some reasons most often offered as explanations for the growth of multiple holding companies. What are the alleged operating characteristics of the holding companies and their implications for various interested groups? What provided the impetus for the formation of holding companies? Many of the reasons discussed below were important historically, and not so important today. Others have grown in importance.

The holding company was a device that enabled individual S&Ls to attain objectives that, acting on their own, they would have found costly or prohibitive on other grounds. The following characteristics fit the S&L industry in 1955-63, the period of holding company growth. S&Ls seek to increase their profits through growth. They can grow within existing offices, but this method is often frustrated by regulations and by local or regional supply and savings capital. Individual associations did not want to wait patiently until growth in the industry pulled their growth rate up. They are prohibited from under-

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[4]Shaw, op. cit., p. 109.

[5]Ibid., p. 17.

taking vertical expansion, so that avenue was closed. Horizontal expansion via merger and branching was a possibility. Mergers under regulation require large capital reserves, and merger negotiations take long periods of time to consummate. Branch office chartering had become very competitive, with many choice locations already taken. The holding company device offered a good way to grow and attain scale economies. "The freeway to larger scale is combination by holding company."[6]

> Holding companies permitted the accumulation of savings and other loanable funds from capital-surplus areas by savings and loan subsidiaries within and outside the state; opened up lending opportunities at distances greater than 50 [100] miles from the head office of any one subsidiary association; and presented profit opportunities in enterprises affiliated with the savings and loan business.[7]

There are several other miscellaneous reasons for the formation of holding companies, especially public holding companies. This device enabled the owners of guarantee stock of savings and loan associations to liquidate a substantial part of their holdings in the associations at a great profit without relinquishing effective control over the association. Without the holding company vehicle, the organizers of these ventures could not have successfully completed a public offering of the guarantee stock of the individual S&Ls of the magnitude and at the prices achieved through the sale of the holding company stock. There are economies of scale in financing. Three separate S&Ls, each of which might have 100,000 shares at a book value of say $10 per share, might

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[6]Shaw, op. cit., p. 11.

[7]SRI, op. cit., p. VI-6.

attempt to sell out individually. They might reasonably expect to get $20 per share, twice book value. But if they should combine the offering into one package of 300,000 shares, it would be to their mutual advantage, for now the stock might sell at $30 per share, or three times book. Larger companies can trade in a broader market, with more shares bought and sold during the average day, and more shares traded without greatly affecting the price per share.

Multiple holding companies often perform for affiliates services that are analogous to those performed by home offices of branch systems. These advantages are probably at least, if not more, as important today as they ever were. Holding companies can use group advertising to advantage, and also by virtue of the larger scale operation there is a greater capacity to campaign for subsequent mergers or branch licenses. It is said that they offered advantages in that non-S&L affiliates would refer their clients to S&Ls (i.e. an escrow company is often in the position to recommend a mortgage lender) and vice versa.

> ...affiliated companies, their suppliers, and their clients or customers, may be required or urged to patronize the subsidiary savings and loan association in lending, borrowing, selling, or buying. The affiliated companies thus perform selling and purchasing functions for the association for which it does not pay in full or at all. This might permit the association to earn higher income, charge higher rates, enjoy lower costs, pay higher interest on savings accounts, or capture a larger share of the local savings and lending markets than it would achieve as an independent association.[8]

This is taken by the Board to be an anti-competitive feature of the holding company arrangement. The Board has also suggested that the holding company vehicle has in the past (but not importantly today) been a way to circumvent Board regulations limiting the amount of

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[8] SRI Report, p. VI - 18.

out-of-state broker capital available to insured associations through the payment of brokerage fees by the holding company rather than the association. Also, limitations on the percent of construction loans in portfolios (and regulations requiring the amortization of loan fees over the average life of a S&L's installment loans) can be avoided if another subsidiary association is caused to grant the construction loan and then another S&L later caused to make the take out loan. State prohibitions on the amount of speculative investment in undeveloped land--for later subdividing--can as well be circumvented via the holding company arrangement.

Thus, there were many, and still are, advantages in holding company affiliation. Next, I review a few of the reported abuses that led to the Federal Holding Company Act of 1967.

FHLBB concern about multiple holding companies enabling S&Ls to effectively evade regulatory controls in some areas, together with the anti-competitive elements contained in this vehicle, led to the passage of the Spence Act in 1959. This federal prohibition on extension of multiple holding company control over additional associations came too late to preserve the local market, independent character of the S&L industry. Since the Spence Act, there are naturally a large number of new holding companies in California that control just one S&L. (In 1969 there were 34 unitary holding companies.) The Spence Act was to be a temporary piece of legislation until more was learned. Nothing happened until 1966, when much was in fact learned--mostly bad. In that year more controlled S&Ls got into financial trouble than any other category; holding companies had done a bad job of managing their subsidiaries. In California, Lytton Financial and Financial Federation recorded losses

of $7 and $3 million respectively. In 1968 Lytton was finally taken over by its creditors.

At the end of 1966, according to the FHLBB, 28 S&Ls with $2.3 billion assets were included in their classification of most serious problem cases; holding company S&Ls accounted for 63 percent of the assets in this group, although they accounted for only 12.5 percent of the industry's assets in the United States.

> In 1966, California S&Ls...were hurt more than other associations, and most holding company S&Ls are also California stock associations...holding company S&Ls were a bit worse off than their counterparts. Nearly 10 percent of holding company S&Ls were serious problem cases, and their assets totaled $1.6 billion, just about equal to the liquid assets of the FSLIC. Since these problem S&Ls were in danger of folding, they presented quite a possible drain on the FSLIC.[9]

In addition, holding company S&Ls outdid all other associations in the number of bad loans and foreclosures; and their ratio of scheduled items grew rapidly. Holding companies argued in the 1950's that, in time of stress or need, they would be able to come to the rescue of subsidiary S&Ls by providing money to meet unexpected savings account withdrawals. In fact, the reverse had proved to be the case because the holding companies themselves experienced a squeeze. They had borrowed money to finance land speculation and subdividing, and with the tight money period were unable to sell the properties--and their loans were falling due. In the aggregate, holding companies drained nearly $18 million from their S&Ls, while returning only $2 million in the same period.

By reporting the above conditions, and many individual cases of abuse of their S&Ls by holding companies, the FHLBB was able to convince

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[9] Marvell, op. cit., pp. 205 - 206.

legislators to bring these companies under greater regulatory purvies than afforded by the Spence Act. Even prior to 1967 federal action, steps were being taken at the California level. Let me review these briefly.

The California Savings and Loan Holding Companies Act of 1964 became the first state legislation of its nature in the U. S. to be signed into law. It marked a fundamental change in the degree of available information upon which supervisory decisions and actions with respect to associations could be made.

The Act requires the registration of all S&L holding companies and provides for detailed disclosure of the financial condition, ownership, management, and intercompany financial relationships (including service contracts) of the holding companies and their subsidiaries.[10]

In addition to the requirements of registration, the Savings and Loan Commission may require reports from any S&L holding company and its subsidiaries on matters that are pertinent to its responsibilities and jurisdiction. The Commissioner examiners conduct periodic examination of all books and records of the holding company. For the purposes of this law, a holding company is one that holds 10 percent of the guarantee stock of any S&L.

The problems raised by holding companies, and their exacerbation of the industry's 1966 crisis mentioned above led the FHLBB to seek and obtain new stricter legislation from Congress in the form of the 1967 Savings and Loan Holding Company Act. The FHLBB had already been

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[10]California State Financial Code, Savings and Loan Holding Companies, Paragraphs 11550 - 11560.

empowered to examine holding companies via the Financial Institutions Supervisory Act of 1966. The Board wanted in addition to the restrictions on books from the Spence Act--on dealings between a holding company and its affiliates, and the freeze on additional controlled S&Ls--two other main provisions. These were the requirements that S&L holding companies be limited to S&L business, and that issues of indebtedness by a holding company be approved by the FHLBB. The first restriction was requested because it was shown that many holding companies damaged their S&Ls in trying to beef up other affiliates and because of the failure of a non-S&L affiliate, tended to drag the S&L down with it. The holding company indebtedness clause was sought because of the many cases in which S&Ls were drained by holding companies that had to pay off huge amounts of indebtedness.

The bill as ultimately enacted contained much that the Board had asked for, but some of the provisions sought were toned down. A holding company was defined as one which owned 25 percent rather than 10 percent of the S&L's stock. Large diversified holding companies were each allowed to control one S&L without the requirement of divesting themselves of their non-S&L affiliates. Companies with more than one S&L and companies which specialized in controlling S&Ls had to sell their unrelated businesses. Diversified holding companies (e.g. Sears, Roebuck, and Co.) are not required to obtain FHLBB approval for new indebtedness at all, but all others must do so when the debts reach 15 percent of net worth.

The rules issued by the FHLBB consequent to this law are viewed as tentative until the Board learns more about the operations of holding companies from the bill's fact-finding provisions. The Board's

position presently seems to be that its powers of control are there to be exercised when it is shown that S&Ls might be or are damaged in a specific instance.

The point of the above cursory review of the evolution of legislation applicable to holding companies controlling insured California S&Ls is to see of any economic impact of these changes might be reflected in my regression analysis. Recall that previous studies (using data, say, from 1959 - 66) found that the holding company arrangement tended to increase the reported costs (and income) of individual, held associations. On the other hand, holding companies boasted that they were providing their affiliates with valuable entrepreneurial inputs, increasing their operating efficiency in other respects, and providing the benefits accruing from a larger scale operation.

Hypothesis regarding the cost impact on S&L affiliates

Many of the original pressures exerted on S&L affiliates by holding companies have diminished. The original organizers sought quick gains, using extensive financial leverage, during booming real estate market years. The hypothesis is, that during the early phases of the multiple holding company movement, with the exigencies of servicing their debt, the parents diverted in various ways much of the cash flow generated by the high profits of their S&L subsidiaries. In recent years, this tendency was halted, and indeed, perhaps reversed. In the early years, how was cash flow diverted to the parent? It was noted above that one device used was forcing the subsidiary to declare high dividends--in some cases, total dividends declared exceeded net earnings. They constituted what could be termed reverse reparations.

Another favorite holding company device was the service contract. The parent and subsidiary entered into a contract whereby the associations either were charged with a fixed fee or a fee based on a percentage of total assets. The fees charged the associations ranged from $1,200 to $6,000 per month depending on the size of the association. A typical contract was that entered into in 1959 - 60 by ABC Savings and Loan Association (first party) and CBA Corporation (second party):

> First party hereby agrees to pay a consultation fee of Two Thousand Dollars ($2,000.00) per month to second party, and second party hereby agrees to accept such consultation fee in consideration for the continued assistance and services of such personnel of second party as may be required in the maintenance of accounting records, and preparation of reports, as may from time to time be required to be filed with regulatory and supervisory agencies. Second party also agrees to render advice and other assistance to first party from time to time pertaining to the investment policies of first party, and to other matters affecting first party's development and growth.[11]

Other typical contracts provided that the holding company furnish advertising, supervision, business and investment counseling, together with managerial services. Fees for such services were based on either 2 or 3 percent of total assets or on a fixed fee basis of $7,500 per month. During some years reported, these fees constituted a substantial portion of the income of the parent companies. In one case, four S&L subsidiaries of XYZ Corporation signed service contracts whereby XYZ agree to provide "general advice, consultation and assistance concerning all aspects of the operations of its business and financial affairs."[12] Two of these contracts were for annual fees of $14,000 and the other two provide for annual fees of $2,500. In yet another case no

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[11] FHLBB Case Files, unpublished.

[12] Ibid.

explanation was given for a S&L's selling its office building to its parent for $75,000, then spending $50,000 itself for improvements and leasing the building back from the parent at $9,300 a year. The S&L still paid all taxes, insurance and maintenance, so that over 15 years, the cost of the "sale" to the parent was estimated at almost $80,000.

Many holding companies claim that they render consulting, training and managerial services to the S&L held, and charge a fee. But in the opinion of FHLBB regulation, S&L associations already pay for and have, or should have, managers and employees that are capable of conducting all the operations of the association (as they were doing before acquisition). It is the duty of the holding company to provide its subsidiaries with management sufficiently competent to conduct all association affairs, which includes those services purportedly furnished by the holding company under service contracts. If the S&L has a competent management, the imposition of service contracts by holding companies constitutes a blatant device to siphon off funds.

Recently, much has happened in the industry environment to change the degree to which holding companies have free rein to divert cash flows from subsidiary to parent. In the past it has been difficult to tell on a priori grounds what the holding company arrangement would do to the aggregate reported costs of subsidiaries--in spite of many observed incidents of blatant draining of funds via service contracts. There were always two possibilities: First, the parent could be providing portfolio counselling and managerial services to the subsidiary, thus enhancing its efficiency in the production of loans and developing accounts. And these extra services, as provided, might not show up as extra costs to the subsidiary. Since the great majority of controlled

S&Ls are stock associations (only three mutuals in California are held) then stock associations will show up to have lower measured accounting costs in every size group than mutuals--only because of passing costs up to the parent, with husbandry and good advice passing in the other direction.[13]

Against this stands the alternative, second hypothesis that the holding company must pay dividends, too, and will tend to overcharge the subsidiary for all services rendered, depending on where the management desires the cash flow to terminate. If the holding company is bleeding the subsidiary, then operating costs will be overallocated and higher on average for those S&Ls that are held, in relation to independent S&Ls and perhaps even mutuals.

As mentioned above, since 1966 and since the Federal Holding Company Act and related legislation was passed, a regulatory environment has developed to keep holding companies from diverting those cash flows generated into their coffers. In fact, they are now perhaps undercharging for their services--and providing more of them free of charge. The Federal Holding Company Act and the State Act make it difficult for the subsidiary; there is more rigorous reporting, supervision, and examination. The relations between parent and subsidiary are sharply delineated, and improper procedure defined. FHLBB examination records under the Act disclose that few service contracts exist today relative to their popularity at one time.

Recently, too, with profits of S&Ls down from their abnormal

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[13]An official of the FHLB of San Francisco informed me that a statistical cost comparison between stocks and mutuals would be spurious because important managerial costs are passed upward to the holding company.

highs of the early sixties and the dangers of insolvency faced in 1966 and 1968 by S&Ls fresh in the minds of holding companies, it is more likely that they would adopt more generous policies vis-a-vis subsidiaries. In summary, the evidence points to the fact that currently, and probably in the future, there is an underallocation of costs--or providing of services to the subsidiary S&Ls at below cost.

With the above legal, institutional and theoretical discussion complete, I discuss the data on California holding companies, the trends in holding company operations, and then I present the statistical results of cost-output relations in controlled versus non-controlled S&Ls.

Trends in holding company activity

Table V - 1 presents the pattern of holding company control by asset size range for the years 1961 and 1969. The share of stock company assets held has shown remarkable stability over these 8 years. Control has fallen from 77.5 percent to 77.1 percent. A smaller number of S&Ls are listed as controlled; the reflects the large number of mergers that have taken place in the last few years. These mergers have affected both held and non-held S&Ls by approximately the same amount. There is some evidence to indicate that holding companies are either more prone to merge or more successful in merger activity than the non-held sector. Of the eleven associations acquired by purchase in 1969, holding company S&Ls accounted for seven. Of the fourteen mergers, holding companies were directly or indirectly involved with ten. It can be seen in this table that as in 1955 - 59, holding company acquisitions are generally of the large or medium size association. Smaller companies (under $25 million) are not as apt to be taken over in the piecing together of a

TABLE V - 1[a/]

TRENDS IN SIZE DISTRIBUTION OF SAVINGS AND LOAN HOLDING COMPANY SUBSIDIARIES, 1961-69

Asset size ($ million)	1961 Number of Assns.		1961 Percent of Total Assets		1969 Number of Assns.		1969 Percent of Total Assets	
	Subsidiaries	Independent	Subsidiaries	Independent	Subsidiaries	Independent	Subsidiaries	Independent
1 - 5	1	30	4.5%	95.5%	1	3	21.3%	78.7%
5 - 15	12	44	22.5%	77.5	1	27	4.4	95.6
15 - 25	15	17	46.5	53.5	4	25	14.2	85.8
25 - 50	17	11	57.8	42.2	15	21	44.3	55.7
50 - 100	15	8	66.9	33.1	12	11	55.2	44.8
100 - 300	14	0	100.0	0	22	10	70.1	29.9
300 +	4	0	100.0	0	9	2	93.0	7.0
Total	78	110			64	99		
Average			77.5	22.5			77.1	22.9

[a/]Sources: For 1961, Computed from Table VII. p. 13 of E. S. Shaw, Savings and Loan Market Structure and Market Performance, California Savings and Loan Commission, 1962. The 1969 figures calculated from data supplied in the Savings and Loan Commission's 76th Annual Report, 1970.

financial empire. The change in the number held in each size group merely reflects the growth of S&Ls that were acquired before 1960 - 61. The distribution showed 28 held S&Ls with less than $25 million in assets in 1961; today there are only 6 in that group. Meanwhile, 12 non-held S&Ls have moved into the $100 million plus category, formerly privy to holding company subsidiaries only. The pattern of control established in the decade of the late fifties and early sixties seems to be firmly entrenched and unchanged in the California industry. Of course after the Spence Act of 1959, further acquisitions by multiple holding companies was forbidden, and only new unitary holding companies could be established in the past 10 years. Only 4 or 5 new holding companies have emerged in the past 2 years. Presently there are 7 multiple holding companies in operation. But there was a recent case where one holding company acquired a smaller holding company. These are all registered with the State Commissioner.

Data and method of analysis

Table V - 2 provides a breakdown of the distribution of controlled and non-controlled associations, still following the small, medium, large asset classification of the previous chapters. Table V - 3 and V - 4 are reported first, and they show the results that the two standard models estimated with all stock association data partitioned into "held" and "non-held" S&L categories. The cost-output elasticity for controlled associations is slightly higher than for those S&Ls not affiliated with holding companies. Non-controlled S&Ls in the aggregate showed larger economies of scale but higher average costs at the mean size in this data than either mutuals or stock S&Ls in any size

TABLE V - 2[a]

DISTRIBUTION OF CALIFORNIA STOCK ASSOCIATIONS BY CONTROL AND ASSET CLASS, JANUARY 1, 1969

		(millions)					
		$0 - 24		$25 - 99		$100 +	
	Total	Number	(Percent)	Number	(Percent)	Number	(Percent)
Non-Holding company Controlled	98	58	(58.8%)	29	(30.0%)	11	(11.5%)
Holding Company Controlled[b]	53	4	(7.5%)	22	(41.5%)	27	(51.0%)

[a] Source: Calculated from figures supplied by the State Commissioner's Office.

[b] Holding Companies are defined as controlling 50 percent or more of an S&L's stock. Generally, the large holding companies own almost all of the subsidiaries' stock.

range. Their cost-elasticity for output was .85 for the TNMS output model and .87 for the TNA/C model, with TEXP the dependent variable. There are other features of interest in the results of Tables 3 and 4. Non-controlled S&Ls have greater economies of scale in both servicing larger average size mortgages and in making loans. This variable SIZES proved important in each regression. The coefficient on SIZEM for held companies is equal to about .11, and significant at the .01 level by conventional test. The corresponding coefficient for non-held S&Ls is also equal to about .11, and almost attains significance at the .05 level. For once, the sign on PSCHI is "right" in the held company regression--it is positive, indicating that more scheduled items increase costs. Unfortunately, not much can be inferred from this; as the coefficient is statistically insignificant. It is significant, and negative, for non-controlled S&Ls. Most of the other coefficients were not significant except for the NOFFS parameter, which was approximately the same order of magnitude in each regression; its size, almost .13, corresponded closely with results reported for other models and aggregate data in the previous chapter.

The aggregate regression results of Tables 3 and 4 are misleading in one fundamental respect. Although separate regressions were run for both holding company affiliates and all other stock associations, there is a serious bias present from the fact that held companies are universally large companies. Therefore, the greater scale economies available to non-controlled S&Ls shown by these regressions reflects mainly the disproportionate number of $0 - 25 million size firms in the non-controlled classification. In other words, Tables 3 and 4 are reflecting in a new guise the same phenomenon registered in the asset-partitioned data of

TABLE V - 3[a/]

REGRESSION RESULTS FOR ALL CALIFORNIA STOCK S&Ls, 1969
HOLDING COMPANY CONTROL AND COST-OUTPUT RELATIONS
DEPENDENT VARIABLE: TECHNICAL EXPENSES (TEXP)

Independent Variables	Stk, Controlled by Hold Co.	Stk. S&L Non-Controlled	All Stock S&Ls
Output variable TNMS	.909** (.024)	.854** (.023)	.863** (.017)
SIZEM	.199** (.062)	.105 (.076)	.106 (.053)
SIZES	.840** (.050)	.477 (.108)	.844** (.044)
PCLM	.024 (.019)	.019 (.020)	.031 (.016)
PSCHI	.011 (.017)	-.075** (.026)	-.016 (.015)
PTMS	-.006 (.031)	-.072 (.040)	-.015* (.006)
SIZEA	-.137 (.083)	-.332 (.194)	-.105 (.079)
NOFFS	.140* (.053)	.116** (.018)	.136** (.051)
POST60	.003 (.016)	.015 (.026)	.033 (.025)
CONSTANT	-1.546 (.360)	.769 (.425)	-1.291 (.333)
$\bar{R}^2$	.955	.978	.963
F-Statistic	297.27	377.00	560.15
No. Observations	98	53	151

[a/]Notes: Standard errors of the regression coefficients are reported in parentheses. Coefficients with a double (single) asterisk are significant at the .01 (.05) level of confidence. The $\bar{R}^2$ is adjusted for degrees of freedom.

TABLE V - 4[a/]

REGRESSION RESULTS FOR ALL CALIFORNIA STOCK S&Ls, 1969
HOLDING COMPANY CONTROL AND COST-OUTPUT RELATIONS
DEPENDENT VARIABLE: TECHNICAL EXPENSES (TEXP)

Independent Variables	Stk. Controlled by Hold Co.	Stk. Non-Controlled	All Stock S&Ls
Output variable TNA/C	.904 (.066)	.866** (.034)	.879** (.032)
SIZEM	.286 (.181)	-.068 (.092)	-.060 (.097)
SIZES	.575* (.290)	.143* (.069)	.163* (.081)
PCLM	.061 (.038)	.059 (.092)	.060 (.059)
PSCHI	-.161* (.067)	-.030 (.025)	-.054* (.028)
PTMS	-.573** (.099)	-.108* (.045)	-.231** (.047)
SIZEA	-.734 (.433)	-.695** (.113)	-.595** (.131)
NOFFS	.120* (.069)	.144** (.043)	.139** (.049)
POST60	.012 (.028)	.047 (.106)	.032 (.091)
CONSTANT	-1.036 (1.778)	.935 (.543)	-.246 (.605)
$\bar{R}^2$	.832	.898	.875
F-Statistic	52.61	142.72	175.81
No. Observations	53	98	151

[a/] Notes: Standard errors of regression coefficients are reported in parentheses. Coefficients with a double (single) asterisk are significant at the .01 (.05) confidence level. The $\bar{R}^2$ is adjusted for degrees of freedom.

Tables IV - 5 and IV - 6. To allow for the discontinuous cost function and keep more homogeneous firms in the same classification, it is essential to compare cost behavior of held and non-held S&Ls by asset size class. This additional sub-partitioning of the data by sizes presents some modest problems. First, I must exclude the size group $0 - 24, because only 4 held S&Ls are included there. A sub-partitioning with separate regression runs for held and non-held associations would drastically lower the degrees of freedom in the equation, so I use instead a dummy variable. This variable is HELDCO = 10 for controlled stock associations and 1 otherwise. The analysis was carried out using this dummy and partitioning by asset size. The results for the TNMS model are given in Table V - 5.

The output parameters presented in this table are consistent with, indeed nearly identical with, those shown earlier in Table IV - 5. The HELDCO variable is significant for the $25 - 100 million group, and highly significant for the large size group. It indicates for given output levels, controlled S&Ls are subject to greater economies of scale in both size groups. The dummy coefficients are -.07 and -.09 for medium and large controlled S&Ls, respectively.

Based on the estimates shown in Table V - 5, I calculated the implied average and marginal costs in the manner described in Chapter IV. These are presented for comparison in Table V - 6. These calculations are rather striking: essentially they indicate that the average cost of controlled stock associations falls from $110.70 to $84.14 to $80.25 in moving from small to medium to large asset class. But non-controlled S&Ls' long-run average cost function levels off in the medium and large categories--going from $110.70 to $99.31 and finally to $99.00.

TABLE V - 5[a/]

ALL CALIFORNIA STOCK ASSOCIATIONS, 1969, BY ASSET SIZE CLASS: MEDIUM, LARGE[b/] WITH HOLDING COMPANY DUMMY; DEPENDENT VARIABLE: TECHNICAL COSTS; OUTPUT MODEL: (TNMS)

Independent Variables	(millions) $25 - 99	$100 +
Output Variable: TNMS	.848** (.051)	.909** (.021)
SIZEM	.061 (.085)	.033 (.021)
SIZES	.920** (.118)	.841** (.061)
PCLM	.011 (.019)	.034 (.021)
PSCHI	-.015 (.018)	-.102** (.030)
PTMS	-.036 (.035)	-.006 (.043)
SIZEA	-.055* (.020)	-.077 (.056)
HELDCO	-.072* (.026)	-.091** (.025)
NOFFS	.144** (.039)	.110** (.034)
CONSTANT	-1.459 (.461)	-1.122 (.522)
$\bar{R}^2$	.859	.927
F - Statistic	61.89	52.84
No. Observations	51	38

a/Notes: Standard errors of the regression coefficients are reported in parentheses. Coefficients with a double (single) asterisk are significant at the .01 (.05) confidence level. The $\bar{R}^2$ is adjusted for degrees of freedom.

b/The asset size class $0 - 25 million regression is not appreciably affected by the holding company dummy, and thus is not reported.

TABLE V - 6

HOLDING COMPANY AFFILIATES AND NON-HELD S&Ls, 1969
ESTIMATED[a] AVERAGE AND MARGINAL COSTS COMPARED
BY ASSET SIZE CLASS, SMALL, MEDIUM, LARGE. OUTPUT
MODEL: TOTAL NUMBER MORTGAGES SERVICED (TNMS)

Average Cost (AC) or Marginal cost (MC) by type	Small[b] $0 - 24	Medium $25 - 99	Large $100+
Stock, Non-Controlled (licensed before 1960)			
AC	$110.70	$99.31	$99.00
MC	$ 73.28	$84.21	$89.99
Stock, Controlled (licensed before 1960)			
AC	n.a.	$84.14	$80.25
MC	n.a.	$71.35	$72.95
Stock, Non-Controlled (licensed after 1960)			
AC	$124.60	$107.90	n.a.
MC	$ 82.49	$ 91.50	n.a.
Stock, Controlled (licensed after 1960)			
AC	n.a.	$91.41	n.a.
MC	n.a.	$77.52	n.a.

[a] Calculated from mean figures for each size class of stock associations, and parameters supplied in Table V - 3.

[b] All stock associations; n.a. = not affected by holding company variable.

(Calculations are for associations chartered before 1960.) Each grouping reveals that both estimated average and marginal costs for holding company affiliated state stock associations are lower than their non-affiliated S&L counterparts. Relationships between long-run cost curves for the types or forms of associations up to this point in the study may be depicted schematically as in Figure V - 1.

Conclusion

If the underlying statistical results upon which the tables and analysis in the above section are sound, then the major conclusion to be reached is that the typical controlled or held S&L in each size range has lower technical operating costs than either mutuals or other stock associations. California appears to be atypical among nation-wide associations by virtue of the prevalence of holding company domination. Studies using nation-wide data of, for instance, stock versus mutual performance will no doubt be biased by a large number of California observations unless the approach considers the holding-company impact. Comparisons of stock and mutual performance in California does in fact yield a difference in costs, but the influence of the holding company arrangement might obscure a large source of this difference of operating performance and scale economies.

It may be that earlier researchers who were correct in concluding that the holding company impact on operating costs was unfavorable. Not only has the legal and economic milieu changed over time, but holding companies could have acquired (with experience and time) the ability to tighten a formerly loose supervision of subsidiaries. It is likely that a more closely-knit integration of day-to-day operations has evolved.

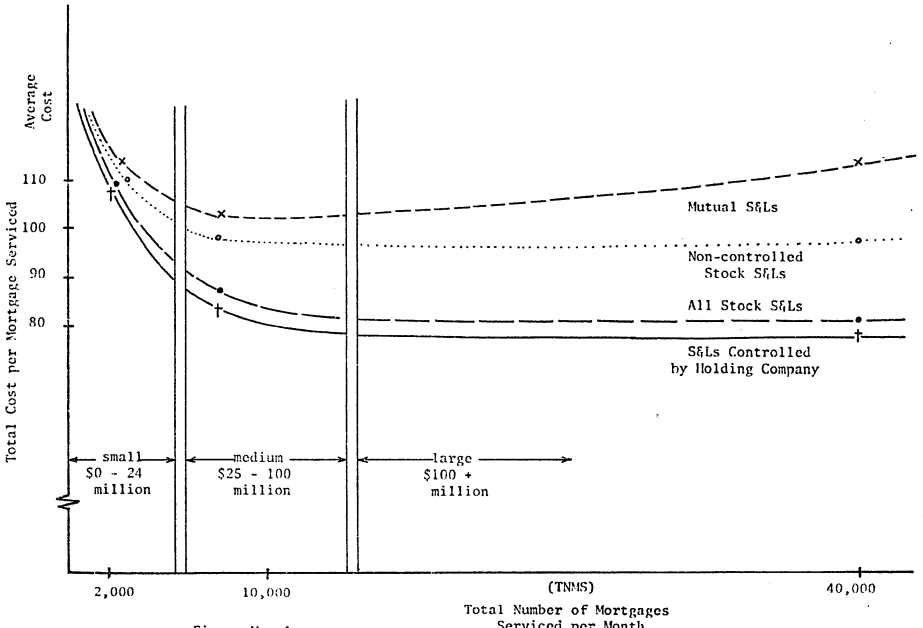

Figure V - 1

This involves unified advertising campaigns, centralized recruitment of management and centralized marketing research. Holding companies have developed the use of uniform financial reporting by their sundry subsidiaries; the provision of legal and computer accounting services; and they encourage their individually controlled S&Ls to compare their operating ratios with others in the same size group. In providing these services at cost, and helping subsidiaries find needed executives, the holding company is giving benefits not available to the same extent or at the same level of quality to independent associations comparable in size.

If the parent company is substantially underallocating costs, and subsidizing the subsidiary S&L, then the economies of scale observed for this group of S&Ls is, in large measure, illusory or pecuniary (representing a non-recorded transfer payment). And future market conditions could reverse this phenomenon, and the measured industry cost curve will take a jump upward. One guess is, some costs are no doubt submerged, but it is unlikely enough could be passed back up in this fashion to make economies for controlled S&Ls quite as large as observed. More information is required before an accurate judgment is to be made; in most cases, holding companies themselves do not have direct cost allocation estimates for services rendered their subsidiaries individually.

In the next chapter, I venture to point out policy ramifications of the scale economy evidence contained in this paper.

CHAPTER VI

SUMMARY AND POLICY IMPLICATIONS FOR CHARTERING, BRANCH LICENSING, MERGER, AND CONVERSION

Savings and loan supervisory agencies--the FHLBB and the State Commissioner's Office--are as interested today as they ever were in the importance of internal economies of scale in the industry they regulate. Among other things, these authorities are charged with a legal responsibility for monitoring the number of firms and external alteration of firm size in the industry. The estimates presented above of the expected reductions in unit costs as firms grow larger within the industry are essential for a host of regulatory decisions regarding branching, chartering, merger, diversification, and conversion from one kind of charter to another.

General remarks

A review of public policy in recent years reveals clearly that regulatory agencies have moved positively but cautiously in reaction to existing evidence regarding the cost impact of scale, merger, and conversion. The exception is, the FHLBB has, since 1965, confined to a state of limbo prospective S&L conversions from mutual to state stock charter. On the other hand, the number of mergers approved by the Board for the United States was 94 in 1969, up from about 52 in 1968. The presumption is that the present Board acknowledges the existence of substantial scale economies. There is evidence that non-supervisory mergers are being encouraged among smaller associations. Chairman Martin has announced a new merger policy which is "neither pro-merger nor anti-

merger."[1] Mr. Martin indicated that this policy "devolves from the recognition of basic shifts in industry economies and from industry analyses indicating definite economies of scale." At the same time, it was emphasized that the Board has a responsibility to protect small well-managed savings and loans against "undue injury" resulting from medium-sized associations entering a submarket via the merger route. The undue-injury proviso, a criterion never operationally defined, is a cause of consternation to many economists who conjure up instances in which inefficient small firms are protected from effective price competition. In the view of regulatory agencies, the problem can be put succinctly: if economies of scale exist, then there is a trade-off between the potential gain in operating efficiency as firms on average are larger, either from selective mergers or a high capital requirement for entry, and the possible losses in allocative efficiency as savings markets become more concentrated. The trade-off can be illustrated with standard mnemonic diagrams:

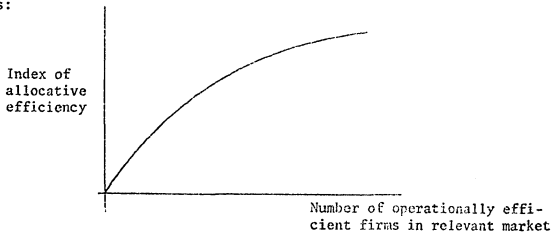

Figure VI - 1

[1]Preston Martin, "A New Merger Policy for Savings and Loans," Speech delivered at the Exchequer Club of Washington, D. C., August 20, 1969. FHLBB Press Release, Office of Public Affairs.

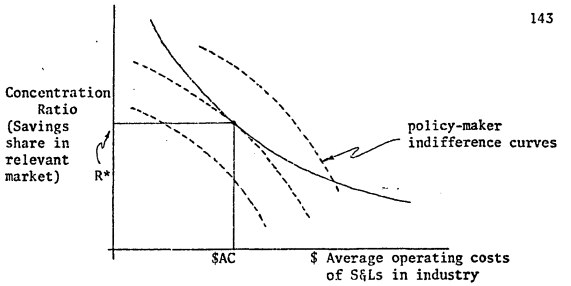

Figure VI - 2

Figure VI - 1 reflects the assumption that more competitors enhance efficiency and insure that price will approximate marginal cost. Figure VI - 2 depicts the trade-off between lower operating costs and higher market concentration of suppliers of indirect securities. A larger share of total savings accounts residing with a single financial intermediary in the relevant market is indicative of a serious risk that market power will be abused and the level of public service consequently reduced.

The latter figure is instructive in the following (limited) way: the present study provides policy makers with only the first of two requisite indices of costs and benefits of policy mix. To date there are no satisfactory statistical estimates of market concentration in financial industry to complete the analysis. Nor is it resolved what the precise measure of concentration should be, and what social cost is borne by increased "concentration"--assuming that agreement could be reached as to what constitutes the "product" (market).[2] This area is very ripe for

[2] A discussion of these problems, and a proposed theoretical framework to confront some of these issues is contained in Marshall A. Kaplan, "Issues in Appraising Anti-Competitive Impact of Savings and Loan Mergers and Holding Company Acquisitions," Working Paper #8, Washington, D. C.: Federal Home Loan Bank Board, August 27, 1970.

empirical analysis. At present reliance is placed on intuition and circumstantial evidence as to what will be the impact on competition of merger or branching.

The Board is sensitive to the need for a theoretical and empirical framework with which to judge the impact on industry structure of alterations of firm numbers and size. Much of the decision-making has been preoccupied with preventing undue injury to firms and protecting the interests of, for instance, the parties to the merger, rather than savers in the market. Lacking a general set of empirical results or a theoretical model, the Board has moved to an alternative solution. In 1969, Chairman Martin reorganized the Office of Applications and formed a new Office of Industry Development. This is said to reflect a change in attitude of the FHLBB toward mergers, as well as toward branching and the processing of applications. The main objectives of the Office of Industry Development are to decentralize and expedite the application procedure and to rely upon local expertise and initiative at the District Bank level as to the needs of the industry. This procedure also allows closer monitoring of the anti-competitive impacts of proposed branches or non-supervisory mergers. Board member Thomas Clarke has emphasized that "this method allows the maximum participation by the Supervisory Agent in a situation where he is well qualified to make sound recommendations based on his familiarity with local conditions and needs."[3] It is on the decentralized level that most evaluation is carried out and recommendations made. Relevant local facts and statistics

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[3]Thomas Hal Clarke, "Some Thoughts on Branching," Speech delivered at the 37th Annual Stockholders' Meeting, FHLB of North Carolina, May 22, 1970, FHLBB, Washington, D. C..

are brought out and presented to the Board for the ultimate decision.

Charter policy

The present study confirms the existence of scale economies and thus is in agreement with recommendations on charter policy already found in other reports whose conclusions rested on different evidence of operating economies of scale. I reiterate the overall guidelines briefly below. The evidence in Chapter IV above shows that branches will be less costly to operate than small, new unit operations. In those areas where a new branch is feasible, there is a presumption against licensing new firms, especially during slump periods in building activity. Periods of industry growth may call for an active charter policy, and these new charters could perhaps be auctioned to bidders meeting certain eligibility requirements. Shaw makes a persuasive case for the no-charter principle, while admitting possible isolated exceptions to the rule in cases where a charter might infuse competition into an otherwise stifled market. He argues that

> In the California context of large-scale financial institutions, these (small) associations face relatively unfavorable markets... Many of them are handicapped with excess capacity, high operating cost, limited portfolio diversification, and marginally adequate net worth reserves. There is temptation for them to venture into the risk-fringe of the mortgage market and to pay higher marginal prices, in interest and promotion, for savings capital. They cannot impose strong competitive discipline on large competitors, and they can do little toward expediting flows of savings and mortgages across local market boundaries.... They would be marginal firms, and policies to shelter them would guarantee excessive profits to the remainder of the industry at the expense of savers.[4]

With the recent Board relaxation of former geographical limits on S&L branching, it is no doubt more feasible for the Commissioner to

[4] Shaw, Report, op. cit., pp. 134-135.

implement this recommendation at present than earlier. Competition for branch locations will perhaps become keener state-wide, thus giving the Commissioner and his staff a wider range of options to choose from--besides "new charter or no facility."

Branching and merger--policy considerations

Branching and mergers will be treated together in this section because both activities raise policy issues involving existing financial firms in the industry and their attempts to enlarge the market area served. Moreover, numerical cost examples calculated below will treat S&L mergers as a special route to branch acquisition.

The industrial organization literature as well as S&L industry studies are replete with discussions of branching and merger policy issues. No attempt is made below to discuss systematically the sundry problems raised or solutions offered in this literature. Instead I attempt to present succinctly the current thinking of public policy makers (such as the FHLBB) as to how they view the issues and where crucial gaps in their knowledge lie.

In the area of branching, the State Commissioner already looks at a number of variables including the size of the association, and a large array of operating ratios. Shaw suggests that, ceteris paribus, the ratio of marginal cost to average cost should be used in choosing between two associations wanting a branch in the same locale. It might be mentioned that the empirical results and approach of this study lend themselves to Shaw's measure, with the additional refinement of allowing a comparison of his suggested ratio with that calculated for the average firm of a given branch structure and size group. This is a more powerful test in

that both potential branch applicants may be grossly inefficient relative to the estimated norm,[5] although one may be less inefficient than the other.

Balderston's Report[6] also asseses the competitive impact of a new branch, and looks to see if the institution proposing a branch office has lower operating ratios, higher reserves, etc. than the average firm in that size group. Managerial competence is also to be considered. State and federal authorities must approve a branch in cases of federally insured S&Ls. Both regulatory agencies try to establish whether "undue injury" will befall existing thrift institutions in the market area of new-branch operations. Savings and loan regulatory authorities see their role as one of choosing policies which enhance the safety and solvency of the industry as a whole. Shaw and Balderston have emphasized an additional function; namely, that these authorities can use their powers to enhance competitive discipline upon costs by means of carefully chosen policies regarding new charters and branches.

My study points to the problems of growth within a market area to capture economies of scale--often impossible without branch structure. Over existing branch ranges, branching was shown to yield economies and lower operating costs. S&Ls which branch into a newer area can normally be expected to experience lower average costs than a unit operation of the same size. Lower costs might facilitate more vigorous competition

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[5]"Norm" in this context is admittedly imprecise, but it could be somewhat arbitrarily quantified as the cost structure of the least-costly quartile of firms in a given size range.

[6]F. E. Balderston, Summary Report: Revision of the Standards of Application for New Charters and New Branches in the Savings and Loan Industry of California, Division of Savings and Loan, State of California, 1963.

with other intermediaries and lower costs of transferring savings to investment. On the other hand, management could become lax, or potential technical cost savings could flow into promotion or excess profits. It might be possible for regulatory agencies to insure "good conduct" by granting renewable branch permits for, say, 10 years. A review of the S&L's operating statistics would then be conducted at the end of this period, and a decision rendered as to whether the permit would have to be auctioned to some other S&L or renewed.

Any discussion of branching policy must also consider mergers as an alternative channel to growth within the industry. The branch application policy enunciated by the California Savings and Loan Commissioner provides that existing associations competing for a particular branch location be evaluated according to their relative efficiency ratios. Successful expansion through branching is, therefore, available only as a reward to the most efficient associations. No comparable impediment obstructs the path of the less efficient association which seeks to expand through merger with a relatively more efficient company. The principal requirement operative here is that the management of the surviving association be the more efficient management. The immediate effect of a successful merger will be to increase the number of authorized offices for the surviving institution. This increase in size is accompanied by the potential for lower operating costs if real internal economies of scale exist. These lower costs facilitate both more vigorous competition and larger allocations to reserves to protect savers against losses. There are clear advantages of a merger over the establishment of a new branch. The surviving institution gains an existing facility, trained personnel, savings and loan accounts, and perhaps a modicum of experience and

goodwill. The choice of whether to branch or merge may not always be open to the individual S&L. The choice often depends on the regulatory authority, and a new branch might not be permitted. Alternatively, when a facility does not exist in a given market area, then an association has no choice but to seek a branch.

Merger desiderata in theory and practice

Regulatory policy regarding mergers hinges on the criteria to be applied in evaluating the proposed merger's impact on market structure, the operating efficiency of the survivor, and on the allocation of mortgage funds. Account is thereby taken of factors and tendencies which do not necessarily involve illegal practices under antitrust laws. Past policy of the FHLBB in the area of mergers has to most observers appeared neither optimal nor consistent. The Board, with its ultimate responsibility for approving all mergers in the industry, is actively seeking to overhaul its merger policy. The aim is to formulate a merger policy that can be consistently applied in a well-defined manner, with the purpose of developing an "optimal" industry structure.

The best statement yet of the criteria to be applied in judging the merits of tentative, selective mergers is Shaw's "net-gain rule." This set of criteria is more complicated than the name implies. For any given market area, some number of firms, size of firms, and number of branches for each S&L will yield the lowest cost per unit of intermediation. Suppose the market can be specified, and cost functions have been estimated. Mergers are to be considered from two angles: operating and allocative efficiency. Allocative criteria for mergers are more important to the public interest and should be given preference.

> The survivor should...be a firm with low average and rising marginal cost: it should be an efficient firm encountering market restraints on growth. The decedent should preferably be an inefficient firm so that its displacement can lower the industry's average costs."[7]

The Shaw rule ascertains whether the merger results in a net gain in operating efficiency and net gains in allocative efficiency, growth continuity, and equity. In addition, the net-gain rule must be subject to two other considerations: the "number rule" and "size rule". That is, merger should not tilt the balance toward monopoly in the industry or in local markets.

If the rule is implemented, allocational efficiency is enhanced in the following manner:[8]

1. The survivor is a firm "that ranks low in substituting promotion for interest so that, for the industry, less is spent on differentiating firms."

2. The survivor is a firm "with technical competence in all segments of the mortgage market, with proven skill in diversifying portfolio risk, and with a record of open and competitive pricing."

3. Growth and stability in the supply of mortgage funds and savings shares is fostered.

4. A balance of market strength is obtained "both by admitting outside participants to local areas and by combining small firms to compete more efficiently with larger (intermediaries)."

Figures VI - 3 and VI - 4 below are useful in illustrating the problem of merger policy as seen by Shaw, Balderston, the Friend Report and others. The problem is to select the proper merger policy mix: one which minimizes the total social cost (given acceptable levels of risk)

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[7] Shaw, op. cit. p. 126.

[8] Ibid., pp. 128-129.

of delivering a specific "amount" of intermediation. Figure VI - 3 represents a more anti-merger policy, given the presumed relative positions of allocative and operating costs as a function of the number of independent S&Ls in the industry. This perhaps depicts the philosophy of the FHLBB before the present members and staff assumed office. Figure VI - 4 indicates a more liberal merger policy. Shaw and the present Board lean more in the direction of policy implied by this latter figure. Much of the data necessary to draw policy conclusions about merger is included in the literature as amplified by this study. What remains is to define the "market" more operationally so that the consequences of concentration can be measured in each merger case, and an index of allocative costs obtained. This is discussed more fully below in context of present policies of the FHLBB's legal division.

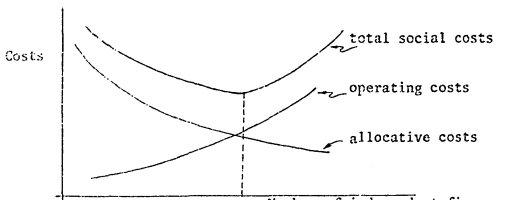

Figure VI - 3

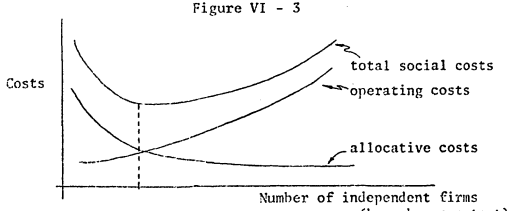

Figure VI - 4

The Shaw Report concludes that merger per se is not injurious to competition and, indeed, can be a technique of prime importance for correcting the competitive disadvantage between the small S&Ls in, say, the $0-25 million asset size and larger associations, particularly when mortgage markets are deteriorating. In these periods, the larger financial intermediaries enjoy superior capacity to neutralize promotional efforts of small competitors to acquire savings; larger firms are also better able to appropriate growth in quality assets. Merger, as a defense mechanism for the small fry, provides an opportunity to consolidate strength. This argument presupposes the emergence of internal economies of scale resulting from merger and the application of the net-gain criteria. The same argument appears in the industrial-organization literature under the rubric "upward competition."

The upward-competition defense of mergers in which relative, rather than absolute, concentration measures are utilized is a double-edged sword. Here, relative measures of competition consider the size of financial competitors in relationship to each other in a given market or submarket. If two smaller or medium-sized firms can combine to challenge the power of the larger, dominant firms, it follows that the post-merger firms will be able to challenge more forcefully any remaining smaller intermediaries in the industry. According to Singer[9] "the courts have rejected the upward-competition defense in that in most of its applicable structural settings a trend toward oligopoly will be enhanced."

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[9]Eugene M. Singer, "The Concept of Relative Concentration in Antitrust Law," American Bar Association Journal, Volume LII (March, 1966), pp. 246-250.

In assessing the impact of a merger in a Standard Metropolitan Statistical Area, the regulatory authorities may have the difficult task of judging whether the creation of medium-sized economic power groups through the merger of lesser-sized S&Ls may challenge the market power of dominant savings institutions and intensify competitive rivalry. This will necessarily be decided on a case-by-case basis. The same merger could create a greater danger to the survival of smaller S&Ls in one market area than it would in another; it may trigger more mergers and increase absolute concentration. This is a valid application of the undue-injury proviso.

Stigler, who rejects the upward-competition argument, has challenged Shaw's position

> ...that mergers of an industry's small firms will more appropriately match them in size with the large firms, hence increasing competition. Reduction in the number of rivals and the increase in concentration will in fact reduce competition.[10]

Presumably he would oppose "supervisory mergers" on related grounds.

Merger policy in practice

The FHLBB adopted a revised Statement of Policy on Mergers effective October 17, 1969, which states: "Mergers that involve institutions of inefficient asset size or which are located in markets overpopulated with savings institutions and which result in economy of operation and management and more efficient service will be regarded favorably insofar as the mergers are not anticompetitive." In practice the day-to-day decision-making process by the FHLBB's legal department

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[10] George Stigler, "Financial Intermediaries and the Allocation of Capital," 1964 Conference on Savings and Residential Finance, Proceedings, U. S. Savings and Loan League, Chicago, Ill., pp. 43-44.

on proposed mergers is much different and the theoretical criteria mentioned in the last section are seldom explicitly applied, although consideration has perhaps already been taken at the Board level of the factors involved in overall policy mix. The FHLBB's Office of Industry Development and the Office of Economic Research analyzes and recommends for or against approval of merger applications on the basis of data on concentration ratios and rivalry before and after the merger.

A study of several dozen merger actions taken by the FHLBB over the past few years leaves the reader with a distinct impression of what critical factors loom large in the final approval or rejection. Granted there are differences of opinion among Board staff members, recent reports on prospective mergers rely heavily on the "market share guidelines." The Board will normally not approve a merger between two institutions when the market share of the resulting institution in a market area equals or exceeds:

Percent of Savings held	Population of Market area (000)
20	Below 200
15	200-500
10	500-1,000
5	1,000 +

The market area is defined as the Standard Metropolitan Statistical Area (SMSA) where this exists; otherwise it is defined as a county or group of contiguous counties in which the bulk of the savings and mortgage business is transacted. In rare cases, one association is located on the edge of a SMSA and transacts a large volume of business

in adjoining counties. Then an appropriate market area not coincident with the SMSA is used, provided the market area ultimately can be defended as the "appropriate" one.

"Market share" of an institution in a market area appears to be defined as the savings accounts imputed to those of its offices located in the market area, expressed as a percentage of total savings accounts imputed to S&Ls, mutuals, and commercial bank offices located in the market area. For the usual case, the FHLBB in measuring shares of the relevant market considered only time deposits of under $25,000 in commercial banks to be part of that market. Other intermediaries and larger deposit classes were ignored.

The schedule above is, of course, not designed to apply to cases where the merging institutions are located and conduct the bulk of their savings and mortgage business in two different market areas.

Other considerations which were emphasized in recent merger decisions included: 1) whether the applicant S&Ls had been losing ground in the past two or three years in terms of savings outflows, while other intermediaries such as mutual savings banks, were experiencing net inflows (in the same SMSA); 2) the share of the surviving S&L of the mortgage market; 3) the degree of alternatives open to savers in all submarkets; and 4) whether the parties to the merger are competitive in their branch submarkets.

After deciding on a relevant savings market (e.g., the SMSA), the next problem is whether to measure the size of this market by outstanding savings accounts at a particular moment in time or by net savings inflow over a period of time. The first approach is static, and measures the cumulative impact of past savings inflows. The second is perhaps a more

current measure of competitive market position.

Kaplan has pointed out the inconsistencies which must plague merger decisions until a decision is reached as to the appropriate measure:

> In computing concentration ratios, stock vs. flow measures of savings can produce radically different results. For example, a large mature S&L with few or no branches in growth areas will tend to have a large concentration ratio computed on a stock basis but a small concentration ratio computed on a flow basis. Discrepancies between stock and flow measures can result from many differences. One is the competitive vigor of commercial banks in the relevant geographical market area. In geographical areas where commercial banks have increased their market penetration, even large S&Ls will have small concentration ratios based on savings flow.... Insofar as flow data reflect current market power, they do provide a better measure of an S&L's impact on competitive market structure than do stock data.[11]

The Board staff reports are also ambiguous in their views of the relevant savings product. It could be either savings accounts of depository institutions designed primarily for the small saver, or all services provided by S&Ls and intermediaries such as mutual savings, commercial banks, credit unions, insurance companies, and so on.

High market shares per se are not generally taken as indicative that the proposed merger would result in a substantial lessening of competition. Weight is also given to past performance and the "intensity of competition" from other large financial institutions in the SMSA.

Many applicant associations argue that the relevant market area is, say, southern California, rather than the San Diego SMSA. In the larger market area, the S&L would be a relatively insignificant entity. Most rulings confine the market area to that no greater than the SMSA. In the case of the San Diego associations, merger was denied because the resulting institution would have an estimated 20 per cent of the broadly

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[11] Kaplan, op. cit. p. 28.

defined savings market, i. e., S&L savings plus commercial bank time and savings deposits under $25 thousand. This merger was also deemed unfavorable since it would widen the surviving association's lead as the largest institution in terms of savings accounts among both S&Ls and commercial banks.

Merger analysis as now conducted by the FHLBB's legal staff is perhaps as good as it can be, given the existing measures, data, and theory. One is left with the uneasy feeling, however, that the Office of Industry Development must determine the proper definition of the market so that economic concentration ratios have some meaning. As a prerequisite to an optimal merger policy, the staff needs allocative considerations as well as operating efficiency information. Allocative considerations hinge on a measure of the degree to which mergers of given associations supplant or retard competition. Competitive impacts are unknown until "the market" can be isolated properly. The crude use of savings concentration ratios (i.e., percent of accounts less than $25 thousand held) when the geographic markets are not correctly identified--the current practice of the legal division of the FHLBB--may often result in inconsistent, ambiguous decisions that achieve a suboptimal industry structure.

The staff at the Board should attempt to explore the future consequences of economic power, and not rely on a static measure of concentration in some arbitrarily defined (SMSA) market. In order to ascertain consequences of economic power, they require various substitutability coefficients or cross-elasticities of demand for the secondary securities of various financial intermediaries, and this allows the empirical specification of market areas. The staff lacks information on the

factors accounting for a high substitutability coefficient. Savers will shift from one financial institution to another when it pays them to do so: either a higher return is offered, or costs of time and effort are lowered to increase profits enough to overcome any inertia preventing the shift. A sufficiently high substitutability coefficient would serve to delineate a relevant market. The division of research at the Board is currently looking into better ways to isolate the relevant market and measure concentration.

California's new merger policy affirmatively encourages selective merger. A statement of this was enunciated on November 7, 1966, as part of Title 10 of the California Administrative Code. The new merger policy was based on recommendations of the Shaw Report. This provided that approval of merger would be considered, jointly with FHLBB criteria, on the basis of 1) the fitness for merger of the applicant associations measured by their capital adequacy and operating efficiency; 2) the equity of the merger terms to participants; and 3) any anti-competitive influence.

Whatever the merits of the pros and cons of the competitive impact of selective merger in general, there is a strong case to be made for encouraging this practice in certain areas. For example, if two S&Ls, each with $20 million in assets, propose to merge in metropolitan Los Angeles, where 70 associations hold assets of approximately $9 billion, the impact of the combination in terms of substantially lessening competition would manifestly be negligible. The reverse may be the case in a rural setting, where for instance, the survivor might control 30 percent of the savings assets in the submarket.

The discussion above highlights the vast difficulties in the

theory and practice of merger policy from an allocational standpoint. It will no doubt be some time before the issues in this dimension of public policy are resolved. The impact on allocational efficiency of S&L mergers is far more complicated and important than the impact on operating efficiency. Nevertheless, the present study assumes that some operational statistical guidelines for measuring the costs in efficiency lost from higher concentration or few independent firms will be forthcoming. Meanwhile, in what follows I demonstrate how the results of the present study can be used to estimate the operating-cost impact of proposed mergers.

Cost impact of merger

As noted above, mergers must be considered in the context of branching costs within the framework of the formal model, and the statistical results of Chapter V. Earlier results showed that branching increases the cost of operations at a given output level. But the net cost effect of a merger may be determined by comparing the scale economies with the additional cost of branching.

There are three possibilities of a merger's impact on costs: i) if the S&L acquired is much smaller than the surviving institution, and it also has several branches, the likely outcome is that branching costs offset scale economies. ii) if both institutions are about the same size, and with the same output mix, so that the merger results in a 100 percent increase in, e.g. the TNLS, then the likelihood is that unit costs for the survivor will be lower. iii) there is the rare case which falls exactly between i) and ii) in which no impact on costs is registered.

In what follows several hypothetical examples are considered. In each case, the assumption is made that the composition of demand is the same for each S&L; thus a proportional post-merger expansion of each category of independent variables results.

Case I: Here it is assumed that stock association A with total assets of $15 million and 1 branch wishes to merge with stock S&L B with no branches and assets of $10 million. S&L A has 1,881 loans being serviced on average per month. Its average loan serviced is $14,300, and average deposit is $2,657. S&L B has the same average deposit and loan size, but services a relatively small total of 1,000 loans on average per month. The two associations are alike in every other respect. Before the merger, S&L A has an average cost of $119.10. S&L B has an estimated average cost of $130.90. Should the merger be consummated, the new S&L, call it AB, will be servicing 2,881 loans and operating two branches (so, NOFFS = 3). Calculations based on estimated parameters in table IV - 5 indicate that average cost for AB is now $110.45, which is lower than that of either association operating independently. In this example, the increased costs of branching do not outweigh the newly captured scale economies.

Case II: This time, I formulate a hypothetical merger between two medium-sized S&Ls. Here, consider two S&Ls, X and Y, the former with 7,677 loans being serviced, the latter with 6,000. Both have 3 branches. The associations are, for simplicity, assumed to have identical remaining characteristics. Pre-merger, X has AC per loan serviced of $97.28. Y has AC of $99.54. If the merger is approved by the regulatory authorities, the new association XY will have a total output of 13,677 loans, 7 branches

(NOFFS = 8) and, say, an asset size of $75 million. The average annual cost per loan of the new S&L would be $100.70. Here, the merger results in greater average annual costs per loan serviced than either X or Y taken separately.

Of course, in Case II, each firm may still be desirous of merging on other (non-cost) grounds. The capacity for future growth might be augmented. But the regulatory authorities no longer face the dilemma presented by Case I. There is no conflict between efficiency and anti-competitive impacts, or lessening of competition versus possible benefits to the community of greater financial stability (assumed to exist with fewer and larger S&Ls).

The above cases illustrate but two possibilities; these should suffice to clarify potential alternative supervisory decisions and the data required to guide these decisions. Economies of scale can be a real incentive in encouraging merger, and the regulatory agency will often find itself in a position of judging between preserving small, atomistic S&Ls--possibly suggesting "vigorous" competition-- and low-cost S&L services. It should also be clearer that it is impossible to issue a blanket justification for all mergers on the basis of observed scale economies over all size ranges. It is also the case that the task of the FHLBB and the State Commissioner is more complex than merely weighing cost factors. There are a large number of other circumstances and factors to be considered, usually classified as needs and convenience of the community, adequacy of capital structures, managerial ability, and "undue injury." If these are accounted for in the interpretation of "lower cost S&L services" then there is no problem. Supervisory agencies are required by law to prohibit mergers resulting in "substantial lessening

of competition." Those cases in which the merging associations are relatively small (in an environment of other Goliath-like financial institutions) or in which one S&L is failing (supervisory merger), then the anti-competitive impact is likely to be nil. The difficult decisions come when substantially lower costs would result from merger, but competition would be lessened. Here great assurances need to exist that the lower costs will be passed on in the form of a narrower spread in that market area between the deposit and loan rates and/or greater quality service to S&L customers.

Conversion from mutual to stock form--policy implications

The analysis of Chapter IV and V showed that mutual associations have a slightly higher average cost curve than non-held stock S&Ls. This seemed to be the appropriate comparison. Much of the larger differences in operating characteristics between stocks and mutuals that are often noted turned out to vanish when the holding-company influence was held constant. The calculations for small, medium and large mutuals indicated average costs of $110.95, $100.45, and $101.60 respectively. For all stock S&Ls, the figures are $110.70, $88.51, and $81.85. It was conjectured earlier that there is a plausible case for urging conversion, especially among medium and large S&Ls, to capture cost savings. This is apparent in comparing the observed cost curves of non-held stock S&Ls with mutuals. One may prefer stock-type forms of enterprise over mutuality on other, dynamic grounds. It may be that stock associations are more sensitive to profit prospects, less risk-aversive, and more dynamic. A possible caveat to the estimated relative average cost curves for mutuals and stock firms is the following: institutional conditions

favor easier mergers among stock associations than mutuals. Thus recent merger activity has been very selective in its impact on the aggregate cost curves of stock S&Ls vis-a-vis mutuals. Thus, differences in observed cost functions probably reflect institutional constraints rather than built-in differences in entreprenurial goals or abilities. The rate of merger activity is three or four times higher for stock firms. Stock associations are more aggressive, take greater risks, and are more prone to fall into the class of supervisory mergers. Compensation for those in control of an acquired association is easier to effect in the case of a stock company. This higher merger rate, sustained over long periods, is bound to show up eventually as differences in cost ratios among these two forms of associations--the weak can more easily perish, so to speak, when they are stock S&Ls. It may be the case that consistency requires those who are pro-merger to be also pro-conversion. In any case, assuming equity problems can be resolved, I see no reason for the FHLBB to continue its moratorium on conversions.

Conclusions regarding holding company impact

S&L holding companies have been subjected to some rather severe criticisms by economists in and out of government agencies. Some of the criticism levied in the past appears to have been warranted. The specific charges raised by the Shaw Report and by the FHLBB in its 1960 Report were reviewed in the last chapter. The evidence examined there suggests that California S&L holding companies are not evil per se. The impact on cost functions of holding company affiliation during 1969 appears favorable. Affiliates possessed lower (allocated) costs at each level of intermediation over the three size ranges. Reasons for these empirical

findings were discussed at length above. Potential abuses by parents no doubt did exist in the early 1960's when the FHLBB Report was written, and therefore the additions to the laws governing holding companies were clearly in the public interest. Until further evidence is in and more time passes, I conclude tentatively that the 1967 Act dealt adequately with the various regulatory problems arising from the holding company segment of the industry. Present legislation at both the state and federal level seems neither too restrictive nor too lenient.

It is instructive to note that a more liberal merger and diversification policy probably makes obsolete many of the original motives that sparked the holding company movement. That movement sought, in part and with undesirable side-effects, to circumvent restrictions on individual associations. There were advantages to be had from larger size and geographic diversification. Presumably, these advantages can be garnered today as easily by merging S&Ls as formerly by the holding-company route. Below I discuss product diversification, which also allows individual S&Ls to carry on additional ancillary activities directly.

Present characteristics of holding company affiliates which were uncovered show that affiliates tend to be relatively large and rapidly growing. They are more active in branching and are more efficient in terms of cost than nonaffiliated S&Ls. Comparisons of returns to scale for firms in California versus the rest of the country will show differences which reflect the large holding company influence. Holding companies operate in 11 out of the 20 states which permit stock companies. California has about half the total number of holding companies and affiliates, but because California affiliates are comparatively large, 83 percent of the holding company assets are in this state.

A note on diversification versus specialization

The existence of scale economies also has a bearing on the issue of diversification versus specialization by financial intermediaries. Within a static, partial equilibrium framework, economic theory tells us that specialization should imply a better division of labor and a routinization of standard processes. Each developed country has relatively specialized intermediaries dealing in housing paper. Economies of scale should emerge as these firms grow and their employees become progressively more adept at assigned functions. External economies benefitting the industry might also be important. For the non- or less-specialized financial intermediaries, such as banks, it might be expected, a priori that, because more diverse tasks or services are rendered, there is less scope for the emergence of operating economies for these firms vis-a-vis S&Ls. Banks provide mortgage loans, but they certainly do not specialize in this portfolio item. It is not obvious, however, that banking firms experience a less rapidly declining cost curve over all (or any) size ranges. Several bank cost studies confirm the prevalence of economies in the lowest one-third of the firm sizes. This is consistent with the pattern observed for credit unions, and that found in this study. After this initial agreement, the controversy comes in--some studies find constant costs for medium and large banks (an L - shaped cost curve) and others find a U - shaped curve. Still others find a continually declining function.

There does not seem to be a clear-cut method of comparing (directly) cost functions estimated for other intermediaries with those reported in the present study. If any generalization might be ventured, it is that banks do not experience more dramatic overall scale economies than S&Ls.

This is not the position taken by S&L industry spokesmen. They use a line of reasoning suggesting a variation on the theme: further specialization and division of labor is limited by the extent of the market. This limitation sets in somewhere before the $50 million asset size level. Once this size is reached, there is no longer scope for gains due to specialization. It is argued in the case of such overhead costs as top management and expensive computer systems, more diversified, multiproduct firms have the advantage of being able to distribute these costs more effectively. Diversification holds the promise of growth and greater economies of scale. Many large S&Ls are currently agitating for greater flexibility in their asset-liabilities portfolio - and they have been getting their wish. The FHLBB has authorized new consumer type loans, mobile home paper, loans on furniture, college loans and third-party transfers (analogous to checks). Lately, loan participation certificates (LPC's) have emerged to compete with commercial banks' certificates of deposit. This appears to be the trend for future developments. Large S&Ls also argue diversification will lead to further economies of scale experienced by the consumer - in the form of one-stop banking convenience.

One troublesome aspect about economies exacted by diversification is, they may accrue only to the large institutions. A major relaxation of present loan, investment, and deposit restrictions favors the corporate giant. Their size better equips them to develop into multi-product bank-type institutions. This might change the structure of the industry drastically, and make it even less competitive.

On the other hand, in smaller submarkets, diversification may improve allocative efficiency by bringing local savers and borrowers new

alternatives. But smaller markets mean smaller institutions, and these may lack sufficient business volume to warrant multi-product, banking type lines of services.

Summary and conclusions

The principal aim of this study has been to test various hypotheses concerning the cost-output relationship in the California savings and loan industry, and to develop useful generalizations for considering public policy questions about S&L industry structure. The paper provides an up-to-date measurement of scale economies in this particular industry. Along with a host of other studies dealing with financial firms, additional confirmation is afforded a time-honored conclusion that all financial intermediation is subject to diminishing unit cost for the firm. A grouping of associations by type (stock, mutual, recently chartered, holding company affiliate) and size (small, medium, large) enabled interesting contrasts and comparisons of various cost curves to be made.

I drew heavily on methodology developed to study costs in the commercial banking industry, notably Bell and Murphy, and this adaptation proved to be a rewarding exercise in terms of significant results. As is the danger with studies that must confine themselves to narrow and hence manageable portions of a field, the present one opened more Pandora's boxes than I care to enumerate. Many of the policy issues necessarily raised by my empirical results must remain treated incompletely or superficially. One can safely fall back on the customary escape hatch; namely, several issues were broached mainly to point the way to future research endeavors.

In particular, the findings of this study are, in large measure, tentative and many of the experiments should be repeated and refined. Perhaps in the future functional cost data will be generated by far-sighted regulatory agencies; this would improve greatly the quality of the statistical cost results. Recent advances in data processing permit a range of quantitative analyses of public policy questions that were considered intractable in the past.

Many policy issues can only be resolved when new research is complete. The tradeoff or mix of allocative and operating efficiency cannot be treated rigorously without new approaches to measures of the impact of concentration in relevant markets.

It is possible that the statistical tests and results reported in Chapters IV and V above have gone some distance toward clearing up the returns-to-scale controversy that existed in the literature on California associations in the past decade.

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