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Journal

Administrative Science Quarterly, 37

ISSN

0001-8392

Author

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Publication Date

1992

Peer reviewed

Between a Rock and a Hard Place: Organizational Change and Performance Under Conditions of Fundamental Environmental Transformation
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Source: *Administrative Science Quarterly*, Vol. 37, No. 1 (Mar., 1992), pp. 48–75
Published by:
Accessed: 04/04/2014 19:16

Between a Rock and a Hard Place: Organizational Change and Performance under Conditions of Fundamental Environmental Transformation

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This paper examines the proposition that change is detrimental to organizational performance and survival chances. I propose that organizational change may benefit organizational performance and survival chances if it occurs in response to dramatic restructuring of environmental conditions and if it builds on established routines and competences. These propositions are tested on the savings and loan industry in California, which has experienced technological, economic, and regulatory shifts that have forced savings and loan associations to change or die. Findings indicate that most changes enhance financial performance, one is harmful to performance, and three diminish failure rates. These results support the model developed here and suggest that the question of whether change is hazardous should be replaced by the questions of under what conditions change may be hazardous or helpful and whether the direction of change affects its impact on performance and survival.[•]

Ecological theory (Hannan and Freeman, 1977, 1984, 1989) posits that organizational change is limited by strong inertial pressures. Eight constraints on organizational adaptation are proposed, four internal and four external. The internal constraints are investment in plant, equipment, and specialized personnel; limits on the internal information received by decision makers; internal political constraints supportive of vested interests; and organizational history, which justifies past action and prevents consideration of alternative strategies. The external pressures for stability are legal and economic barriers to entry into new areas of activity; constraints on the external information gathered by decision makers; legitimacy considerations; and the problem of collective rationality and the general equilibrium. The assumption of strong structural inertia has two implications: (1) Organizational change is infrequent, much less frequent than environmental change. (2) When change does occur, it sets back the liability-of-newness clock (Stinchcombe, 1965; Amburgey, Kelly, and Barnett, 1990), rendering performance less reliable and thereby hurting survival chances (Hannan and Freeman, 1984: 159; 1989: 83). Moreover, undertaking change diverts resources from operating to reorganizing, reducing the efficiency of organizational operations.

These assertions are not novel. It has long been recognized in the organizations literature that change is difficult. Merton's (1957: 195–206) essay on bureaucratic structure and personality described two dysfunctions of bureaucracy that relate to organizational inertia. First, bureaucracies are subject to excessive rigidity in the application of rules and regulations. This severely constrains their ability to change in response to environmental shifts or internal organizational growth. Second, bureaucracies are inherently conservative and resistant to innovation. In the model developed by Crozier (1964: 175–208), based on observations of French public agencies, bureaucratic organizations are seen as increasingly rigid over time, subject to a bureaucratic "vicious circle." Crozier argued that increased dependence

on impersonal rules, centralization of decision making, isolation of hierarchical strata from one another, and the development of nonhierarchical power combine to lock bureaucracies into patterns of increasing rigidity. Blau and Scott (1962: 240) discussed the relationship between conflict and change in formal organizations: Change precipitates conflict, while conflict often engenders change. They argued that much of the resistance to change encountered in organizations is due to the disturbances that proposed innovations would produce in organizational status structures. Finally, the literature on the impact of administrative succession, starting with Gouldner (1954) and Grusky (1960), provides evidence that this kind of organizational change can be disruptive because it increases conflict, lowers employee morale and cohesion, and interrupts the unity of command.

The premise that organizational change is difficult and that organizations are subject to strong inertial forces is central to organizational ecology. The key issue is that the existence of strong inertial tendencies limits the ability of adaptationist theories to account for diversity in organizational communities. In their most recent writing on ecological theory, Hannan and Freeman (1989: 67) recognized the importance of investigating the premise that structural inertia is strong. A stream of research investigating the occurrence of change in organizational populations and its consequences has recently emerged (Singh, House, and Tucker, 1986; Delacroix, Swaminathan, and Solt, 1989; Miner, Amburgey, and Stearns, 1990; Amburgey, Kelly, and Barnett, 1990; Kelly and Amburgey, 1991; Swaminathan and Delacroix, 1991; Romanelli and Tushman, 1991). This paper adds to this new stream of research and performs two functions. First, it provides descriptive evidence about the occurrence of change in one population of organizations, California savings and loan associations. The characteristics of individual firms in this population demonstrate moderate year-to-year shifts and large differences over the ten-year observation period. Second, this paper assesses the consequences of change for financial performance and survival. The central premise of this paper is that organizational change may prove beneficial if it occurs in particular circumstances: if it occurs in response to dramatic environmental shifts that threaten the organizational form with extinction and if it builds on established routines and competences. These propositions are tested on the savings and loan industry in California, which has experienced technological, economic, and regulatory shifts that have forced savings and loan associations to change or die (Balderston, 1985: 4–8; Brumbaugh, 1988: 31–88; Eichler, 1989: 42–54, 57–58). Dramatic shifts in environmental conditions have wedged savings and loan associations between a rock and a hard place. Analysis of firms in this industry indicates that most types of organizational change enhance financial performance, only one type of change is harmful to performance, and three types of change diminish organizational failure rates. These findings support the model developed here.

AN ECOLOGICAL MODEL OF CHANGE AND PERFORMANCE

A central tenet of the ecological model is that structural inertia is a property of all organizational forms. Pressures in modern societies favor organizational forms that offer reliable performance (demonstrate low variance cross-sectionally and over time) and that can account rationally for their actions (Hannan and Freeman, 1984, 1989). Achieving high reliability and accountability requires that organizational structures be highly reproducible over time and cross-sectionally (highly inert). Organizational forms that are stable will be selected over organizational forms that are changeable; moreover, stable organizational forms will exhibit lower failure rates.

A distinction has been made between absolute and relative inertia (Hannan and Freeman, 1984, 1989; Singh, Tucker, and Meinhard, 1988). Strong absolute inertia implies that the rate of organizational change is almost zero; organizational structures and activities do not shift appreciably. In contrast, strong relative inertia implies that the rate of organizational change relative to the rate of environmental change is zero; organizational structures and activities do not adjust quickly enough to keep up with the demands of uncertain, changing environments, and organizational change cannot be timed precisely to coincide with environmental shocks (Hannan and Freeman, 1989: 66). In the research reported in this paper, I studied the converse of absolute inertia—organizational change without reference to the speed of environmental change. This study takes a first step toward investigating the impact of change on performance and survival under the assumption that environmental change occurs at the same rate for all organizations in this population.

The ecological argument about the causes and consequences of inertia predicts the behavior of organizational populations. It also has implications for the behavior of individual organizations. If inertia in the features of an organizational form diminishes its failure rate, then inertia or stability in the features of an individual organization diminishes its probability of failure. The opposite of stability is change. Stability in the structure and activities of an individual organization increases both the reliability of its performance (i.e., reduces the variance over time) and its ability to account rationally for its actions, thereby increasing its survival chances. Hence, change in the structure or activities of any organization reduces the reliability of its performance and its accountability, thereby increasing its probability of failure.

Ecological theorists argue that when an organization changes its core, it sets back the liability-of-newness clock (Stinchcombe, 1965; Hannan and Freeman, 1984, 1989; Amburgey, Kelly, and Barnett, 1990). When an organization undertakes nontrivial change, it must learn new patterns of communication to facilitate the flow of different information, it must integrate new members and learn new work routines in order to fill new job functions and manage the altered flow of work, and it must forge new relations with suppliers and clients (Hannan and Freeman, 1984; Singh, House, and

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Tucker, 1986). During the reorientation period that follows change, an organization diverts a considerable portion of its resources from operating to restructuring. The task facing an organization that undertakes change is similar to that facing a new organization. The effort involved in developing a structure and system of activities de novo or in restructuring an existing organization lowers the efficiency of operations, which leads to poor performance in the short term and lower survival chances in the long term.

There is a paradox here. If change increases the risk of failure, why do organizations ever try to change? There is abundant evidence of organizational change. But ecological theorists argue that change is detrimental to the reliability of organizational performance and hence to organizational life chances (Hannan and Freeman, 1984: 159; 1989: 83). When is change worth the risk? Change may be worth the risk when the transformation of environmental conditions renders previous organizational strategies and orientations obsolete (Tushman and Romanelli, 1985) so that an organizational form—an entire population of organizations—is faced with extinction. Under such perilous circumstances, some individual organizations may seek to avoid death by trying to adapt to new environmental demands.

Organizational forms can face extinction as the result of an accumulation of a series of small, incremental changes in environmental conditions or as the result of one sudden, dramatic change. The biological literature on evolution describes the sudden transformation of environmental conditions as punctuational change. Punctuational change operates through the structural reordering of environmental conditions (Eldredge and Gould, 1972; Gould, 1980). This contrasts sharply with gradual change, which operates through the ordinary selection pressures generated by competition and mutualism. According to punctuationalist theories of evolution, the central mechanisms of evolutionary change are exogenous shocks that appear random from the point of view of a species. Contrary to Linnaeus and Darwin, advocates of punctuationalist theories of evolution argue that nature does make leaps. It is during these leaps that new habitats appear in which new forms of life can thrive, which thus increases species diversity. Within the organizations literature, Gersick (1991) has urged researchers to investigate how organizations and industries react to punctuational changes in their environments. Astley (1985) also argued for the value of punctuational thinking. He focused on technological change as the force behind the structural reordering of environmental conditions. Carroll (1987: 227) investigated political turmoil as the source of punctuational change and concluded that "exogenous punctuational change is probably more important, pervasive, and frequent than has been acknowledged by economists or organizational analysts." This paper considers two further engines of punctuational change: shifts in the task and institutional environments through macro-economic and legal change.

The ecological model can be applied to situations in which punctuational change occurs. If the conditions that affect performance undergo a sudden (punctuational)

transformation, an organization will be prevented from offering consistent performance if it reproduces its previously effective structure and activities. If the output required of an organization changes frequently and by large amounts, if the inputs available (quantity, quality, or relative proportions) change, or if the processes used to transform inputs into outputs change, then that organization will be forced to adjust in order to achieve stable performance. If an organization does not adjust when its environment undergoes punctuational change, its performance and survival chances will be hurt. By contrast, if an organization does change in response to environmental transformation, two outcomes are possible: (1) Change will hurt performance and survival chances because the liability-of-newness clock is reset (Stinchcombe, 1965; Hannan and Freeman, 1984, 1989) and resources are diverted from operating to restructuring. However, it may be that not changing will lead to certain failure in the long run, so that a small short-term rise in the failure rate following change may be an acceptable risk (Amburgey, Kelly, and Barnett, 1990). (2) Alternatively, change could improve performance and survival chances because it enables organizations to meet new environmental demands. If the gain from meeting new environmental demands is greater than the loss of operating effectiveness due to restructuring, the second outcome will dominate the first. These arguments lead to the following proposition:

Proposition 1: When environmental conditions undergo a sudden (punctuational) transformation, change in organizational structures and activities will prove beneficial to short-run performance and to long-run survival chances.

What is it about organizations and organizational forms that changes? This question implies a second: What is organizational form? The definition first proposed by Hannan and Freeman (1977) is that of a blueprint encompassing the organization's formal structure, patterns of activity, and normative order. These authors later elaborated, defining organizational forms in terms of four core characteristics: stated goals, forms of authority, core technology, and marketing strategy (Hannan and Freeman, 1984). In more recent writings, they and other authors have distinguished organizational forms on the basis of relatively fixed repertoires of highly reproducible routines (Nelson and Winter, 1982: 14–19; Hannan and Freeman, 1989: 76). McKelvey (1982) categorized organizations on the basis of competence elements, meaning the skills, knowledge, and experience of organizational members, and organizational records and routines. Finally, Romanelli and Tushman (1991) argued that core activity domains are the defining features of organizational forms. Despite the differences in terminology, all of these scholars have focused on the same phenomenon. Organizational form is encompassed by domain, meaning the claims an organization stakes out for itself in terms of the clients it serves, the goods and services it produces, and the technologies it employs (Levine and White, 1961; Thompson, 1967). Change in one or more of these dimensions of domain involves change in an organization's core form.

There has been a great deal of research on the relationship between organizational change and organizational performance in the management strategy field (see Ramanujam and Varadarajan, 1989, for a review). This literature focuses primarily on change of domain through diversification—the introduction of new products, often for new clients, and sometimes requiring the introduction of new technology. Authors in a large body of work argue that the impact of diversification on firm performance is contingent on the direction of change, the degree to which new activities are related to the original core competences of a firm. Related diversification has three main benefits: (1) It can generate additional resources to further increase competence in the firm's original domain. (2) It can reduce average long-run costs, due to scale effects, rationalization of production and managerial tasks, and opportunities for technological innovation. (3) It can reduce the variability of the firm's income stream. In one of the most extensive studies of diversification, Rumelt (1974) found that firms that followed a related diversification strategy ("controlled diversity") outperformed firms that followed an unrelated diversification strategy. Even after adjusting for industry effects, the negative relationship between profitability and extent of diversification remained (Rumelt, 1982). The impact of organizational change on performance thus depends not only on whether the environment is changing or stable, but also on what type of change firms undertake—whether they enter related or unrelated fields of activity.

The degree to which a new line of activity represents related or unrelated diversification can be determined by reference to the organization's original domain. Organizational domain has three dimensions: products sold, clients served, and technology employed (Levine and White, 1961; Thompson, 1967). Diversifying involves changing one or more aspects of domain. What distinguishes related from unrelated diversifying is the extent to which each dimension of an organization's domain must be altered to accommodate new activities. Change that affects one dimension of domain only slightly should be less arduous to undertake than change that requires extensive modification of two or all three dimensions. For instance, offering new products to old clients with a similar production and distribution technology requires adjustment of only one dimension of domain, whereas offering new products to different clients that are made and sold in ways very different from the original products requires substantial modification of all three dimensions of domain. The former should be easier to undertake and be less harmful to performance and survival chances than the latter. This argument leads to a modification of proposition 1:

Proposition 2: Under conditions of sudden environmental transformation, the impact of diversifying away from an organization's original domain depends on the degree to which new activities are related to existing competences. The more closely related new activities are to the original domain, the better an organization's subsequent performance and survival chances.

METHOD

Research Setting: The Savings and Loan Industry in California

The savings and loan (thrift) industry provides an appropriate setting for testing the propositions developed above. Following more than a century of stability, the environment of this industry has recently undergone a fundamental transformation. From the 1830s to the 1970s, the core domain of savings and loan associations consisted of taking in small deposits and lending money out as residential mortgages. Thrifts' primary client base was composed of consumers. Until recently, thrifts offered only two financial services: passbook savings accounts and fixed-rate residential mortgages. The technology employed in this industry was financial intermediation of the most basic kind. Thrifts transferred funds from stable savings accounts to long-term mortgage loans, deriving profits from the dependable spread between the interest paid on savings accounts and that gathered from mortgage loans. For years, the savings and loan industry was described as "the 3-6-3 industry": Thrift management consisted of taking in deposits at 3 percent, lending them out at 6 percent, and teeing up on the golf course by 3:00 P.M. This piece of folklore illustrates how mundane managing a traditional savings and loan association used to be. This placid mode of operation has recently been shaken by dramatic shifts in the competitive and institutional environments. The entire financial services sector (including banks, thrifts, insurance companies, brokerage firms, and credit unions) has undergone fundamental structural transformation (Balderston, 1985), which has upset the ecological balance of the thrift industry, necessitating a rapid and extensive shift in industry structure.

Two external changes have affected the competitive pressures felt by savings and loan associations. The first is the development of electronic data processing systems, including back-office mainframes and central check-clearing and funds-transfer systems. Technological innovation has had several effects. It has enabled the creation of a secondary market for mortgages. Thrifts no longer have to be in the business of managing mortgage loans over their long lives; instead, they can focus on mortgage origination and sell most mortgages into the secondary market. Thus technological change has created a new investment target for savings and loan associations—mortgage-backed securities. Technological change has also increased competition for sources and uses of thrifts' funds by lowering barriers to entry between industries in the financial services sector. It has increased the speed with which information is processed, decreasing thrifts' time buffer and thus squeezing their profits. It has increased the complexity of financial products and has enabled the creation of many new financial products; e.g., adjustable-rate mortgages and mutual funds. Lastly, technological change has increased economies of scale and scope, making it more advantageous for thrifts to administer a wider range of financial products than just long-term mortgage loans and short-term deposits.

Change and Performance

The second major change that has affected the savings and loan industry is macro-economic. Over the past two decades, interest rates have risen and have become more volatile. Although savings and loan associations were protected from interest-rate changes by Regulation Q, which limited the rates paid on passbook savings accounts by thrifts and commercial banks, the effectiveness of this buffer has been attenuated by the emergence of unregulated competitors offering savings vehicles paying higher rates. Depositors have shifted their accounts from regulated thrifts to the unregulated money-market accounts offered by securities firms. Savings and loan profits, a function of the spread between interest gathered on mortgage loans and interest paid out to savings-account holders, have fallen because the mortgages held by thrifts are generally old and pay lower interest rates than do thrifts' deposits. The appearance of volatile and generally inverted interest-rate spreads has prompted many thrifts to seek shorter-term loans, such as consumer automobile and education loans and short-term commercial loans.

Combined, technological and economic change have made it very difficult for thrifts to achieve consistent profits by sticking to their traditional domain, residential mortgages. This transformed competitive environment has forced savings and loan associations to seek investments outside their traditional domain. However, investment opportunities are to a great extent regulated by federal and state governments. In response to the transformation of the financial services sector in general and the thrift industry in particular, federal and state governments have loosened regulatory constraints on savings and loan investment powers. Between 1978 and 1982, three major pieces of legislation were passed that loosened regulatory constraints on the financial services sector in general and thrifts in particular: the Financial Institutions Regulatory and Interest Rate Act of 1978; the Depository Institutions Deregulation and Monetary Control Act of 1980; and the Garn-St. Germain Depository Institutions Act of 1982. These acts opened up a multitude of new markets for federally chartered thrifts, providing them with substantial opportunities to expand beyond their original domain; they also swept away interest rate ceilings, loosening constraints on the liability side of the balance sheet. State legislation followed the federal government's lead. In California, the Nolan Bill (enacted 1 January 1983) widened state-chartered thrifts' investment powers considerably.

Technological and economic change together created pressure for the restructuring of the financial services sector in general and for the transformation of the savings and loan industry in particular. That pressure was unleashed by deregulation, a punctuational change that dramatically altered the conditions of competition within the savings and loan industry and between this and other financial services industries. Punctuational regulatory change has threatened the savings and loan industry with extinction. Deregulation transformed the competitive environment from placid and constrained to uncertain and dynamic. At the same time, deregulation enabled thrifts to escape the threat of

extinction by diversifying their asset portfolios and changing their domains. The savings and loan industry thus provides a good forum for studying the extent and consequences of organizational change under conditions of punctuational environmental change.

Data Sources

The Federal Home Loan Bank Board (FHLBB), the regulatory body governing California thrifts, produces the three primary sources of data used here. First, annual *Directories of Members* provide data on each firm, including the date of incorporation, the location of all offices, simple balance sheets, and any change in a firm's status. Second, *Financial Reports* publishes the reports filed by all thrifts. These provide detailed balance-sheet data. Third, the FHLBB maintains a file documenting merger and acquisition activity within the savings and loan industry. I have acquired *Financial Reports* from June 1977 to March 1987 (semi-annual reports, 1977–1983; quarterly reports, 1984–1987); *Directories of Members* from December 1976 to December 1987; and a merger and acquisition file for the years 1960 to 1987.

Operationalization of Variables

Organizational form is embodied in the core activities of the organization. For savings and loan associations, change in form involves movement away from the traditional domain—investment in residential mortgages—and into new markets. Thrifts' assets can be broken down into ten investment categories: (1) *residential mortgages* (ResM)—the traditional domain; (2) *nonresidential mortgages* (NresM), including mortgages on commercial, industrial, and undeveloped property; (3) *mortgage-backed pass-through securities* (MBS), which are based on bundles of mortgages whose rates of return are a function of the rates of return of the individual mortgages that make up the securities; (4) *consumer nonmortgage loans* (ConsL), such as credit cards and car, vacation, and education loans; (5) *commercial nonmortgage loans* (CommL); (6) direct investments in *real estate* (RE); (7) *cash and investment securities* (CIS), including cash reserves, securities issued by government agencies, and corporate stock; (8) equity investments in *service corporation subsidiaries* (SCo), which operate in such businesses as real estate development and sales, property management, appraisal services, and escrow and trustee services; (9) *fixed assets,* including land, building, furniture, and equipment; and (10) *other assets,* including stock in the Federal Home Loan Bank and the Federal National Mortgage Association, goodwill, accounts receivable, leased property, and deferred net losses or gains on assets sold. Fixed assets and other assets are residual categories; the other eight categories involve earning assets.

The propositions presented above posit different consequences for diversifying into new markets. Proposition 1 states that when the environment changes dramatically, domain change will benefit organizational performance and survival chances. Proposition 2 states that the direction of change undertaken also matters. Change will benefit organizational performance and survival chances if it builds

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on established routines and competences. In order to test proposition 2, we need to know which markets are related to residential mortgages and which ones constitute unrelated diversification. Below, I undertake a qualitative assessment of the degree to which the new markets are related to residential mortgages, based on similarity of the three dimensions of domain. This analysis is derived from Haveman (1990) and is summarized in Table 1.

Table 1

A Qualitative Summary of the Relatedness of Savings and Loan Markets*

Market	Clientele	Products	Technology	Overall assessment
Nonresidential mortgages	D	S	S	Related
Mortgage-backed securities	D	S	S	Related
Consumer loans	S	D	S	Related
Commercial loans	D	D	S	Unrelated
Direct investments in real estate	D	D	D	Unrelated
Cash and investment securities	S	S	S	Related
Service corporation subsidiaries	S	S	D	Related

* D = Different from original domain; S = Similar to original domain.

Nonresidential mortgage lending differs from residential mortgage lending in one respect. The clientele consists of corporations and small businesses rather than individual home buyers. Both residential and nonresidential mortgages are long-term loans secured by real property. Both involve the same financial intermediation technology, namely, the management of long-term, steady-payment loans. Investment in nonresidential mortgages is thus closely related to investment in residential mortgages.

Investing in mortgage-backed securities rather than in residential mortgages directly involves different clients and a slightly different technology, because the product is packaged differently, but the base product is still residential mortgages and therefore is well understood by savings and loan associations. This type of change is closely related to the traditional domain and should therefore be fairly easy to undertake (Brumbaugh, 1988: 162–169).

Offering new consumer financial services entails new products and a slightly different technology (shorter-term loans), but the basic product is still a loan. The client base (consumers) remains the same. The benefits to be reaped from this market derive from expanded opportunities to attract and hold retail customers. Moreover, such a move will lower the gap in maturity between thrifts' assets and liabilities, leading to better financial performance (Woerheide, 1984: 124–135). Consumer nonmortgage lending can be classified as related diversification.

Commercial nonmortgage lending involves both different clients and different products than does residential mortgage

lending, but the technology changes only slightly, involving shorter-term loans. However, thrifts' primary competitors in this market, commercial banks, have strong ties to commercial clients. Hence, the conditions of competition in the commercial loan market are very different from those of the residential mortgage market (Benston, 1985; Eichler, 1989). Movement into this market constitutes unrelated diversification.

Entering the market for direct investments in real estate (commercial and industrial properties as well as residential properties) requires more reorientation and entails more risk, as all three dimensions of domain change: products offered, clients served, and technology. Entering this new market should be the most hazardous for thrifts, since it is the most different from their current domain (Brumbaugh, 1988; Eichler, 1989).

The market for cash and investment securities involves different clients, products, and financial intermediation technologies. Thrifts that enter this market earn income from the spread between asset yield and their cost of liabilities (primarily deposits) and from capital gains realized when appreciated investments are sold. This market differs somewhat from residential mortgage lending. However, thrifts have always had substantial cash reserves and small investments in the securities issued by government agencies. Their new investments in corporate securities constitute only part of this market. Taken as a whole, this market is similar to thrifts' pre-deregulation domain.

A service corporation is "a regulated business organization wholly owned by one or more [savings and loan] associations, which may engage in specified business activities that the parent cannot or does not want to engage in" (U.S. League of Savings Institutions, 1982: 59). Service companies generally operate in markets from which thrifts are barred but which are closely related to residential mortgage lending, such as real estate development and sales and property management. Thus many service corporations serve the same clients as the traditional domain. Moreover, many service corporations offer products and services that complement residential mortgage lending; for example, escrow services. Insofar as they operate in areas closely connected to residential mortgage lending, service corporation investments represent related diversification.

Movement into five of the seven new markets thus represents related diversification: nonresidential mortgages; mortgage-backed securities; consumer nonmortgage loans; cash and investment securities; and equity investments in service corporation subsidiaries. Entry into two markets constitutes unrelated diversification: commercial nonmortgage loans and direct investments in real estate.

Dependent variables. There are two dependent variables: financial performance and failure. Financial performance is measured in two ways. The first measure is the level of reserves or *net worth* (NW): assets minus liabilities. This is a stock variable that assesses a firm's capital adequacy, meaning capital not committed to cover current obligations

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and therefore available to handle unanticipated outlays. This variable is an important factor in federal regulators' closure rule for savings and loan associations. If a thrift's net worth declines below a threshold of 6 percent of its total assets, the firm is considered to be insolvent and is subject to closure or takeover by federal regulators. Because it measures a firm's financial strength, this variable provides an early warning signal of impending organizational failure (Benston, 1985). The second measure of financial performance used is *net income* (NI): total income minus total expenses. This is a flow variable that assesses the profitability of each period's operations. Net income, like all other dollar amounts, is adjusted for inflation using the GNP deflator index.

The *rate of failure* is the second dependent variable. In the savings and loan industry, outright organizational dissolution is not a likely outcome. Between 1970 and 1988, only 17 California thrifts were liquidated, while 247 firms disappeared in mergers. The FHLBB often negotiates with healthy potential investors (usually other thrifts) to acquire failing firms; for example, the Bass brothers bought American Savings, the largest U.S. thrift, in 1988. The FHLBB or the Federal Savings and Loan Insurance Corporation (FSLIC) underwrites the cost of these mergers, in effect selling failing thrifts for the assessed value of their portfolios and absorbing a loss in the process (Woerheide, 1984: 172–177). I distinguish between involuntary mergers—those forced by federal regulators or by impending insolvency—and voluntary mergers—those entered into freely, without coercion. This variable is coded one if a firm fails during the period under study and zero if it continues to operate.

The FHLBB notes all merger events and describes them in some detail in the *Directories.* Supplementary sources were used to validate information presented in the *Directories,* including the State Department of Savings and Loans' *Annual Reports* on state-chartered firms and information provided by the FHLB of San Francisco's public information office. For those cases in which archival sources do not classify thrift mergers as voluntary or involuntary, I used a simple decision rule: I classified as involuntary any merger in which the disappearing firm was technically insolvent; i.e., it had zero or negative net worth. Thus, three types of exits were grouped together under the classification "organizational failure": (1) mergers explicitly labelled as FHLBB- or FSLIC-supervised, (2) outright liquidations, and (3) mergers of firms with zero or negative net worth. This classification scheme is a conservative one in that voluntary mergers (exits due to success) are very unlikely to be classified as involuntary (exits due to failure).

Independent variable. The independent variable is diversifying and is measured as change in the dollar amounts invested in each of the eight markets described above. These are actual increases or decreases in investments, calculated after correcting for inflation with the GNP deflator index. For models of financial performance, all changes are calculated over six-month periods between June 1977 and December 1986; for models of failure, some periods are six

months long (June 1977 through December 1983), while others are three months long (December 1983 through March 1987). The data are structured differently for the two analyses because of the limitations of the models used to analyze financial performance, which assume equally spaced time periods. In contrast, no such restrictions apply to hazard rate models of organizational failure, so the full data set can be used in that analysis. Data on change in asset portfolios are taken from the detailed balance sheets given for each firm in the FHLBB's *Financial Reports*.

Control variables. The multivariate models presented below include several control variables: *diversity of asset portfolios,* organizational age and size, level of competition, and gap between short- and long-term interest rates. I operationalize diversity of asset portfolios by measuring amounts invested in the eight markets at the beginning of each period. Levels of investment in asset portfolios have to be controlled in order to interpret the coefficients of the change variables. Consider the case of two otherwise similar thrifts, one with $20 million of its $500 million of assets invested in commercial loans and one with none in this market. Both thrifts may show an increase of $4 million in commercial lending over a six-month period; however, the impact of the $4 million increase can be expected to be different for the thrift with a prior investment level of $20 million than for the thrift making its first investment in this market.

I measure organizational *age* as the number of years since founding. I measure organizational *size* in terms of both the dollar value of assets (Assets) invested in all ten categories and the number of branch offices (#Br). I operationalize competitive pressure as *density* (Dens) and measure this as the count of savings and loan associations operating in California each year. I also calculate a density measure (BDens) for the primary competitor of California savings and loan associations, California commercial banks. Finally, I measure the most salient macro-economic force operating on this population: the gap between short- and long-term interest rates (IRGap).

There are two primary modes of diversifying: through internal growth or through acquisition. Although my data sources do not reveal the provenance of investments in new markets, I can infer the degree of expansion that occurs through internal development vs. through acquisition by counting the number of acquisitions made by each thrift. The number of thrifts acquired in the previous period—both within California and in other states—is included in the models presented below as a control variable (#Acqs). Controlling for the number of acquisitions is one way to address the alternative hypothesis that strong savings and loan associations acquire weak ones and that differences in later performance are due to differences in modes of diversification—internal vs. external.

Descriptive Statistics

Means, standard deviations, and correlations for the variables used in these analyses are presented in Table 2. Three hundred and thirteen firms operated in the California savings and loan association industry between June 1977

and March 1987. There were 102 mergers and 7 dissolutions between June 1977 and March 1987. Forty of these exits represent organizational failures; the remainder were other exits. In addition to the 102 acquisitions of California thrifts, 33 thrifts in other states were acquired. On average, California thrifts' financial strength was 5.4 percent of assets. Net income was positive, on average. Both net worth and net income demonstrate very large standard deviations, indicating vast differences over time and cross-sectionally in this industry. Failure is negatively correlated with both net worth and net income, as expected. The correlation between the two performance variables is moderate (.47), which is not surprising, since net worth is a stock variable and net income is a flow variable.

All but two correlations between changes in assets and financial performance are positive, while all correlations between changes in assets and failure are negative. This suggests that the more thrifts modify their portfolios, the better they perform and the less likely they are to fail, in accord with the predictions of proposition 1.

Multivariate Model Specification and Estimation

Models of financial performance. I investigated change in performance using regression models estimated on pooled cross-sectional and time-series data. Data were available semi-annually from 1977 to 1983 and quarterly thereafter. Quarterly data were aggregated into semi-annual data points in order to create equally spaced time periods. There are 308 firms in the data set that ends December 1986. Five firms that operate for less than one year disappeared from the original data set because I lagged the independent and control variables and thus lost one observation per firm. The model estimated is as follows:

$$Y_{t1} = \alpha Y_{t0} + \beta X_{t0} + \gamma \Delta X_{t0-t1} + \epsilon,$$

where Y_{t1} is the value of a firm's financial performance at the end of a period, Y_{t0} is the value of this variable at the start of the period, X_{t0} is a vector of time-varying control variables measured at the start of the period (organizational characteristics, level of investment in eight markets, and environmental forces), and ΔX_{t0-t1} is a vector of changes in thrift investments in eight markets between $t0$ and $t1$.

Pooling multiple observations for each organization violates the assumption of independence required for ordinary least squares (OLS) regression. This violation may result in biased parameter estimates that overstate variance across firms. To correct this bias, I estimated fixed-effects models, introducing one dummy variable for each company and suppressing the intercept. Fixed-effects models offer a very conservative test of my hypotheses because they model only within-firm variation over time and eliminate across-firm variation (Judge et al., 1982). Fixed-effects models are thus equivalent to pooled within-firm regressions. These models assume that the effects of the independent variables are the same for all firms and that only the intercepts are different. All across-firm variation is captured in the effect estimates of the dummy variables.

Table 2

Means, Standard Deviations, and Correlations for Performance and Failure, Change in Asset Portfolios, and Control Variables*

	1	2	3	4	5	6	7
Mean	.008	26.46	2.11	13.88	4.76	7.72	1.24
SD	.088	78.23	19.61	143.57	31.63	100.69	15.19
1. Fail		−.037	−.048	−.013	−.020	−.007	−.009
2. NW			.472	.153	.279	.158	.172
3. NI				.275	.139	.063	.100
4. ResM					.416	.077	.213
5. NresM						.177	.235
6. MBS							.021
7. ConsL							
8. CommL							
9. RE							
10. CIS							
11. SCo							
12. Age							
13. # Brs							
14. Assets							
15. # Acqs							
16. Dens							
17. BDens							
18. IRGap							

* These statistics are calculated using pooled cross-sectional and time-series data covering 313 firms and 3,425 six-month firm-periods. All dollar amounts are in millions.

I also corrected for autocorrelation. Autocorrelation of errors for individual firms over time occurs when unobserved factors that vary greatly between firms and change slowly over time influence the outcome variable. Model misspecification introduces errors whose effects are felt in both the coefficient estimates for the lagged dependent variable and the independent variables. When the lagged dependent variable is included in the model, as it is here, autocorrelation confounds the disturbance term with the effects of the lagged dependent variable. OLS estimation then yields biased and inconsistent estimates of the coefficient of the lagged dependent variable. When the exogenous variables are correlated with the lagged dependent variable, estimates of all parameters are biased and inconsistent (see Ostrom, 1978; Sayrs, 1989). To correct the bias caused by autocorrelation, I estimated maximum-likelihood autoregressive models, including a term to control for first- and second-order autoregression, using the SAS AUTOREG procedure (SAS Institute, 1987).

Models of organizational mortality. To study organizational mortality I used an event-history methodology. The dependent variable is the instantaneous rate of merger or dissolution, defined as

$$r(t) = \lim_{dt \to 0} \frac{Pr(\text{merge } t,\ t + dt | \text{alive at } t)}{dt},$$

where $r(t)$ is the hazard rate of organizational mortality, the instantaneous rate of organizational failure, and $Pr(.)$ is the probability of merger (or death) between times t and $t + dt$, given that the firm is alive at time t. I used the Gompertz

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Table 2 (*continued*)

8	9	10	11	12	13	14	15	16	17	18
0.70	0.81	4.48	0.95	29.51	18.38	579.86	.033	191.53	340.52	1.62
19.68	8.93	67.21	27.84	129.20	35.17	1636.16	.324	18.77	90.99	1.94
−.004	−.005	−.010	−.004	−.059	−.030	−.024	.011	.101	.061	−.009
.098	.149	.101	.004	.361	.826	.903	.150	−.013	−.020	−.011
.155	−.122	.120	−.046	.143	.324	.334	−.071	−.046	−.038	−.021
.049	.217	.106	.063	.046	.228	.115	−.070	−.031	.015	.038
.068	.217	.082	.036	.099	.327	.289	.081	.004	.084	.056
−.016	−.085	.061	.063	.090	.193	.294	.124	.046	.046	.023
.033	.037	−.028	.028	.031	.236	.171	.061	.020	.043	.053
	.016	.096	−.588	.013	.055	.074	−.0004	.027	.040	.034
		.025	.084	.051	.110	.197	.014	−.013	.028	.026
			−.240	.062	.154	.128	.075	.028	.039	.029
				.028	.053	.014	.016	−.040	.008	.028
					.429	.369	.073	−.152	−.189	−.094
						.884	.266	.023	.049	.031
							.194	.045	.060	.039
								.030	.022	.012
									.750	.144
										.553

specification of the hazard rate, a monotonic function of time:

$$r(t) = \exp[\alpha X_{t0} + \beta \Delta X_{t0-t1} + \gamma t],$$

where β is a vector of coefficients, X_{t0} is a vector of time-varying control variables measured at the start of the period (organizational characteristics, level of investment in eight markets, and environmental forces), ΔX_{t0-t1} is a vector of changes in thrift investments in eight markets between $t0$ and $t1$, and γ is the time-dependent coefficient. The time clock for this analysis is organizational age. This log-linear specification constrains the rate to be nonnegative. I used Tuma's (1980) maximum-likelihood (ML) program RATE to estimate the hazard rate models, which controls for right censoring. Right censoring occurs when the value of the outcome under study is unknown, when the change in state has not yet occurred for some firms in the sample. ML estimation with RATE allows right-censored observations to be used in estimating parameters, thereby avoiding biases that result from eliminating censored observations or from treating censored observations as though events occur when the period ends (Tuma and Hannan, 1984). With ML estimation, censored observations contribute exactly what is known about them, namely that the organization did not experience an event for the duration of the observation period. Noncensored cases contribute their entire histories, including the event. For the analysis of failure rates, the data were broken down into spells (six-month spells, 1977–1983; three-month spells, 1984–1987). All variables are updated each period. Independent and control variables are measured at the beginning of each period; the dependent variable—failure—is measured at the end of each period.

One problem with this research design must be addressed, namely, left truncation. Left truncation occurs whenever data are unavailable on the initial conditions and past history of the social actors under study (Cox and Oakes, 1984: 177–178). This study begins in 1977. Thrifts that failed or were voluntarily merged before 1977 are not part of the population analyzed; thrifts that were born before 1977 and that were still alive at that time are included in the data set. Having left-truncated data creates difficulties in interpreting parameter estimates. The sample of savings and loans studied is chosen contingent upon being alive at the start of the observation period. This selection criterion creates bias if it is correlated with the outcome under study (Heckman, 1979; Tuma and Hannan, 1984). If the factors that cause a thrift to live until 1977 are related to the factors that influence survival after 1977, then there is sample-selection bias. Previous research has shown that organizations of many types exhibit liabilities of newness (e.g., Freeman, Carroll, and Hannan, 1983). Other work has found age to influence organizational change rates (Singh, Tucker, and Meinhard, 1988). The average age of thrifts in the population in June 1977 is about 30 years. In investigating the effects of change on selection I am therefore confronted with severe sample-selection bias.

Mortality models must control for the fact that many of the organizations studied were alive before the beginning of the observation period—165 out of 313. Hence, the models estimated were conditioned on organizational age. In addition, the models include a dummy variable to provide a rough test of whether firms born before 1977 differ from firms born in 1977 and onward. The dummy variable for left truncation provides a main-effects test for significant differences between the two groups of organizations. This helps to control for sample-selection bias.

RESULTS

Descriptive Analysis: How Much Do Thrifts Change Their Domains?

Table 3 traces how much the characteristics of the average savings and loan change over time. For each year-end, Table 3 presents data on the mean proportion of assets devoted to the eight investment markets, the percentage of thrifts with investments in each market, and the mean of Blau's (1977) index of heterogeneity, which measures the diversity of thrifts' asset portfolios over time.[1] For this analysis, I standardize all figures by dividing them by the size of each firm's asset base. This provides a better basis of comparison across firms that operate on different scales.

Savings and loan associations have changed substantially over the decade since deregulation began. There is a smooth downward trend in concentration on the traditional domain, residential mortgage lending. Between 1977 and 1986, the proportion of assets invested in residential mortgages drops from 77 percent to 50 percent for the average California thrift. The biggest increase occurs in nonresidential mortgage lending. Investment here more than triples, from 5 percent to 16 percent of the average savings and loan association's assets. Cash and investment

1
Blau's (1977) index of heterogeneity is calculated as $D = 1 - \Sigma(P_i^2)$ where P_i is the proportion of assets invested in market i. This index is basically an application of the Hirschman-Herfindahl index to the distribution of a firm's investments among markets rather than to the distribution of an industry's sales among firms (Berry, 1974: 62–63). The Hirschman-Herfindahl index is subtracted from one to produce an index that increases with increasing diversification. If all assets are concentrated in one market, $D = 0$; if assets are spread evenly across all n markets, $D = 1 - 1/n$. For thrifts, which have ten possible investment markets, the maximum value of D is .90.

Table 3

Trends in Diversification of Asset Portfolios for Savings and Loan Associations*

Year	ResM	NresM	MBS	ConsL	CommL	RE	CIS	SCo	D
1977	77.4	5.3	1.8	1.8	0.4	0.4	9.2	0.3	.37
	100	92.1	43.9	98.8	39.0	54.3	100	84.8	
1978	76.6	5.0	1.8	2.0	0.5	0.4	9.8	0.3	.37
	99.4	90.6	48.8	97.1	40.6	47.1	100	83.5	
1979	74.4	4.8	1.8	2.6	0.6	0.5	11.1	0.3	.38
	98.9	87.7	46.9	98.3	46.4	45.8	100	82.7	
1980	69.5	4.5	1.6	2.9	0.7	0.6	15.3	0.4	.39
	94.9	82.6	43.1	96.4	49.2	50.3	100	75.4	
1981	66.1	5.5	3.2	2.2	0.3	0.8	16.4	0.6	.44
	98.9	88.8	54.0	97.9	36.9	65.8	100	79.1	
1982	54.1	6.8	8.9	2.0	0.3	1.4	19.8	0.8	.55
	97.1	88.9	73.7	97.7	39.2	77.2	100	80.1	
1983	51.1	9.0	12.1	1.8	0.6	2.9	15.7	1.5	.59
	98.3	93.9	81.2	96.7	44.8	83.4	100	75.7	
1984	47.5	12.9	8.6	2.3	0.7	2.7	18.0	2.3	.62
	100	98.0	76.5	98.0	45.5	80.5	100	70.5	
1985	48.0	16.0	4.8	2.3	1.1	3.2	16.8	2.4	.62
	98.2	96.8	58.9	96.4	49.8	79.9	100	67.6	
1986	50.0	16.2	5.2	2.2	1.1	3.2	14.8	1.8	.63
	100	96.3	57.4	97.7	52.3	79.2	100	68.5	

*For each year, figures in the first eight columns of the top row present the mean percentage of assets devoted to each investment category. In order, these are residential mortgages (ResM), nonresidential mortgages (NresM), mortgage-backed securities (MBS), consumer nonmortgage loans (ConsL), commercial nonmortgage loans (CommL), real estate (RE), cash and investment securities (CIS), and service corporation subsidiaries (SCo). The last column presents the mean diversity of assets, calculated over these eight categories of assets, plus two residual categories (fixed assets and other assets). For each year, the first eight columns of the second row present the percentage of California thrifts with investments in each category. All figures are calculated at 31 December.

securities (including corporate stock and securities issued by government agencies) also shows a substantial increase, doubling from 1977 to 1982, then dropping a little. Investment in mortgage-backed pass-through securities grows rapidly, increasing almost sixfold between 1977 and 1982, then dropping. Other markets—consumer lending, commercial lending, direct investments in real estate, and equity investments in service corporation subsidiaries—remain small for the average California thrift. The overall diversity of savings and loan asset portfolios increases steadily throughout this decade.

The second row of figures, the percentage of thrifts investing in each market, shows that almost all savings and loan associations continue to invest in residential mortgages. Over this decade, only forty-four firms have, at any time, zero assets invested in residential mortgages. These savings and loan associations are acting as mortgage brokers, channelling mortgages to the market for mortgage-backed pass-through securities. Such firms hold only a small volume of mortgages for the brief period of time between loan origination and sale into the secondary market (Eichler, 1989: 91). Hence some thrifts cease acting the traditional role of mortgage originators and administrators.

The biggest change in participation in new markets happens in the mortgage-backed securities market. The percentage of

thrifts investing in mortgage-backed securities rises from 43.9 percent in 1977 to 81.2 percent in 1983, then drops to 57.4 percent in 1986. Participation in the market for direct investments in real estate also shows considerable change, rising from 54.3 percent of thrifts in 1977 to 79.2 percent in 1986.

Some may contend that these diversification moves are important from the point of view of getting thrifts into markets they did not pursue prior to deregulation, but trivial from the point of view of disruption to the organization, since some markets never involve a large part of thrifts' asset portfolios. However, several industry analysts have concluded that the new markets opened to thrifts did in fact constitute significant departures from their traditional domain, requiring the acquisition of very different and very complex marketing and financial management skills (e.g., Benston, 1985; Brumbaugh, 1988; Eichler, 1989).

The data presented here indicate that substantial change does occur in organizations in this population. But they do not answer the question of what impact change has on financial performance and on failure rates. This is considered in the following sections.

The Impact of Change on Financial Performance

Table 4 presents models of the impact of diversifying on thrifts' levels of net worth and net income. Models 1 and 2 present the analysis of net worth; models 3 and 4, the analysis of net income. Models 1 and 3 present baseline models containing all control variables (portfolio of investments, organizational structure, and environmental factors). Models 2 and 4 add variables that represent change in the dollars invested in each of the eight markets. Investments in the two residual categories (fixed assets and other assets) have been excluded from the models.

Proposition 1 is tested by examining the direction and statistical significance of the parameter estimates for the change variables. If proposition 1 is correct, the parameter estimates for the change variables should be positive. Model 2 shows that six change variables have positive and statistically significant effects, as predicted by proposition 1: change in residential mortgage lending, mortgage-backed securities, consumer nonmortgage lending, commercial lending, investment securities, and service companies. One variable, change in real estate, has a negative and significant estimate, opposite to the predictions of proposition 1. Change in nonresidential mortgage lending has a nonsignificant estimate. On balance, these results support proposition 1, because six out of eight types of change improve net worth, while only one out of eight appears to harm net worth.

Proposition 2 is tested by examining the direction of the coefficient estimates for related vs. unrelated markets. The related markets are nonresidential mortgages, mortgage-backed securities, consumer loans, cash and investment securities, and service corporation subsidiaries; the unrelated markets are commercial loans and direct investments in real estate. If proposition 2 is correct, the

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Table 4

The Impact of Diversifying on Financial Performance*

	Model			
	Net worth		Net income	
Variable	(1)	(2)	(3)	(4)
Dep var$_{t-1}$	.849•••	.786•••	.185•••	.004
	(.016)	(.014)	(.019)	(.019)
Residential mortgages	.039•••	.028•••	.053•••	.061•••
	(.010)	(.009)	(.014)	(.013)
Nonresidential	.109••	.076•••	.127•••	.161•••
mortgages	(.013)	(.011)	(.017)	(.016)
Mortgage-backed	.025•	.006	.026•	.040••
securities	(.011)	(.009)	(.015)	(.014)
Consumer loans	.098•••	.075•••	.161•••	.110•••
	(.016)	(.014)	(.022)	(.020)
Commercial loans	−.084•••	−.075•••	.072•	.010
	(.025)	(.021)	(.035)	(.031)
Real estate	.082•••	−.050••	.392•••	−.066••
	(.021)	(.019)	(.029)	(.028)
Cash & investment	.084•••	.064•••	.109•••	.117•••
securities	(.011)	(.010)	(.015)	(.015)
Service corporations	.085•••	.044•••	.129•••	.083•••
	(.012)	(.010)	(.017)	(.015)
Δ Residential		.050•••		.012•••
mortgages		(.002)		(.003)
Δ Nonresidential		.004		.099•••
mortgages		(.008)		(.011)
Δ Mortgage-backed		.039•••		.045•••
securities		(.003)		(.004)
Δ Consumer loans		.038••		.070•••
		(.015)		(.020)
Δ Commercial loans		.102•••		.082•••
		(.014)		(.019)
Δ Real estate		−.278•••		−.826•••
		(.030)		(.043)
Δ Cash & investment		.015•••		.021•••
securities		(.003)		(.005)
Δ Service corporations		.060•••		.076•••
		(.010)		(.014)
Age	−.281	−.276	1.03	1.24
	(.687)	(.583)	(.923)	(.793)
Assets ($ MM)	−.050•••	−.025••	−.077•••	−.065•••
	(.010)	(.008)	(.013)	(.012)
# Branches	.430•••	.114•••	.459•••	−.046
	(.031)	(.028)	(.044)	(.042)
# Acqs	−3.91•••	−.004	2.50••	2.83••
	(.828)	(.720)	(1.06)	(.982)
Density	−.043	−.036	−.091•	−.112••
	(.032)	(.026)	(.041)	(.038)
Bank density	−.005	−.001	−.044•	−.044•
	(.019)	(.016)	(.026)	(.022)
Interest-rate gap	.134	−.083	.405•	.425•
	(.179)	(.152)	(.224)	(.201)
Adj. R^2	.976	.983	.375	.500

• $p < .05$; •• $p < .01$; ••• $p < .001$; one-tailed t tests.
* There were 308 firms and 3,425 firm-periods. Standard errors are in parentheses. All models present ML estimates that include first- and second-order autoregressive terms. For models 1 and 2, the dependent variable is net worth; for models 3 and 4, it is net income.

estimates for the first group should be positive, while those for the second should be negative. The case for proposition 2 is supported, with one exception—six estimates are statistically significant and in the direction predicted by proposition 2; one (commercial loans) is significant but in the direction opposite to that predicted. On the whole, these

results imply that moving into markets related to the traditional domain helps performance, while moving into markets not related to the traditional domain harms performance.

Results for the analysis of net income, shown in models 3 and 4, parallel those for the analysis of net worth. In model 4, all change variables have statistically significant estimates. All are positive, except for change in direct investments in real estate. Seven types of change improve performance (residential and nonresidential mortgages, mortgage-backed securities, consumer loans, commercial loans, cash and investment securities, and service corporations), while only one type of change harms performance (direct investments in real estate). On balance, these results support proposition 1. There is also substantial support for proposition 2—seven out of eight estimates are statistically significant and in the predicted direction; only one (commercial loans) is in the opposite direction.

Change in residential mortgages has a positive effect on both financial performance variables. But if savings and loan associations' traditional domain is troubled, increases in this type of investment should be negatively related to performance. It may be that change and stock variables for investments, which are positively correlated with total assets, capture some effects of economies of scale, even though the models estimated control for overall size with two variables—total assets and number of branch offices. Unfortunately, estimating models that include variables that are scaled to remove the impact of organizational size (e.g., proportion of assets in each market rather than absolute amount) creates more problems than it solves, primarily through creating heteroskedastic errors (Bollen and Ward, 1979).

I re-estimated all models of financial performance, using one-year lags for all independent and control variables and measuring change variables over one-year periods. The results of this modified analysis are very similar to those shown. The only important difference is that the coefficients estimated for change in residential mortgages and change in consumer lending become nonsignificant. This difference is likely due to the loss of observations and firms when one-year lags are used instead of six-month lags: 310 observations and eight firms disappear.

The Impact of Change on the Failure Rate

According to the propositions, if savings and loan associations diversify into markets that are closely related to residential mortgages, their life chances will improve and the failure rate will decline. If they make unrelated diversification moves, their life chances will worsen and the failure rate will rise. Models of the impact of organizational change on the rate of failure are presented in Table 5. As with the analysis of financial performance, the first model is a baseline model containing all control variables; the second is a full model that includes variables representing changes in the amount invested in each of the eight markets. Investments in the two residual categories (fixed assets and other assets) have been excluded from the models.

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Table 5

The Impact of Diversifying on the Rate of Failure*

Variable	Model (1)	Model (2)
Constant	− 15.5•••	− 14.9•••
	(2.78)	(2.91)
Residential mortgages	− .014•	− .013
	(.008)	(.009)
Nonresidential mortgages	− .011	− .006
	(.008)	(.010)
Mortgage-backed securities	− .029•	− .044••
	(.015)	(.018)
Consumer loans	− .024	− .031
	(.023)	(.021)
Commercial loans	− .007	− .018
	(.025)	(.042)
Real estate	.0001	− .007
	(.014)	(.015)
Cash & investment securities	− .025••	− .039••
	(.010)	(.013)`
Service corporations	− .014	− .011
	(.010)	(.010)
Δ Residential mortgages		− .024••
		(.009)
Δ Nonresidential mortgages		− .039••
		(.016)
Δ Mortgage-backed securities		− .006
		(.024)
Δ Consumer loans		− .020
		(.059)
Δ Commercial loans		− .053
		(.064)
Δ Real estate		.021
		(.028)
Δ Cash & investment securities		− .037••
		(.015)
Δ Service corporations		− .010
		(.015)
Age	− .012	− .013
	(.011)	(.012)
Assets ($ MM)	.015	.014
	(.008)	(.009)
# Branches	− .037	− .027
	(.033)	(.031)
# Acqs	− 11.5	− 16.2
	(653.)	(1270.)
Density	.059•••	.051••
	(.018)	(.019)
Bank density	− .001	.001
	(.005)	(.005)
Interest-rate gap	.218	.203
	(.160)	(.160)
Left-censoring indicator variable	.654	.766•
	(.458)	(.464)
χ^2	74.02	88.48
d.f.	16	24

• $p < .05$; •• $p < .01$; ••• $p < .001$; one-tailed t tests.
* There were 313 firms and 4,674 firm-periods; 40 failure events occurred. Standard errors are in parentheses.

As with models of financial performance, proposition 1 is tested by examining the direction and statistical significance of the parameter estimates for the change variables. If proposition 1 is correct, the parameter estimates for the change variables should be negative. Model 2 shows that three change variables have statistically significant impacts

on the failure rate. Increases in assets invested in residential mortgages, nonresidential mortgages, and investment securities diminish the failure rate. Estimates for changes in four other markets are negative but not significantly different from zero; change in one market (real estate) has a positive but nonsignificant effect. A χ^2 likelihood-ratio test comparing the relative goodness of fit between models 1 and 2 shows that adding the eight change variables marginally improves the fit to the data ($\Delta\chi^2 = 14.86$, Δd.f. $= 8$, $p = .06$). These results provide some support for proposition 1. Three out of eight estimates are negative, as predicted, and are statistically significant; moreover, the addition of the change variables marginally improves the model's fit.

In hazard rate models, individual variables have a multiplicative effect on the dependent variable (the rate of failure), rather than an additive one. This effect can be calculated as follows for the "average" firm in the population:

Multiplier $= \exp[\beta_i{}^*X_i]$,

where X_i is the average value of variable i for the population. For the three change variables with statistically significant parameter estimates, the multipliers of the rate of failure for the average savings and loan association in this population are as follows:

Residential mortgages: multiplier $= \exp[-.024(1.017)] = .976$

Nonresidential mortgages: multiplier $= \exp[-.039(3.491)] = .873$

Cash and investment
  securities: multiplier $= \exp[-.037(3.237)] = .887$.

The average change in residential mortgages exhibited by California thrifts diminishes the failure rate by 2.4 percent, while the average changes in nonresidential mortgages and cash and investment securities diminish the failure rate by 12.7 percent and 11.3 percent, respectively.

Proposition 2 is tested by examining the direction of the coefficient estimates for related vs. unrelated markets. If proposition 2 is correct, the estimates for the related markets should be negative, while those for the unrelated markets should be positive. Model 2 shows some support for proposition 2. Three out of eight estimates are in the direction predicted by proposition 2 and are statistically significant. Increasing investment in residential mortgages, nonresidential mortgages, and investment securities attenuate the failure rate. However, neither of the unrelated diversification moves shows a significant positive effect on the rate of failure. It is impossible, therefore, to make the case that unrelated diversification moves harm survival chances, although some related diversification moves improve survival chances.

As with models of financial performance, I re-estimated mortality models using one-year lags for all control variables and measuring change over one-year periods. The results are very different from those shown in Table 5. Increases in residential mortgages, nonresidential mortgages, and cash and investment securities no longer improve thrifts' survival chances. Instead, increases in mortgage-backed securities and decreases in real estate investments improve survival

chances. By increasing the lag to one year (from three or six months), the data set has been reduced considerably, losing six of forty failure events, fifteen of 313 firms, and 1,770 of 4,674 observations. Such a substantial change in the data calls into question the validity of using longer lags with such a short time series.

DISCUSSION AND CONCLUSIONS

This paper tested two propositions concerning the impact of organizational change on organizational performance and failure rates. First, the model developed here predicts that when environmental conditions change rapidly and substantially—when they undergo punctuational change—adjustments in organizational structures and activities will prove beneficial to short-run financial performance and to long-run survival chances. Second, a modification of this model predicts that under conditions of dramatic environmental change, the impact of diversifying away from a firm's base domain depends on the degree to which new activities are related to existing competences. Hence, the more closely related new activities are to the original domain, the better a firm's subsequent financial performance.

The analysis presented here supports proposition 1. Although California savings and loan associations have diversified substantially between 1977 and 1986, most of this change in domain has benefitted financial performance. Only a few types of change have improved survival chances. Change in six of the eight markets open to thrifts improves a firm's net-worth position; change in seven markets improves net income; change in three markets reduces the failure rate. The only type of change that appears to be hazardous for savings and loan associations is acquiring direct investments in real estate; this type of change harms both net worth and net income but has no significant impact on the failure rate. The time frame of this study is short, however: only ten years. This may be why only a few (three) changes demonstrate significant effects on the failure rate. If these firms were studied over a longer period of time, stronger relationships might be found.

This analysis provides some support for proposition 2. The distinction between moving into related and unrelated lines of business appears to matter for short-term financial performance but not for organizational failure. For net worth, the estimates for six of the eight markets are statistically significant and in the predicted direction; for net income, seven of eight are significant, as predicted. However, for the failure rate, only three markets show estimates that are statistically significant and in the predicted direction. None of the predicted negative effects appear. Thus, during times of tremendous environmental restructuring, diversification is beneficial to financial performance if it builds on competences developed by operating in the original domain and hazardous if it is not related to these competences; the impact of direction of change on the failure rate is less pronounced.

The negative impact of real estate investments on financial performance cannot be explained by reference to the hazards of buying real estate for investors in general. These savings and loan associations were investing in California real estate between 1977 and 1987 (primarily between 1982 and 1987), a time of strong upward movement of California real estate prices. The negative coefficient for real estate investments is not due to the inability of any investor to make money in California real estate during this time period; it must be ascribed to the technical incompetence of thrifts to select, manage, and develop real estate properties.

This study performs two functions. First, it provides descriptive evidence that one population of organizations, California savings and loan associations, has undergone substantial change during a period of fundamental environmental restructuring. It also assesses the consequences of change for both short-term financial performance and for long-run survival. Under conditions of dramatic environmental change, change in organizations' core features (products offered, clients served, and technologies employed) will prove beneficial to financial performance and survival chances. Moreover, the direction of change affects financial performance but not survival chances. If organizations build on their original domain, financial performance is enhanced; if change bears no relation to the competences developed through experience in the original domain, financial performance is hurt.

Punctuational change in environmental conditions threatens the savings and loan population with extinction. Some individual thrifts may persist into the next century, but they will neither look nor act as savings and loan associations did circa 1970. Many traditional thrifts—whose assets are concentrated in residential mortgage loans—have died or changed already, and more are foundering. Traditional thrifts, which constituted 98.9 percent of the population in 1979, are being replaced by organizations that call themselves savings and loans but manifest new forms, for example, commercial lending institutions that are virtually indistinguishable from banks, mortgage bankers that service other firms' loans, and real estate development firms (U.S. General Accounting Office, 1991: 62–67).

The question addressed in this study concerns only one of the processes operating in the extinction of the traditional savings and loan organizational form. This study focused on the consequences of changing organizational form, of moving away from the traditional domain (residential mortgage lending) into the new markets opened up by punctuational regulatory change. This study did not investigate the founding of new, nontraditional savings and loan associations; it did not compare the rate of change of existing organizations from traditional to nontraditional with the rate of failure of traditional organizations and the rate of founding of new, nontraditional organizations. This study thus does not answer the question of whether change in organizational communities comes about through adjustment of the structure and activities of existing organizations or through replacement of old organizational forms by new ones.

Change and Performance

The results of this study raise several questions. First, how much does the degree to which new activities build on current routines and competences matter to organizational performance and survival? This question cannot be answered here because this study uses a qualitative assessment of relatedness of markets. Investigation of this issue awaits the development and application of quantitative scales of the relatedness of organizational domains. Another question that could be addressed by future research is Which bases of relatedness are critical predictors of success after change? It may be that the relatedness of new client groups to the original clientele is an important distinction, whereas the difference between the function of old and new products is not. It may be that the crucial dimension of domain is technology; changing in ways that require mastery of new production and distribution technologies may prove difficult, while changing in ways that allow a firm to continue using familiar technologies is relatively easy.

The ecological model was applied in this study to conditions of fundamental environmental transformation. Inertia in the structure and activities of individual organizations does not improve survival chances when environmental conditions undergo a punctuational change, a structural reordering of the environment that threatens an organizational form with extinction. Organizational change can be beneficial, if it occurs under conditions of dramatic environmental restructuring that threaten an organizational form with extinction. However, it remains to be determined how rare are such transformations of organizational environments. Several engines of punctuational change have been discussed: technological change, political turmoil, macro-economic change, and legal change. This paper has investigated an instance of punctuational change that derives from a combination of economic, technological, and legal changes. The results presented here suggest that scholars working within the ecological framework may benefit by shifting their attention from the question of whether change is hazardous to the questions of under what conditions change may be hazardous or helpful and whether the direction of change affects its impact on performance and survival. Firms in dramatically changing environments may be compelled to adjust their strategies and structures in order to survive.

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