To the Graduate Council:

I am submitting herewith a dissertation written by Drew Dahl entitled "The Role of Capital in Bank Acquisitions." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Finance.

Ronald E Shrieves

R. E. Shrieves, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Provost
and Dean of The Graduate School

THE ROLE OF CAPITAL IN BANK ACQUISITIONS

A Dissertation

Presented for the

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ABSTRACT

This study examined motives for bank acquisitions based on capital considerations and related these motives to postacquisition changes in the capital positions of acquired banks. It consisted of two components: (1) A preacquisition test which used a multinomial logit model to compare the capital positions and other characteristics of a sample of acquired and nonacquired banks; and (2) a postacquisition test which used a multiple regression model to analyze changes in the capital positions of acquired and nonacquired banks.

The study employed a unique construction of the capital variable which allowed for the simultaneous existence of motives for acquisition based on both high and low capital ratios for the acquired bank. The sample consisted of 140 banks acquired in 1982 and 1983 in seven unit banking states and 3856 nonacquired banks in the same states.

Preacquisition results provided relatively strong evidence that high capital ratios are a motive for acquisition and weaker evidence that low capital ratios are a motive for acquisition. Postacquisition results show that banks likely to have been acquired because of a high capital ratio experience a relative decrease in capital levels subsequent to acquisition, while banks likely to have been acquired because of a low capital ratio experience a relative increase in capital levels subsequent to acquisition.

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CHAPTER 1

INTRODUCTION

Acquisitions account for a substantial amount of the equity investment in banks and are a significant contributor to the growth and concentration of banking. The impact of these acquisitions on competition, efficiency and profitability has been widely studied. Somewhat neglected, at least in relation to the attention paid to the impacts of acquisitions, are the factors which motivated their conception.

Attempts that have been made to identify these factors have been frustrated by an inability to reconcile theory with fact. Many of the avowed advantages on which acquisitions supposedly rely have not been borne out by empirical research, while some theories which are supported by evidence in one study are refuted by evidence in another.

Much of the confusion appears to stem from the multiplicity of motives for bank acquisitions. With several, perhaps dozens, of motives entangled among the often competing interests of the management and ownership of both acquiring and acquired bank entities, support for any one theory is difficult to discern.

This is particularly true of motives for acquisition based on capital considerations. The findings of previous studies yield often conflicting conclusions, which may result from sampling differences, from possible changes over time in the impact of capital on acquisitions

or, more significantly, from a failure of the studies to focus on the implications of specific motives.

This study tests for the existence of motivations for bank acquisitions based on capital considerations and relates these motivations to postacquisition changes in the capital positions of acquired banks. The methodology is designed to isolate the impact of capital. It has two components: (1) A preacquisition test which uses a multinomial logit model to compare the capital positions and other characteristics of a sample of acquired and nonacquired banks; and (2) a postacquisition test which uses a multiple regression model to analyze changes in the capital positions of these same banks.

The study employs a unique construction of capital position which allows for the simultaneous existence of multiple motives for acquisition based on capital considerations. It has a further advantage of using quarterly data, rather than annual data, which offers a sharper focus on differences or changes in the capital position of banks during the period surrounding acquisition.

The role of capital in bank acquisitions is worthy of attention if only because of the extent to which bank holding companies involve themselves in capital decisions made on behalf of acquired banks. Although decisions on important aspects of banking such as pricing, marketing and lending are generally relegated to affiliate banks, there is, as Rose [58] points out, a tendency for bank holding companies "to exercise considerable control over the capital management" of their affiliates.

Two possible roles for capital in bank acquisitions are studied. These roles involve latent debt capacity, which is based on the theory that the debt capacity of a bank holding company can be increased by acquisitions of banks with "excess" capital, and informational asymmetry, which is based on problems faced by banks in raising money in the capital markets. The latter motive, as developed by Myers and Majluf [48] and applied to banking, states that banks in possession of information unknown to investors will forego equity issues in some cases because of potentially adverse impacts of a stock issue for existing bank shareholders.

Acquisitions based on informational asymmetry can be understood in this context as an alternate method of capital transfer from bank holding companies with a capital surplus to banks with a capital deficiency. The easiest solution for these low-capital banks would be to issue equity capital directly in the primary market. But this option can be very expensive in view of the impact of flotation costs, of limited markets for the shares of many banks and, more importantly, of dilution.

Costs of dilution have been estimated by Asquith and Mullins [2] and by Masulis and Korwar [39] in studies of the primary equity issues of large, publicly traded companies. These costs, themselves significant, presumably are greater for a banking industry characterized by a large number of relatively small or regional banks and may help explain the reliance of banks on internal financing; Heggestad [22] estimates that only 20 percent of total bank capital generation since 1975 has been provided by external sources.

Results of the test undertaken in this study could be used to:

1. Provide information which could be used by regulators considering individual applications for bank acquisitions or changes in laws restricting certain classes of acquisitions, such as interstate banking. Acquisitions motivated by capital considerations in many cases ought to be encouraged, rather than discouraged, because they allow the banking system to direct capital to its most productive uses. Allowing a wider array of banks and bank holding companies to combine enhances the ability to effect these economically beneficial capital transfers.

2. Provide empirical evidence on motives for bank acquisitions. This evidence, moreover, is not limited to banking; Rhoades [56, 55] provides justification for viewing banks and other businesses homogeneously, and concludes that "the banking industry provides a particularly fruitful laboratory for investigating most of the basic questions and issues that arise in the field of industrial organization."

The remainder of the paper will be organized as follows. Chapter 2 describes the institutional setting in which bank acquisitions occur, with particular emphasis on the regulatory structure and the role played by bank capital, and reviews the literature on motivations for bank acquisitions, with consideration of both theories and evidence. Chapter 3 provides a statement of hypotheses to be tested and describes the methodology to be used. In Chapter 4, empirical results will be discussed. Chapter 5 will include a summary and conclusions.

CHAPTER 2

LITERATURE REVIEW

A. Institutional Setting

The motivations for bank acquisition based on capital considerations which are studied in this paper are similar to motivations for acquisition of industrial or other firms which are based on what is generally described as financial synergy. There are peculiarities to banking, however, which require explanation. These peculiarities include a business environment marked, in some areas, by extensive government regulation and a unique role for equity capital.

1. Bank Regulation

Regulation of commercial banks has evolved from its limited origins at the inception of the banking industry into an overlapping maze of multiple regulatory agencies which today govern nearly every phase of bank operations. Depending on where, how and under what authority a bank operates, it may be regulated by a state banking commission, the Federal Deposit Insurance Corp. (FDIC), the Comptroller of the Currency, the Federal Reserve System, the Securities and Exchange Commission and the Department of Justice.

Bank holding companies are organized either to acquire controlling interest in several banks, in which case they are regulated as multi-bank holding companies, or to acquire controlling interest in a single bank and other businesses "closely related" to banking, in which case

they are regulated as one-bank holding companies. Each bank owned by a bank holding company retains its own name along with its own board of directors and is accountable individually to stockholders and regulators.

The degree of autonomy held by individual banks varies among holding companies; some are operated as virtual branches, while others are run independently. From the perspective of bank holding companies, however, existing evidence summarized in a study by the Federal Reserve [12] suggests that they "tend to operate their organizations more as single integrated entities than as collections of commonly owned but autonomous companies."

The formation of bank holding companies, along with their acquisition strategies, are often made in response to regulatory restrictions. A one-bank holding company can enter produce and geographic markets from which banks are barred, while a multi-bank holding company can operate as an effective substitute for branch banking in states where branching is either limited or prohibited. (Branching is regulated by individual states; since the McFadden Act of 1928, Federally chartered banks are subject to state branching regulations.)

The impact of branching restrictions is an especially important factor. Data compiled by Rhoades [56] indicates that 58 percent of the 4,373 bank acquisitions from 1960 to 1982 in the United States occurred in nine states which had restrictive branching laws and in which multi-bank holding companies were the only vehicle for substantial geographic expansion. (See Table 1).

Table 1

Bank Acquisitions, 1960-1983

Year	Number of Acquisitions	Year	Number of Acquisitions
1960	75	1972	280
1961	96	1973	321
1962	178	1974	262
1963	144	1975	137
1964	129	1976	135
1965	140	1977	138
1966	123	1978	144
1967	134	1979	179
1968	139	1980	188
1969	208	1981	359
1970	247	1982	422
1971	195	1983	432

Rhoades [57] says

> Thus, while branch banks may expand geographically simply by establishing a new branch of the same bank, bank holding companies must set up a new (de novo) bank, which requires obtaining a new charter and establishing a formal corporate structure . . . . Because of the relatively high cost of de novo expansion, bank holding companies generally opt for expansion by acquisition.

Restrictions on interstate banking are also a factor in the formation and expansion of bank holding companies. Although Congress banned interstate banking in the McFadden Act, as amended by the Banking Act of 1933, it later delegated to the individual states the right to allow entry of out-of-state holding companies--which many states have subsequently done--and, in the Depository Institution Act of 1982, provided for interstate acquisitions of large, failing banks. Hawke [21] concludes that interstate banking eventually will evolve through state action.

Bank holding companies can expand through three channels: merger, consolidation or acquisition. A merger is a combination of two banks, one of which ceases to exist as a separate entity, while a consolidation is a merger of more than two banks into a single bank. An acquired bank maintains its own identity within a bank holding company.[1]

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[1]This paper uses "acquisitions" by bank holding companies as a general term intended to incorporate all forms of combination--acquisitions, mergers and consolidations--involving banks and bank holding companies as both acquired and acquiring entities. Although this simplification is somewhat limiting from a descriptive standpoint, it can be considered trivial from a practical standpoint because of the way in which the sample is constructed, which limits the universe of

Bank holding companies provide an effective mechanism for expansion. This fact is reflected in acquisition activity which is coincident with the formation of bank holding companies. During the period of intensive acquisition activity from 1960 to 1982, bank holding companies, according to Roussakis [60], expanded from a relatively insignificant presence to a system of 3,702 separate companies with 98 percent of all deposits.[2]

Bank acquisitions must be approved by the Comptroller of the Currency, the Federal Reserve or the FDIC, depending on the charter of the acquiring bank or bank holding company. Their decisions on acquisition requests, according to Roussakis, are based on the financial history and condition of each bank involved, the convenience and needs of the community served, the character of the bank management and the effect of acquisition on competition.

The attention of regulators traditionally has tended to focus on the competitive impact. The Federal Reserve Board regulates market extension acquisitions, which are defined as those which combine banks operating in different geographic markets, while the Department of Justice, acting under Federal antitrust laws, regulates horizontal combinations of two banks operating in the same geographic market which result in excessive concentration.

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all possible combinations involving acquiring and/or acquired entities to acquisitions of banks, or groups of banks, by bank holding companies.

[2]Much of this increase, it should be noted, was due to conversions by existing bank holding companies.

The guidelines of the Federal Reserve Board raise the prospect of challenge only if two general conditions are met: (1) The bank or bank holding company is seeking acquisition of a dominant bank in a highly concentrated market; and (2) it is considered by the Justice Department, acting under the concept of potential competition, to be a likely entrant to the market anyway. The potential competition concept is intended to promote the establishment of new banks in a market by inhibiting acquisitions of existing banks.

The impact of the Federal Reserve Board guidelines is questionable. Hawke [21] concludes that "there is no present vitality in the potential competition doctrine, in any of its variants, in the area of bank expansion," while Heggestad [22] points out that, despite the Federal Reserve guidelines, acquisitions that meet the criteria for challenge are rare. Nevertheless, potential competition is a part of the regulatory process, and even Hawke concedes that "the Federal Reserve Board has routinely--and rigidly--applied" the guidelines.

The Department of Justice first promulgated guidelines in 1968 detailing conditions under which a bank merger or acquisition could be challenged on anticompetitive grounds. In 1982, revised rules were issued, which use an index constructed by summing the market shares of each bank in the market--the Herfindahl-Hirschman Index--to measure market concentration. These rules, which have been relied upon by the Federal Reserve Board, appear to be more accommodating to many mergers or acquisitions than the rules they replaced and have been used as a planning device by banks attempting to gauge the likelihood of challenge to expansion plans.

Regulations also exist which attempt to limit risks arising from the "non-arm's-length" relationship between a bank holding company and its affiliates. Among these regulations, summarized by Rose [59], are those which limit financial transactions between affiliate banks in the same holding company to no more than 10 percent of the bank capital of any one bank and those which limit transactions with all affiliates combined to no more than 20 percent of bank capital of any one bank. In addition, loans and extensions of credit from a bank to its affiliates are subject to strict collateral requirements.

There are exceptions to these regulations, including one which exempts from transaction limitations purchases of loan paper by a bank subsidiary from a sister bank subsidiary if those purchases are made "without recourse." Loan participations among affiliated banks are increasing; early studies cited by Rose report little of this activity, while more recent studies report more activity.[3]

Despite the exceptions, the net impact of the regulations provides a significant restraint in the operation of bank holding companies. Rose says that "whatever the desire of the parent holding company, financial integration of sister bank subsidiaries is effectively constrained by present law, except insofar as it can be satisfied through loan participations among the affiliated banks."

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[3]Rose [58], in summarizing these studies, says that loan participations comprise an area of centralized policy making controlled by bank holding companies, rather than their affiliate banks, and that bank holding companies typically include participations as a service offered to their affiliate banks.

(See later section on informational asymmetry for a discussion of loan participations among nonaffiliated banks.)

2. The Role of Bank Capital

Capital is used to provide funds for a bank beginning operation, to protect depositors and other creditors, to generate a competitive return for bank shareholders and to comply with the requirements of regulatory agencies.

Primary capital consists of common stock, surplus, undivided profits, contingencies, capital reserves, perpetual preferred stock, reserves for loan and lease losses, minority interests in subsidiaries and mandatory convertible debt up to 10 percent of primary capital exclusive of such debt. (Mandatory convertible debt comprises capital instruments with covenants mandating conversion into common or perpetual preferred stock.)

Total capital consists of primary capital plus limited life preferred stock, qualifying subordinated notes and debentures and mandatory convertible debt in excess of 20 percent of primary capital.

Relative to industrial firms, the capital position of banks is very small, constituting about 6 percent of total assets. Nagle and Peterson [49] identify three reasons for this more leveraged position of banks: (1) The guarantee of the FDIC in providing deposit insurance for accounts up to $100,000 is a significant advantage in raising low cost funds because of the virtual risk-free return to the depositor; (2) the ability to manage funds for individuals and firms is an advantage in tapping nonequity funding sources; and (3) creditors perceive the

credit risk of a financial institution to be lower than that of other firms.

The extreme use of leverage by banks creates an opportunity for high returns on equity but also entails considerable risk since it is capital that provides the buffer against which uncollectable loans are charged; the lower the capital level, the greater of risk of insolvency.

Regulators carefully monitor banks to ensure that the capital base is large enough to maintain the safety and soundness of bank operations. This monitoring includes both qualitative factors, such as considerations of unique characteristics of sound and well managed banks, and explicit quantitative factors, of which capital adequacy ratios (capital as a percentage of total deposits) are most important. Penalties for failure to comply range from "moral suasion" to charter revocation.

Traditionally, capital ratios have been based on bank size, since larger, more diversified banks presumably need less capital as protection against deposit losses. In 1985, however, the Federal Reserve, the FDIC and the Comptroller of the Currency issued capital requirements which require all banks to meet a uniform level of 6 percent, of which 5.5 percent must qualify as primary capital.

The Federal Reserve is currently considering changes which would establish different risk categories for various assets. The

changes would supplement, but not replace, existing capital standards.[4]

The consideration by the Federal Reserve of explicit categorization of bank assets according to risk reflects an emphasis of all regulatory agencies on bank safety. This emphasis on safety results in a conservative asset structure for banks relative to other industrial firms. It also results in portfolios of assets which vary to a lesser degree among banks than among other industrial firms.

Further regulatory restrictions related to capital are directed at lending limits and capital transfers between holding company banks. Both restrictions are intended to maintain bank safety; the former minimizes the vulnerability of a bank's capital position to large loan losses by limiting loans to a single borrower to 25 percent of capital, while the latter prevents a drain of capital from a bank to its parent bank holding company by linking upstream dividends to earnings. (The amount of dividends that banks can pay in any year without prior regulatory approval is limited to the net profits of that year plus an amount equal to the retained profits of the two previous years.)

The limitations on funds transfers, however, may not be as restrictive as they seem to be. Rose [58] says the limitations are characterized by significant "loopholes," while there are no limitations on other avenues, such as fee payments, by which funds can be

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[4]The proposal, issued January 24, 1986, is "intended to bring (The Federal Reserve's) policies on bank capital into better alignment with the risk profile of the banking industry."

transferred from an acquired bank to its parent. (See Section 3.2 for more information on fee payments.)

B. Bank Acquisition Motives

A variety of theories on motives for mergers and acquisitions exist. Attempts at empirical verification, however, have failed to result in a consensus opinion; it appears that bank holding companies buy banks for many different motives. Among these motives are those which rely on synergies created by acquisition.

Other motives for merger emphasize the role of management benefits through growth by merger or "ad hoc" explanations which may have very little, if any, theoretical foundation. An example of an "ad hoc" motive is one cited by Hannan and Rhoades [17] which involves high market shares[5] for acquired banks; while this may in fact be a desirable quality, there is no reason to believe that an acquiring bank holding company would be in a better position than the target bank to take advantage of it. In such a situation attractiveness of market share would be valued equally by both the bank holding company and the target bank. It would be factored into the purchase price, thus eliminating its existence as a motive for acquisition.

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[5]Hannan and Rhoades say that high market shares confer a greater "name identification" and marketing advantages.

It is the role of synergy, therefore, that will be emphasized in this paper. Without synergy and in perfect capital markets there is no compelling justification for mergers on the basis of economic advantage.

Steiner [69] classifies synergies developing from mergers as either real or pecuniary. Real synergies result from economies in a firm's production, distribution, management, research or sales functions, while pecuniary synergies are created by the impacts of taxes, financial strategies, accounting rules and other factors unrelated to a firm's basic activities.

The first part of this section of the paper will examine synergistic motives for bank acquisitions resulting from capital considerations. The last part will examine acquisition motives based on other synergies, including economies of scale, and motives based on managerial considerations.

1. Capital Oriented Motives

Two motives for acquisitions which are frequently mentioned as relevant to banking, or which at least appear applicable to banking even if they are usually considered in the context of industrial mergers, involve informational asymmetry and latent debt capacity. The first motive is based on access to capital markets and predicts an inverse relationship between the likelihood of a bank being acquired and its capital level. The latter motive is based on debt capacity and predicts a positive relationship between the likelihood of a bank being acquired and its capital level.

1.1 Access to Capital Markets

A lack of capital for the acquired bank is often cited by bankers and analysts as a factor in bank acquisitions, particularly acquisitions of banks which have seen their capital levels decline because of rapid growth of loans or deposits. Francis Bell, the head of an acquired community bank [3], said that his bank

> continued to grow rapidly, and with growth came capital problems. The demand for credit and the growth of the banks had been phenomenal. We were unable to increase our capital rapidly enough--to maintain the requisite capital "adequacy"--and allow the banks to grow at the speed we thought they should to support their respective communities.

It is also possible that declining capital levels can be brought about by negative factors such as large loan losses. Regardless of whether eroding capital positions are the result of positive or negative factors, however, the underlying impact is the same: Some banks find themselves unable to generate enough funds internally through earnings retention to maintain regulatory capital ratios or to extend large loans.

The capital problem is exacerbated by the reliance of banks on internal financing. Heggestad [22], in summarizing the impact of his estimate that only about 20 percent of total bank capital generation since 1975 has been provided by external sources, suggests that internal financing may be reaching a point of saturation.

Heggestad says

> Given the magnitude of future capital requirements in the eighties and the anticipated decline in financial institution profitability as a result of increased competition it seems unlikely that retained earnings can continue to contribute as

> large a share of total capital growth, . . . Increasingly, banks will need to utilize both traditional and innovative ways of accessing the capital markets to meet the shortfall.

An inability of banks to tap capital markets can result from the following factors: An informational asymmetry between what managers know about their banks and what outside investors know about them; flotation costs; and limited markets for shares of bank stock.

1.1a Informational Asymmetry

The informational asymmetry considered by Myers/Majluf [48] can be used to explain corporate finance choices as attempts by firms to avoid problems associated with security issues.[6] One type of financing choice explicitly mentioned in their paper concerns mergers.

Myers/Majluf develop a model in which management possesses information, unavailable to the market, about the value of a firm's existing assets and an investment opportunity. This asymmetry occurs at the midpoint of a three-date period. Prior to the creation of the

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[6]The importance of an informational gap, or asymmetry, was first identified by Akerlof [1] in the context of used cars. He showed how markets can collapse when sellers have "inside" information about the quality of their cars which buyers are unable to verify.

Recent studies have used the idea of informational asymmetry to portray equity issues as signals which communicate management's inside information about firm value. Leland and Pyle [32] predict that large equity issues by owner-managers are a negative signal. From a diversification standpoint, these owner-managers have an incentive to hold large positions in their own firm only if its shares are undervalued. Their fractional ownership can be interpreted as a signal of firm value.

Miller and Rock [42] contend that changes in outside financing are signals to investors of changes in a firm's earnings. In their model, equity issues are equivalent to negative dividends and convey pessimistic information about the firm's future earnings.

asymmetry, both management and the market know only the probability distributions of possible end-of-period values of the investment under consideration and existing assets. At the midpoint, the end-of-period values are known by management but not by the market. The asymmetry is eliminated when the values are revealed to the market in the final period.

Two further conditions are imposed by Myers/Majluf: First, that the investment requires an outlay of funds in excess of what can be generated internally by the firm, which means that outside financing is necessary; and second, that management acts in the interest of "old" stockholders who own shares prior to the new financing. Management makes a decision on security issuance and investment at the midpoint when informational asymmetry occurs.

If managers act in the intersets of old stockholders, they seek to maximize the value of the old shares conditional on the decision to issue and invest and on their knowledge of the future values of the investment opportunity and existing assets. In other words, managers base their decision on a comparison of the market value of the old stockholder's shares if the project is undertaken, and outside financing obtained, with the market value of the old stockholder's share if the project is rejected, and outside financing avoided.

A simple decision rule requiring managers to invest in all positive net present value projects is not credible in the presence of informational asymmetry; if existing shares are incorrectly priced, as is likely, investment in all positive net present value projects will not

necessarily maximize old shareholder interest. This anomaly results from management's possession of inside information about the values of existing assets and the investment opportunity.

If the inside information is favorable--which means existing shares are undervalued--management may forego a valuable investment opportunity rather than being forced to issue share for less than they are worth. The project may also be passed by even if the information is unfavorable, which means that existing shares are overvalued. Investors, understanding management's motivation, would interpret a decision to issue and invest as bad news, and the benefits of "overvaluation" to old shareholders would disappear as the price of existing shares drops.

The existence of a drop in share price on announcement of a primary security offering has been documented by many studies including those by Asquith and Mullins [2] and by Masulis and Korwar [39]. The two studies identify price declines, or dilution, of about 2.5 percent on announcement day.

The impact of this dilution is even more apparent when measured as a percentage of stock offerings. Asquith and Mullins find that the average loss in firm value on announcement day is 31 percent of the funds raised in the primary offerings, which, as they point out, indicates that "to raise $100 million in new equity, existing shareholders, on average, gave up $31 million in current market value."[7]

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[7]Explanations for price declines are varied. Competing theories include those focusing on information effects, which are supported

In the Myers/Majluf model, the inevitable price drop associated with external financing becomes a factor in management's decision on the proposed investment. The existence of inside information, whether favorable or unfavorable, has created a situation in which the increment to firm value obtained by old stockholders following a decision to issue and invest in a positive net present value project can be less than the share of existing assets going to the new securityholders. This leads to a potential rejection of a valuable project, which, in turn, is reflected in a loss of ex ante firm value (measured at the beginning of the period before the issue-invest decision is made).

Myers/Majuluf identify several financial choices that management can use to minimize the loss in firm value. One choice is to rely increasingly on internal financing through utilization of "slack," which they define as cash on hand, marketable securities and riskless debt. If enough slack exists to fund the project, there is no loss in firm value associated with a decision to invest since the need for external financing is eliminated.

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empirically by the findings of Asquith and Mullins and of Masulis and Korwar; a "price pressure" effect which contends that an increase in the supply of shares reduces price because of a downward sloping demand for shares; and capital structure effects which result from changes in debt ratios caused by the equity issue.

The studies by Asquith and Mullins and by Masulis and Korwar emphasize the impact of information effects. Although neither study clearly establishes the dominance of any one particular information theory--whether it be Leland and Pyle, Miller and Rock, Myers/Majluf or others--both provide support "consistent" with the idea that investors view equity issues as unfavorable signals about a firm.

If the firm's slack is insufficient to fund all investment projects, it can attempt to acquire more by such methods as limiting dividend payments or issuing riskless debt. A firm with too little slack, according to Myers/Majluf, increases its value by acquiring more.

Acquisitions can bolster slack. In the Myers/Majluf model, an acquisition will always increase the value of a combined firm relative to its preacquisition components provided that one firm's surplus slack fully covers the other firm's deficiency. In addition to increasing firm value, the reallocation of slack following merger has a societal benefit: By reducing the impact of informational asymmetry on the issue-invest decision, rejections of valuable investment opportunities are reduced. Capital is directed to its most productive uses.

Acquisitions can be initiated by either the buyer or the seller. In the Myers/Majluf model, however, mergers initiated by the seller are hampered by the same complications arising from a decision to issue and invest. As the authors point out, the decision to sell shares always carries negative information, regardless of whether the shares are sold to investors generally or to a specific acquiring firm. Selling to an acquiring firm, in fact, poses greater problems than issuing a limited quantity of securities, since the firm is attempting to sell more share than is necessary to fund prospective investments. This conveys an even more pessimistic signal to the market. The gap between buyer and seller is widened.[8]

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[8]Partial disclosure of inside information can mitigate the difficulties faced by a firm seeking to be acquired, according to

An acquisition initiated by the buyer rather than the seller is more likely in the context of the Myers/Majluf model and also appears to fit what is observed in the market. Myers/Majluf say that firms with plenty of slack should seek out acquisition candidates which have good investment opportunities and limited slack, and about which investors have limited information. These firms are most likely to have shares priced in the market, prior to the issue-invest decision, at a substantial discount from their potential value in the absence of the information effect. They require large amounts of external financing, and, moreover, have managers who are privy to a disproportionate amount of inside information. It is possible, therefore, for a firm with surplus slack to make a tender offer to the shareholders of a firm with inadequate slack at a price satisfactory to both. This price would be above market value yet below the potential value which could be realized following the elimination of the slack deficiency and of the associated need for external financing at a time when information asymmetry exists.

Although the argument of Myers/Majluf was presented in the context of industrial mergers, it appears to be applicable to bank mergers as well. A direct effect is cited by Harris [19], who says "the situation exists where the board could raise additional capital through a

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Myers/Majluf. But this is an imperfect remedy. Proprietary information made available to just one firm, or many firms, in the process of acquisition negotiation could undermine the planned investment or the value of existing assets. Even if the information was not proprietary, its transmission to potential acquirers would be costly in terms of supplying reports, time spent by management in interviews, etc.

local public offering, but prefers not to do so for fear of diluting its own influence or control, as well as the equity interests held by its members."

The characteristics of relevance to mergers motivated by informational asymmetry in an industrial setting--differential financial slack for acquiring and acquired firms, existence of limited information about the acquired firm and the possession of good investment opportunities by the acquired firm--are also of relevance to similarly motivated mergers in banking. The terminology is different, however, and requires some explanation.

"Good investment opportunities" for an industrial firm can be translated as "good loan opportunities" for a commercial bank. Loans are the primary reason for the existence of a bank and constitute the largest single class of assets held. They are also profitable; the majority of bank profits are earned from lending or lending-related activities.

Banks traditionally have preferred to make short-term loans to businesses, although in recent years they have attempted to balance their portfolios by spreading loans over various industries with differing risk characteristics. This has tended to lengthen the maturity of their business loans as well as expand lending in the areas of real estate, consumer installment and agriculture.

Investments in government securities are important as both a secondary source of liquidity and as a source of income. But their homogeneity appears to disqualify them as "good investment

opportunities," which, in the Myers/Majluf model, is limited to opportunities unique to a particular firm. If a valuable project rejected by one firm can be assumed at no extra cost by another firm, the informational asymmetry rationale for merger disappears.

Loans are subject to the same criticism since they are less readily definable as unique or proprietary opportunities. This is in contrast to other industries in which the investment opportunities are predicated to a greater extent on unique characteristics of the firm--technology, efficiency, location, etc.

Yet loans for a variety of reasons may be considered to some extent proprietary. Bankers claim to have experience, expertise and flexibility in lending which gives them a competitive advantage over all other financial institutions, while within the banking system itself, there is at least some differentiation with respect to financial services offered. For instance, banks may specialize in certain types of loans, or may differ in their ability to evaluate or to serve them.

There is also significant geographic segmentation in the markets for loans, which may make it difficult for a well capitalized bank holding company to capture loan opportunities in distant markets which a local bank in that market is unable to satisfy because of a weak capital position. Some segmentation may also exist within markets, particularly in unit bank states which prohibit branching.

The existence of geographic segmentation, loan specialization and a comparative advantage of banks relative to other financial institutions means that loans may be considered to some extent "proprietary."

This suggests a measure for "good investment opportunities" based on a bank's loan growth.

Homogeneity of product in banking poses another problem with respect to application of the Myers/Majluf model because of the relative ease with which investment opportunities can be transferred among institutions through such means as loan participations. This means that a bank can satisfy strong loan demand, despite a capital shortage, by acting as an originator of loans which are immediately sold to another bank with surplus capital. Thus loan participations mitigate the need to access the capital market on which the model relies.

The same rationale, however, can be used to varying degrees in he industrial sector; for instance, a manufacturer unable to finance development of a new invention could sell the patents to a capital-rich competitor. And regardless of whether the transfer of investment opportunities occurs in banking or in some other industry, it is an inferior solution to the problem of capital inadequacy since some of the profits are captured by the entity to whom the inventions or loans are sold.[9] Participations may also be hampered by inefficiencies or uncertainties.

The transfer of the informational asymmetry aspect of the Myers/Majluf model to banking is less troublesome. Although much more information about banks is available to investors through regulatory

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[9]A lack of data on loan participations between nonaffiliated banks makes it impossible to quantify the impact of these participations on the transfer of investment opportunities in the banking industry.

agencies than is available about industrial firms, it is still incomplete. Attesting to this fact are the many bank failures in which an insolvent loan portfolio has been at least temporarily represented by "inside" management as sound and profitable to "outside" investors or even regulators.

A measure of informational asymmetry for a bank can be constructed from an examination of its risk. More risk is associated with a greater degree of informational asymmetry.

Myers/Majluf justify this relationship by linking the degree of risk, defined as the standard deviation of earnings from a firm's existing assets and growth opportunities, with the amount of information available to investors before the firm reveals whether it will issue and invest. Their numerical simulations indicate that the standard deviation of the value of existing assets, in particular, plays an important role in determining the loss in the firm's ex ante market value relative to its potential value in the absence of informational asymmetry.[10]

The redefinition of financial slack in the context of banking presents opportunity rather than problems since the unique financial

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[10]The measure of informational asymmetry derived from the riskiness of a bank's portfolio is confined to existing assets and offers little evidence on the degree of informational asymmetry associated with the standard deviation of growth opportunities (other than what can be suggested by the past history of bank operations). But if the Myers/Majluf simulations are accurate the standard deviation of growth opportunities is of lesser importance anyway.

structure of banks offers a way to indirectly quantify slack that is not possible using industrial firms.

The cash and marketable securities components of slack are easy to identify for both industrial firms or banks. But for industrial firms, the final component of lack, default-risk-free debt capacity, is difficult to measure; technically, in fact, there is no such thing as default-risk-free debt for private industrial firms.

Because of the availability of FDIC insurance, banks can always "issue" deposits which can be considered free of default risk in the context of Myers/Majluf. In view of the previously mentioned incentives for using leverage, this tradeoff between a theoretically unlimited ability to issue deposits and the strain on capital adequacy which deposit issuance creates provides an excellent measure of financial slack. The higher the capital/asset ratio, the greater the slack.

In conclusion, acquisitions motivated by informational asymmetry should involve acquired banks with low capital levels, a high degree of informational asymmetry and the existence of valuable loan opportunities. The impact of these factors, moreover, should vary depending on whether the acquisition is defined as between markets or within a market.

(Within market acquisitions, which will be called "inside" acquisitions in this paper, involve an acquiring bank holding company and an acquired bank which have operations in the same geographic markets, while between market acquisitions, which will be called "outside" acquisitions, involve an acquiring bank holding company and an acquired bank which are located in different geographic markets.)

The informational asymmetry motive should exist to a greater extent in outside acquisitions. This is true because of an overlap in the loan growth opportunities of an acquiring bank holding company and a potential target bank with operations in the same market. Obviously, not all of the loan opportunities are unique to the target bank, and those which are not unique can be captured directly, without inside acquisition, by a bank holding company in the same market.

1.1b Flotation Costs and Limited Markets

It is the premise of this paper that informational asymmetry is a major determinant of a bank's inability to tap the capital markets. Among other factors which may have a potential impact on access to capital markets are flotation costs and limited markets for bank shares. Yet these factors are of questionable magnitude and, moreover, are themselves affected by informational asymmetry.

Flotation costs include commissions to underwriters selling the equity or debt issue, printing expenses, advertising costs and registration fees with the Securities and Exchange Commission (SEC). These costs are predominantly fixed, and therefore generally are more burdensome for issues of smaller and less-known banks.

A study by Smith [66] of 578 common stock issues between 1971 and 1975 confirms the fact that smaller firms experience higher flotation costs. He finds that flotation costs as a percentage of total proceeds are about 14 percent for underwritten offerings smaller than $1 million while for offerings larger than $100 million the same costs

are less than 4 percent. Similar results were reported in a study by the SEC [71].

These differences in flotation costs cited by Smith appear to be significantly less important than information costs; the finding by Asquith and Mullins [2] of an average rate of dilution of 31 percent following issue announcements more than doubles Smith's most extreme flotation cost estimate of 14 percent.

This dominance of information costs compared to flotation costs is further underscored by the fact that the companies studied by Asquith and Mullins were large, listed on either the American or New York Stick Exchanges and in general much better known than the relatively small banks (less than $100 million in assets) acquired during the period in which this study is based. This implies a greater relative impact of informational asymmetry in the banking industry.

Finally, part of the impact of flotation costs on access to capital markets, regardless of its magnitude, reverts to informational asymmetry anyway. Securities characterized by a large degree of informational asymmetry can be presumed to be more difficult to sell, which increases underwriting commissions. (Commissions constitute about half of the total flotation costs cited by Smith for issues of less than $1 million.)

Informational asymmetry also plays an important role in limiting markets for bank shares, which is another hypothesized reason that banks are often unable to tap primary equity markets. Compared with large industrial companies, whose stock is publicly traded, most of the

approximate 15,000 commercial banks in the United States face much more constricted markets for their shares. The most extreme cases of limited markets typically are those for the stock of relatively small or community banks--where, presumably, the informational asymmetry is also likely to be greatest.[11]

1.2 Latent Debt Capacity Motive

An increase in debt capacity has many advantages for banks and bank holding companies. The most obvious advantage is the potential for increased profitability created by added leverage. If a bank decides to either reduce equity capital through dividend payment or to issue additional liabilities against a given level of capital--while at the same time investing these additional liabilities in income earning assets--the return on equity for stockholders is increased.

This strategy is particularly important for banks because of the existence of deposit insurance and the widely held belief that regulatory agencies will not permit the largest banks to fail. Lower capital levels incurred by expanded loans and deposits may subject shareholders--or the parent bank holding company--to increased risk of

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[11] Dince and Forston [10] describe the market for community bank stock as involving

> the president of a bank looking in his desk drawer for the list of local businessmen or board members who have expressed an interest in buying shares. The president or chairman is the focal point of the market and makes the market, even suggesting the price (often different for outsiders as compared to insiders). The more stock being offered the greater the discount.

insolvency, but the liabilities are still effectively default free. As Heggestad [22] points out, this means that there is no significant market penalty in the form of higher interest costs for banks with higher leverage.[12]

Heggestad says that the bank with the greater leverage has an ability to underprice its competitors. Since the spreads between interest revenue and interest costs are very narrow, the firm with more leverage is able to maintain a smaller spread and still earn a comparable return on equity. This could be a substantial competitive advantage.

Two additional advantages from an expanded debt capacity are available to bank holding companies. One advantage results from the finding of Magen [36] that bank holding companies can leverage extensively without increasing their cost of borrowing; Heggestad and Mingo [23] say that this means that funds passed up to the bank holding company are worth more than dividends issued to shareholders of independent banks, who do not have a similar ability to leverage.

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[12]One way that bank holding companies can adjust their capital levels is through what is called "double leveraging," which occurs when bank holding companies issue debt to finance equity investments in their bank subsidiaries. Graddy, Homaifar and Karna [15] view double leverage as a

> method for cogeneric organizations to adjust their capital structures in the face of regulatory constraint at the affiliate level. That is, the bank holding company organizational form provides a mechanism for satisfying capital adequacy guidelines at the affiliated banks while, at the same time, still achieving a consolidated financial structure commensurate with investor preferences.

Latent debt capacity as a basis for conglomerate mergers was suggested by Lewellen [34], who says that if one of two merged firms had been underutilizing low-cost funds in its capital structure prior to merger, the combined firm can remedy that oversight by refinancing. "In particular," Lewellen says,

> if it should turn out that for a substantial range of debt-to-equity ratios for a firm, debt is "cheaper" than equity--in the cost of capital sense--failure of an acquisition candidate to employ debt up to the upper limit of that range would provide an opportunity for an astute acquiring company to rearrange their joint capital structure through additional borrowing.

The previously cited study by Magen, in fact, shows that the average cost of funds for a bank declines slightly with increases in leverage.

Lewellen's argument appears to be especially well suited to banks. When "debt" in the form of deposits is rendered riskless by the FDIC, there obviously exists a substantial range of debt-to-equity rations--a better translation for a banking environment is a range of capital ratios--in which deposits are cheaper than risky equity capital. The failure to achieve a financial structure which utilizes leverage up to the limits of that range results in a position of "excess" equity capital.

Variants of the excess equity capital rationale are often mentioned as motivating factors in bank mergers. Frieder and Apilado [14] cite a lack of debt in the capital structure of most banks prior to acquisition, with debt in this case referring to subordinated debt and debt of other types which is classified as equity capital by regulatory agencies. They suggest that acquisition increases the debt capacity of the acquiring bank holding company, thereby expanding its potential use of financial leverage.

Piper [52] says that some bank holding companies he studied "acquired in many instances excess capital, that could be reallocated to other affiliates, and unused debt capacity." A similar role for "bootstrap cash or capital" is noted by Harris [18].

"Certain target institutions have a cash position or capital structure that enables an acquiring firm to use a portion of those target assets to finance or pay for the acquisition," Harris [18] says.

> This fortunate circumstance may permit the acquiror to invest less of its own funds at the closing. Alternatively, the condition may permit the acquiror to use excess capital in the target to improve a low capital position in one of the parent's existing subsidiaries.

The key in each instance is that the target institution has cash or capital that can be effectively freed for other uses after the target is combined with the resulting entity. Mayne [40] says that 30 percent of the dividends paid by banks to the parent is used for purposes other than dividend payment by the bank holding company.

Regulations restricting dividend payment by banks to bank holding companies create an advantage in deploying excess capital at the bank holding company level. Rose [58] says

> there is an incentive for the parent holding company to "upstream" as much of the earnings of its subsidiary banks as possible (that is, to minimize each bank's retained earnings and increase its leverage) in order to have the earnings available to "downstream" quickly to any bank.

There is nothing unique to acquisition which creates gains through utilization of latent debt capacity; as Lewellen says, acquisition is just one way of remedying "a kind of management ineptitude in capital structure planning." Thus the motive for acquisition based

on latent debt capacity might be better understood as an extension of a motive based on replacement of incompetent management.

The latent debt capacity motive for bank acquisitions is distinct from another debt capacity motive for conglomerate mergers which also was developed by Lewellen. This motive is based on increased debt capacity achieved through diversification. As long as two merging firms have cash flows which are less than perfectly correlated, the combined entity will have a cash flow with less dispersion.

This reduced dispersion, Lewellen says,

> will induce lenders to establish a new aggregate limit on lending which can only exceed the sum of the original limits established for the two merger partners individually. Therefore, as long as leverage has, in a world of taxes, a beneficial impact on residual equity market values, an expansion of the range of borrowing levels by corporations as an automatic by-product of merger provides a convenient and reliable vehicle for the augmentation of shareholder wealth.

Risk reductions associated with more diversified cash flows are mentioned by several authors as motives in bank mergers or acquisitions. Rose [58] says that to "the extent that the acquired banks are located in different markets and that capital flows among markets are imperfect, such geographical diversification should reduce the variation in earnings for the group of affiliated banks," while Heggestad [22] says that "managers of the acquired bank may be able to take advantage of its greater diversification and increase the risk exposure of the portfolio without any increase in risk to the combined firm" (see Section 3).

2. Evidence on Capital Oriented Motives

Empirical evidence on the incidence of characteristics in bank acquisitions which is consistent with the notion of capital motives for those acquisitions is, in many cases, either unclear or nonexistent. Existing studies generally are concerned with aspects of bank acquisitions which are not directed at identifying specific motives based on capital considerations. This is particularly troubling in seeking evidence on the informational asymmetry motive, which requires explicit examination of the interactions among differential capital positions of acquired and acquiring bank entities, expected postacquisition loan growth of the acquired bank and asset composition of the acquired bank.

2.1 Preacquisition Differences

Early studies measuring the financial characteristics of merging banks find little evidence of premerger differences in either acquired banks and nonacquired banks or of differences in acquired banks and acquiring banks which were not attributable to size. One of the first studies comparing acquired banks to nonacquired banks was Lawrence [30], who uses a univariate methodology to test for preacquisition differences between a sample of 98 holding company affiliated and matched independent banks on which observations were recorded between 1952 and 1964. He finds that bank holding companies generally acquire banks which are similar to other banks in terms of capital.

Smith [67] uses a univariate study to compare the preacquisition characteristics of 81 banks in the Fourth Federal Reserve District that

acquired other banks between 1960 and 1965, the characteristics of the banks acquired and the characteristics of a matched sample of non-acquired banks. He finds that acquired banks have slightly higher capital ratios than acquiring banks, although this evidence is biased by differences in size between the acquired and acquiring banks.

A study by Mingo [44] uses multivariate regression analysis of holding company affiliated and independent banks to test for differences in preacquisition characteristics. The study compares 167 randomly chosen banks that were independent in 1967, the year in which his sample was drawn, with 33 banks from that same group of 167 banks which were acquired by bank holding companies between 1968 and 1972. Comparisons include a regression of capital ratios against a dummy variable representing whether the bank was acquired or nonacquired and control variables for size, profitability, market concentration, business investment, personal income and interactions among the variables.

Mingo finds that prospective holding company banks have higher capital ratios, but he describes this result as "tenuous," with only small differences observed--holding company banks have capital ratios about 4 percent higher than other banks--and relatively weak statistical significance. His results, moreover, are hampered by his data, which is relatively old and is taken from a period prior to increases in the use of double leveraging of bank holding companies. (See next section for a discussion of double leveraging.)

Among other studies from which can be gleaned at least weak evidence of a motive for acquisition based on high capital ratios is one by Curry [8], who uses a multivariate study to test for preacquisition differences between 91 banks which were acquired between 1969 and 1972 and 1,065 nonacquired banks. To test for possible differences over time in acquisition motivations, Curry divides his sample into two subsamples, one with banks acquired in 1969 and 1970 and another with banks acquired in 1971 and 1972.

Among regressions run by Curry is one of total capital against a dummy variable representing whether a bank was acquired or non-acquired and several independent variables measuring the financial characteristics of banks or the markets in which they operate. He finds a positive and significant relationship between acquired banks and capital ratios in the sample of banks acquired in 1971 and 1972 and a negative and insignificant relationship in the sample of banks acquired in 1969 and 1970.

A recent preacquisition study by Hannan and Rhoades [17] provides an improved analysis of the role of capital in acquisition decisions. They use a multinomial logit model to study the characteristics of 201 banks in Texas which were acquired between 1971 and 1982 and the characteristics of 845 nonacquired banks, also in Texas, which were in existence in 1970. These characteristics, which are based on financial information and on information on the markets in which the banks operated, are used to determine the probability of a bank being acquired.

Although their study is structured to test for the existence of an acquisition motive based on replacement of incompetent management (see next section), direct and explicit evidence is also provided on the role of capital: They find that acquired banks tend to have lower capital ratios than nonacquired banks. This evidence is corroborated in a related study by Rhoades [55].

Hannan and Rhoades say that this finding is consistent with a "practitioner opinion" that banks with high capital ratios are unattractive acquisition targets because of the higher premiums they command in the marketplace. They fail, however, to establish a link between financial theory and empirical fact--they provide no theoretically complete rationale for the "practitioner opinion."

2.2 Postacquisition Changes

Some of the previously mentioned studies from which information on preacquisition differences was obtained also include "before and after" comparisons of the financial characteristics of acquired banks and matched independent banks during a period surrounding acquisition. The previously cited study by Smith [67], for instance, makes observations on acquired and nonacquired banks one year prior to acquisition and three years subsequent to acquisition, then compares the changes for the two groups of banks. Any differences are attributed to acquisition.

Although the results of these studies are far from uniform, several patterns seem to emerge. They generally find that acquired

banks have lower capital ratios than independent banks after acquisition. They also find that acquired banks have significantly riskier asset structures than independent banks, in terms of more loans and municipal securities, fewer U.S. Government securities and less cash.[13]

A separate type of study focuses on the differences between independent banks and banks which are affiliates of bank holding companies without considering how or when the affiliate bank became a part of the holding company. These studies provide conflicting evidence on the degree to which bank holding companies either inject capital into or withdraw capital from their affiliates.

Heggestad and Mingo, in their study which concludes that the capital ratios for affiliate banks are lower than for independent banks [23], also find that affiliate banks add to capital at a slower rate than independent banks. They use a multiple regression model with percentage change in capital from 1970 to 1972 regressed against a dummy variable representing bank holding company affiliation (1 if owned by bank holding company; 0 otherwise) and several control variables thought to affect capital flows. Their sample consists of 365 of the

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[13]One two-edged factor affecting risk directly results from affiliation: Acquired banks are exposed to less risk because their affiliation with a diversified holding company provides a "safety valve" of support, while, at the same time, they are exposed to more risk because their affiliation means that their resources may be used by the holding company to rescue failing affiliates. Rose [59] says it remains to be seen how far the increase in risk exposure created by riskier asset structures "may be offset by lessened affiliation risk from geographical diversification through multi-bank expansion."

largest banks in the United States; 248 were affiliated, 117 independent. (A problem with their study is their focus on the largest banks without consideration of smaller banks which constitute the overwhelming majority of all banks.)

A second component of the Heggestad and Mingo study is essentially a variation of the "before and after" methodology. In this component, they measure the difference in the capital ratios of the 248 affiliate and 117 independent banks in 1972 and the difference in the capital ratios of a subsample of these banks in 1964. This subsample consists of 264 banks, some of which were independent in 1964 but were acquired by bank holding companies by 1972 and the remainder of which were independent in both 1964 and 1972.

Heggestad and Mingo find that prospective bank holding company affiliated banks in 1964 had lower capital ratios than independent banks in 1964 and that affiliated banks in 1972 had lower capital ratios than independent banks in 1972. The size of the difference, however, was larger in 1972 than in 1964, which leads the authors to conclude that banks' capital positions decline after they become affiliated with bank holding companies.

Other evidence that bank holding companies drain capital from subsidiary banks, or least that they drain profits which normally would add to bank capital by paying more dividends than independent banks, is cited by Mayne [40]. She suggests that this higher payout is reinforced by other methods of funds transfer and concludes that "for multi-bank groups, there is apparently somewhat more emphasis on upstreaming funds as fees than as dividends."

Mayne's study consists of an analysis of the intracompany funds flows of 160 bank holding companies in 1976. Examples of funds flows considered include dividends, interest payments, management fees, loans, advances and service fees.

Evidence also exists that bank holding companies inject capital into their affiliates, and that this phenomena is becoming more prevalent. Boczar and Talley [6] find a significant increase in double leverage--the issuance of debt by bank holding companies to fund equity investment in their affiliate banks--during the 1970s.

They report that 14 of the 50 largest bank holding employed double leverage in 1970, with an aggregate double leverage ratio (aggregate investment in subsidiaries/aggregate parent equity) of 105 percent. In 1979, 40 of the 50 largest bank holding companies employed double leverage, with an aggregate double leverage ratio of 114 percent.

In conclusion, the results of most studies indicate that bank holding companies decrease the capital position of acquired banks subsequent to acquisition. The bulk of this evidence, however, is provided by studies which have methodological flaws (see Section 5) or which were undertaken prior to the expanded use of double leverage by bank holding companies.

3. Other Motives

Factors other than capital considerations which may affect bank acquisitions are the following:

1. Operational economies resulting from the merger which result in what Steiner [69] describes as "a downward shift in the real opportunity cost of production of goods and services." Economies of scale are the most commonly cited efficiency in an industrial context; as applied to banking, this implies that unit costs of banking will fall due to the elimination of duplication of effort and the utilization of more efficient banking offices, technology or equipment that is available only to large banks.

Several studies of the importance of economies of scale in banking have compared the operational efficiency of banks affiliated with holding companies and independent banks. The results offer little evidence that acquisition of a bank creates economies of scale; on the contrary, they generally find that affiliated banks are less operationally efficient than independent banks. Among these studies are those by Kalish and Gilbert [29] and by Drum [11], which find that costs for acquired banks are higher than for independent banks at each level of output.

The evidence provided by these studies is limited by their focus on affiliated bank operations, which overlooks such considerations as excess service fees charged by the bank holding company at the expense of the affiliated bank or economies at the organizational level accruing to the bank holding company. As Benston and Hanweck [4] point out, only by examining the entire holding company can many economies be uncovered.

2. Geographic or product or defensive diversification. Bank holding companies may want to balance an emphasis on commercial banking, for example, by acquiring a group of retail banks or banks which are located in different markets. This "balancing" may cause gains arising from a diminished variability of cash flows and deposit drains for a bank holding company following a bank acquisition.

Another type of diversification is defensive. This motive exists when bank holding companies may desire to shift away from troubled markets or to acquire more successful banks. Weston and Mansinghka [74], in a study of industrial mergers, say that firms with depressed earnings are able to increase profitability through diversification, while Harris [18] says that "an acquiree institution that enjoys returns on assets and equity well ahead of the acquiror is likely to be a more favorable target than one that merely matches or even lags the parent firm in these benchmarks."

Evidence is scarce on the difference in profitability for acquired banks and acquiring bank holding companies; Smith [67] finds that acquired banks are slightly more profitable than acquiring banks, although it is uncertain how much of this difference is related to size. Hannan and Rhoades [17] find no evidence that profitability affects the likelihood of a bank being acquired.

3. Market concentration, which Steiner [69] describes as a motive which involves few real efficiencies but considerable adverse impacts on competition.

The question of concentration of market power can enter decisions on bank expansion when the choice is made between establishing a new bank or acquiring an existing bank. If a new bank is established, a competitor is added to the market, diminishing concentration, while if an acquisition is made, concentration is not diminished and eventually may be increased. Harris [18] says that avoiding a new competitor

> may become controlling where the difference in cost between the branching and acquisition methods is relatively small, the payback on the branching method is somewhat long and the market involved is located some distance from the acquiror's existing operations.

Market concentration appears to be a valid motive for acquisitions, whether inside or outside, to the extent that collusive or "monopoly" profits are attainable. In the case of inside acquisitions, however, there is an offsetting influence which lessens the value of concentration to acquiring bank holding companies; regulatory agencies are less likely to approve inside acquisitions which eliminate a competitor and lead to a further concentration of an already concentrated market.

The results of many studies have generally failed to provide the link between concentration and profitability which appears essential to bank acquisition theories based on market power.[14] Hannan and

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[14]Smirlock [68] provides evidence which he says indicates that there is no relation between concentration and profitability. Any effect of concentration found in some previous studies, according to Smirlock, is probably due to a correlation between profitability and market share, which he describes as an often omitted proxy variable for concentration. He says his findings "are consistent with the assertion that market concentration is not a signal of collusive behavior but rather the superior efficiency of the leading firms."

Rhoades [17], for instance, find no significant relationship between market concentration and the probability of a bank being acquired by a bank holding company which is not operating in the same market. (They find a negative relationship between the probability of a bank being acquired by a bank holding company which does operate in the same market, which is expected in view of regulatory restrictions on horizontal acquisitions.)

4. Market share. Harris [19] says that a bank with an extremely low market share may be unable to increase its presence without recourse to acquisitions; some bank expansion strategists, Harris says, "assert that a 10 percent share of the local deposit market is required for an institution to achieve the synergy and marketing economies necessary for long-term growth and profitability."

This motive also is likely to be influenced by a regulatory prejudice against inside acquisitions of banks with high market shares. It is these acquisitions which cause the greatest reduction in competition.

The results of Hannan and Rhoades [17] indicate that the probability of a bank being acquired by a bank holding company which does not operate in the same market is increased by a high market share, while there is no relationship between market share and the probability of a bank being acquired by a bank holding company which does operate in the same market.

5. Replacement of incompetent management increasing firm valuation. Manne [38] describes mergers as constituting a market for corporate control in which firms compete for control of inefficiently managed companies.

Hannan and Rhoades [17], using profitability measures as a proxy for management competence, find no evidence to support this theory.

6. Managerial motives. The idea that mergers are prompted by some motive other than maximization of shareholder wealth is rooted in the idea of a separation of ownership and control in corporations. This separation, as Jensen and Meckling point out [26], is particularly acute in large, modern corporations with ownership so diffuse as to render the firm a "legal fiction which serves as a nexus for contracting relationships." In such an environment it is impossible for owners to ensure that management will make optimal decisions on their behalf.

A goal separate from maximization of shareholder wealth which has been cited by many authors, including Reid [54] and Mueller [47], is growth. Acquisitions, obviously, are an expedient method of achieving growth objectives of management. Growth may be an object of managers because the resultant larger firm provides additional security, power, prestige promotions, or income.

Hannan and Rhoades find no relationship between the probability of a bank being acquired and its size.[15]

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[15]Another motive often mentioned in an industrial setting concerns gains resulting from acquisition of failing firms. Lee and Barker [31] show that what they call "crisis" and "bankruptcy" costs have an impact on firm value, and that this value can be increased through acquisitions. They conclude that a direct effect of acquisition comes from "the avoidance of crisis/bankruptcy costs and a reduction in the probability of crisis/bankruptcy" at preacquisition debt levels. They specifically isolate this impact from that of increase in debt capacity.

Although the relevance of bankruptcy costs is questionable to a banking environment in which the FDIC plays so crucial a role in

4. Evidence on All Motives

Despite the conflicting evidence--or lack of evidence--on the validity of each of the individually identified synergies, it may be possible to render a judgement on whether any synergy, or combination of synergies, can create value through mergers.

Gains derived from synergies, as Mueller points out, "should be reflected in the rate of return on the acquiring company's stock, unless the market was capable of fully anticipating the consequences of a merger or series of mergers long before they occurred." This means that profitability can serve as a proxy for synergistic benefits upon which an economic justification for mergers rely.

Two methods have been used to test for the impact of acquisition profitability. One method, employed by Piper and Weiss [52], uses earnings as a measure of profitability, while another method, employed most recently by Lobue [35], uses a market model to assess the rate of return on the stock of the acquiring bank holding company.

The Piper and Weiss study examines the earnings per share of bank holding companies following an acquisition with a hypothetical

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arranging mergers or otherwise disposing of failed banks, the existence of crisis costs may be important enough to justify acquisitions of some troubled banks. One obvious crisis cost faced by banks with well publicized problems is the suboptimal redisposition of assets required by possibly massive withdrawals.

This particular motive, however, is unlikely to be a factor in this study since the data base used eliminates from consideration acquisitions of failing banks, or of banks described by Federal regulators as being likely to fail in the absence of acquisition.

estimate of what the earnings would have been without acquisition. The authors use a sample of 102 bank acquisitions by 30 bank holding companies between 1947 and 1967.

An acquisition is judged to be profitable in this study if the net operating earnings of the holding company, after taxes, were higher in 1967 as a result of the acquisition. Results indicate that 53 percent of the acquisitions made by these companies were profitable. Piper and Weiss attribute unprofitable acquisitions to overly generous prices and the failure of holding company managements to raise the profitability of acquired banks relative to the acquiring holding company.

Other studies based on similar methodologies to that used by Piper and Weiss provide differing results which indicate that, in some instances, bank mergers do benefit the owners of acquiring bank holding companies. (See Frieder and Apilado [14] and Varvel [72].)

Lobue finds that the impact of acquisitions on adjusted returns depends on specific characteristics of the acquisition. Her evidence indicates that positive returns are generated for New York Stock Exchange listed bank holding companies (the stock of the holding companies were all publicly traded), bank holding companies which acquired large banks and bank holding companies which operated in unit bank states (those which restricted branching). Returns were negative for the largest and the smallest bank holding companies.

Lobue's explanations for positive returns include

> marketing exposure for New York listed firms, the well planned nature of acquisitions in unit banking states, the advantages holding companies obtain from the acquisition of

large, financially sound subsidiaries and the increased market share and resulting decline in price elasticity of demand faced by bank holding companies that acquire the largest affiliates.

Her explanations for negative returns include "the possibility of a maximum size threshold for the largest firms, the lack of access to capital markets for the smallest firms and probably the lack of opportunity for new bank entrance (state banking markets)."

5. Criticisms of Previous Studies Related to Capital Motives

A general criticism of all of the various studies concerns the timing of acquisitions. Johnson and Meinster [27] say results can be biased by mixing holding company affiliated banks into the same sample when the banks were acquired in different time periods. This bias is reflected in the results of Curry [8], which identifies differences in the effect of capital ratios on likelihood of acquisition depending on when the acquisition occurred (1969-1970 or 1971-1972).

Studies which are hampered by this problem include, to varying degrees, those by Mingo [44], by Hannan and Rhoades [17] and by Heggestad and Mingo [23].

Further problems occurring in some studies results from a failure to adequately control for bank size and the utilization of varying time intervals to measure changes in banks resulting from acquisition or to measure preacquisition differences.

Mingo [44], for instance, focuses on characteristics of at least some "prospective holding company banks" which were not actually acquired until five years later, during which time they may have

changed significantly. Hannan and Rhoades have a potential difference of a year between the time observations are taken on banks and the time the bank was acquired.

Heggestad and Mingo utilize a postacquisition interval which could range from as little as one year to as much as six years. This mixture of different interval lengths could have important effects; as Frieder and Apilado [14] point out, they could "give rise to confounding and/or insignificant results."

A more fundamental criticism reflects problems with model specification. This is a particular handicap in attempting to isolate acquisition motives based on capital.

For instance, the postacquisition study by Heggestad and Mingo [23], which finds that acquired banks experience a reduction in capital subsequent to acquisition, appears to undermine the informational asymmetry motive for acquisition. But they fail to focus on those acquisitions motivated specifically by capital inadequacies.

Similarly, the preacquisition studies by Mingo [44] and by Hannan and Rhoades, which find very little difference in preacquisition capital ratios between acquired and nonacquired banks and a negative relationship between capital ratios and the likelihood of acquisition, respectively, fail to provide much support for the latent debt capacity motive for acquisition. But these studies fail to focus on those acquisitions in which latent debt capacity is most likely to have an impact.

In each of these studies, the capital variable is constructed as homogeneous, single measure, which does not allow a simultaneous test of the motives based on latent debt capacity or informational asymmetry. Using this approach, it is possible for a model to generate results indicating an insignificant impact of capital as an acquisition motive when in fact motives based on both high and low capital ratios exits simultaneously; the extremely high ratios of banks acquired because of latent debt capacity could exactly offset the extremely low ratios of banks acquired because of informational asymmetry.

CHAPTER 3

METHODOLOGY

A. Statement of Hypothesis

Many studies providing empirical evidence on the role of capital in bank acquisitions compare preacquisition characteristics of acquired and nonacquired banks, or postacquisition changes in acquired banks relative to nonacquired banks, with methodologies based on univariate regression analysis, multivariate regression analysis or multinomial logit analysis. The evidence provided is both direct and indirect, while the data samples from which it was generated encompass a variety of geographic locations and time periods.

These studies, however, fail to produce a comprehensive description of the role of capital in bank acquisitions. They are weakened, to varying degrees, by methodological and theoretical shortcomings.

This paper will test for the existence of two motives for bank acquisitions based on capital levels in preacquisition comparisons of acquired and nonacquired banks. One of these motives, informational asymmetry, predicts that bank holding companies seek out bank acquisition targets which have good investment opportunities and limited capital, and about which investors have limited information. The other motive, latent debt capacity, predicts that bank holding companies seek out bank acquisition targets which have excess capital.

This test will also provide evidence on other motives for acquisition. These motives include defensive diversification, operating

economies, market power, market concentration, replacement of incompetent management and managerial considerations.

A second test of postacquisition changes in the capital position of acquired banks will provide corroborate evidence on the role of capital in the acquisition process itself. Supporting a motive for acquisition based on informational asymmetry would be a finding that acquired banks with low capital ratios experienced an infusion of capital from the acquiring bank holding company subsequent to acquisition; supporting a motive based on latent debt capacity would be a finding that acquired banks with high capital ratios experienced a reduction in capital subsequent to acquisition.

Both the preacquisition and the postacquisition tests will employ methodologies intended to correct three specific problems of previous studies: (1) Extended sampling periods; (2) varying intervals between acquisition and the point at which preacquisition or postacquisition measurements are taken on the characteristics of acquired banks; and (3) a failure to isolate the potentially simultaneous impacts of capital-related motives in a theoretically complete specification.

Some of the studies have been criticized because of a bias introduced by mixing holding company affiliated banks into the same sample when the banks were acquired in time periods as much as a decade apart. This study will confine itself to a sampling period of 18 months in 1982 and 1983. This period has an added advantage of being relatively recent; other studies use older data taken from

periods prior to significant and relatively recent changes in the banking environment.

The studies also have been criticized for failing to hold constant the interval between acquisition and the point at which postacquisition changes or preacquisition differences are measured. This study is the first to use quarterly data in studying bank acquisition, which provides greater accuracy in measurement intervals. The maximum difference in the intervals will be three months rather than the 12 months in the case of studies using annual data. (If December 31, 1982, is the reporting date used in an annual data collection on banks acquired in the following year, a 12 month interval could elapse before an acquisition occurring on December 31, 1983. The maximum interval in a quarterly data collection is three months for an acquisition occurring on March 31, 1983.)

The most significant change in this study is the splitting of the capital measure into high capital and low capital groups which allows for the simultaneous existence of multiple motives for acquisition. Previous studies used only a single measure which is misleading in the presence of motives for acquisition based on both high and low capital levels.

A further benefit of this study is that it hypothesizes a theoretically complete motive based on low capital ratios. The motives used in previous studies which were based on low capital ratios involved "practioner opinion" or other forms of ad hoc reasoning with little or no basis in financial theory.

B. Methodology

1. Statistical Procedure

A statistical model using qualitative dependent variables will be used to classify banks as a function of a list of independent variables representing acquisition motives. The particular classification model this dissertation uses is known as the multinomial logit model.

The multinomial logit model uses qualitative dependent variables which are discrete classifications of events into categories. This model assumes that each of these discrete variables, sometimes called polychotomous variables, depends on an underlying and unobserved continuous random variable, called a latent variable. The multinomial logit model assumes a Type I extreme value distribution for the latent variables which results in logistic probabilities for the discrete events. This model relies on the maximum likelihood method for estimation.

Although other models can be used to estimate qualitative dependent variables, the logit model has several unique advantages: (1) Unlike discriminant functions, the logit model is specially constructed to eliminate the possibility that predicted values of the dependent variable Y may be outside the interval between 0 and 1; (2) the maximum likelihood estimators of the logit model are consistent and asymptotically efficient; (3) the parameter estimators are asymptotically normal, which means that the usual statistical significance test of coefficients can be performed; and (4) a likelihood ratio test which follows the chi-square distribution is available to test the overall significance of the logit model.

This dissertation assumes that the motives for acquiring bank holding companies in "inside" acquisitions of banks operating in a separate geographic market are different from the motives for "outside" acquisitions of banks operating in a separate geographic market. This creates a qualitative dependent variable with three distinct, mutually exclusive alternatives: acquired, inside; acquired, outside; and nonacquired.[16] These discrete events will be modeled with a multinomial logit model.

Letting P(i) represent the probability of a bank falling into category i (i = 1, 2, 3); the three-alternative logit-probabilities are given by:

$$P(i) = \exp(a_i X) / \sum_{k=1}^{3} \exp(a_k X) \qquad (1)$$

Each equation presumes that the logarithm of the odds of one choice relative to a second choice is a linear function of X, a vector of explanatory variables, with a_i representing a vector of coefficients which is allowed to differ in explaining the probability of acquisition.

These odds, as pointed out by Pindyck and Rubinfeld [50], are dependent on the odds associated with the remaining two equations

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[16] Acquisitions are classified by Rhoades [57] on the basis of geographic breadth. As a general rule, an acquisition is inside if the distance between an acquired bank and an office or affiliate of the acquiring bank or bank holding company is less than 15 miles and outside if the distance is more than 25 miles. "Inside" acquisitions are those which are referred to by regulators as horizontal acquisitions, as previously described, while "outside" acquisitions are those referred to by regulators as market extension acquisitions.

only in the sense that the system must be constrained so that the sum of the individual probabilities equals 1, which means that it is necessary to estimate only two of the three equations. This paper will estimate the relative odds of being acquired by inside acquisition and being acquired by outside acquisition, leaving the third category, being nonacquired, to be determined by the three probabilities summing to 1.

The assumptions of the multinomial logit model give it a property known as "independence of irrelevant alternatives," which means that if a new alternative is added--call it alternative 4--which is very similar to, say, alternative 3, the choice probabilities for all alternatives will be affected proportionally when in fact one would expect that only alternative 4 should be affected. To use the independent multinomial logit model, one must assume independence of irrelevant alternatives, which may not be true. In this study, a test was undertaken to determine if the independent assumption was consistent with the data.

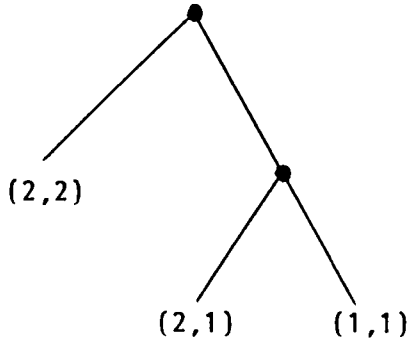
Independence of irrelevant alternatives is usually a problem only when a pair of alternatives is closely related. In this study, this is possible for the inside/outside acquisition. Consequently, it seems advisable a priori that the independence assumption should be tested for these two types of acquisitions. For this purpose, an alternative model, known as the nested model, without the property of independence of irrelevant alternatives, is useful.

A nested model describes the categorization process as if certain pairings are correlated in a way such that the more general categorization (between being acquired or not acquired) is made, in effect, as if it were one step; the more specific choice (between being acquired by inside acquisition and being acquired by outside acquisition) is made in effect independently of the nonacquired choice.

In a nested model, characteristics obtained through bank acquisitions can be divided into two components: Those which vary by acquisition itself, whether acquired or nonacquired, called X_1; and those which vary by type of acquisition, whether inside or outside, called X_2. The a_i and a_n are coefficients allowed to vary in explaining the impact of variables X_1 and X_2 on the probability of acquisition (n) and type of acquisition (i) according to:

$$p(i,n) = \frac{\exp\ (a_{1i}X_1 + a_{2n}X_2)}{\sum_{j,k} \exp\ (a_{1j}X_1 + a_{2k}X_2)} \qquad (2)$$

The model in equation (2) can be depicted graphically in the following manner:



The (i,n) categorizations represent not acquired (2,2); inside, acquired (1,1); and outside, acquired (2,1).

The model in equation (2) describes the three-choice process as follows:

$$p(i,n) = \frac{\exp(a_{1i}X_1 + a_{2n}X_2)}{\exp(a_{11}X_1 + a_{21}X_2) + \exp(a_{11}X_1 + a_{22}X_2) + \exp(a_{12}X_1 + a_{22}X_2)} \tag{3}$$

This equation can be decomposed into a sequential process with the first stage defined, using a (1-@) test parameter to be discussed later, as:

$$p(2/2) = \frac{\exp\,[a_{22}/(1-@)]\,X_2}{\exp\,[a_{22}/(1-@)]\,X_2} = 1 \tag{4}$$

$$p(1/1) = \frac{\exp\,[a_{11}/(1-@)]\,X_1}{\exp\,[a_{11}/(1-@)]\,X_1 + \exp\,[a_{12}/(1-@)\,X_1]}$$

$$= \frac{1}{1 + \exp - [a_{11}/(1-@)) - (a_{12}/(1-@))]\,X_1}$$

$$= \frac{1}{1 + \exp - [B_1X_1]} \tag{4}$$

where $B_1 = (a_{11} - a_{12} / (1-@)$.

$$p(2/1) = 1-p(1/1) \tag{4}$$

Estimating the first stage choice results in an estimation of the B_1 coefficients. These can be used to calculate the value of (1-@), which is then entered into the second stage choice:

$$p(n) = \frac{\exp\,[a_{2n}X_2 + (1-@)\ I_n]}{\exp\,[a_{21}X_2 + (1-@)\ I_1] + \exp\,[a_{22}X_2 + (1-@)\ I_2]} \qquad (5)$$

where

$I_1 = a_{11}X_1/(1-@)$

$I_2 = \ln\,[\exp\,(a_{11}X_1 + a_{12}X_1)]/(1-@)$.

This means that the probability of being acquired, p(1), can be structured as follows:

$$p(1) = \frac{\exp\,[a_{21}X_2 + (1-@)\ I_1]}{\exp\,[a_{21}X_2 + (1-@)\ I_1] + \exp\,[a_{22}X_2 + (1-@)\ I_2]} \qquad (6)$$

$$= \frac{1}{1 + \exp\,-\,[X_2(a_{21}-a_{22})/(1-@)]\,-\,(1-@)\ (I_1 - I_2)]}$$

Solving for $I_1 - I_2$ from equation (5) yields:

$$I_1 - I_2 = a_{11}X_1/(1-@) - \ln\,[\exp\,[a_{11}X_1/(1-@) + \exp\,[a_{12}X_1/(1-@)]] \qquad (7)$$

$$= \ln\,[\hat{p}\ (\tfrac{1}{2})]$$

Finally, substituting equation (7) into equation (6) yields:

$$p(1) = \frac{1}{1 + \exp\,[X_2B_2 - (1-@)\ \ln\,\hat{p}\ (\frac{1}{2})]} \qquad (8)$$

where $B_2 = (a_{21} - a_{22})/(1-@)$.

The parameter $\ln\,\hat{p}\ (1/1)$, which will be called EST in this study, is the log of the probability of the second stage choice conditional on

the first stage. It can be interpreted as representing the impact of factors which distinguish between two alternatives, inside acquisitions and outside acquisitions, on the third alternative, nonacquired. If EST is significantly different from zero, there is a correlation between those factors and the third alternative, which means that the assumption of independence of irrelevant alternatives is not met. A nested model is required.

If EST is not significantly different from zero, then the I_n components of equation (5) drop out. This means that there is no correlation of those factors with the third alternative, which reduces the nested model of sequential choices to a regular model, specified in (1), in which the assumption of independence of irrelevant alternatives is met.

Thus the sequential estimation of the equations provides a statistical test of the degree of independence of irrelevant alternatives.

2. The Sample

This paper will use the listing compiled by Rhoades [57] of bank acquisitions occurring during 1982 and 1983.[17] In that period, 854 acquisitions, involving about $80 billion in assets, were consumated.

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[17] Rhoades considers an acquisition to have occurred at the time when regulatory approval is granted. This is not entirely accurate, although it is an empirical necessity because of an absence of information on acquisition completions. Of those instances in which I was able to obtain information on both regulatory approval for an acquisition and its completion, there appeared to be an average gap of about four months between the two dates. However, wide variations in this gap were observed.

Both the number of acquisitions and the amount of assets acquired surpasses by a wide margin comparable figures for any other two-year period reported by Rhoades.

Rhoades cites the anticipation of interstate banking and the relatively liberal approach to bank acquisitions by regulators as factors contributing to the high levels of acquisitions in 1982 and 1983. If he and other authors are correct, trends underlying these acquisitions are likely to be representative of acquisitions in the future.

The specific sample will include acquisitions for which approval by one of the three Federal bank regulators was granted between June 31, 1982, and December 31, 1983. The first half of 1982 was excluded partly because of a potential bias which may have arisen because of a change in bank regulations that went into effect during that time period. This was the Department of Justice merger guidelines which were issued on June 14, 1982. The new regulation increased the specificity of the methodology for defining product and geographic markets and instituted the Herfindahl-Hirschman Index as the measure of concentration in a bank market. This index is the sum of the squared market shares of all banks in the market.

(Another regulatory change during this period was the Garn-St. Germain Depository Institutions Act of 1982, passed on October 31, 1982, which had several provisions that may have affected bank acquisition decisions. One provision gave thrift institutions crucial banking powers, which made them more competitive with banks and more attractive as acquisition candidates for bank holding companies, while

another provision opened the possibilities of interstate acquisitions of failing banks. Because this sample does not include acquisitions of either failing banks or thrift institutions, however, it is doubtful whether the institution of this regulation had significant direct impact of the acquisitions used in this study. Another factor is likely to have minimized indirect effects: In instances where information on the announcement of acquisitions for banks in this sample was available, there appears to be a difference of four months between announcement and regulatory approval. This means that acquisitions for which approval was granted between June 31, 1982, and February 28, 1983, which may bias the sample, were contemplated at a time when the enactment of this legislation was uncertain.)

Aside from differences previously noted, 1982 and 1983 appear to exhibit few eccentricities regarding banking. Laws regulating bank acquisitions, branching and other factors of direct relevance to this paper were unchanged during the sample period in the states from which the sample is drawn. Although interest rates declined over the period,[18] and economic conditions generally improved, there were no major macroeconomic disturbances in the states from which the sample was drawn.

Rhoades establishes several criteria for inclusion in his listing, with the principal concern being that an acquisition bring together

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[18]The yield on bank holding company issues, reported in Moody's Bank and Finance Manual, decreased from more than 16 percent in July, 1982, to less than 14 percent at year-end 1983.

under common ownership previously existing, separately owned banking resources. He excluded acquisitions if: (1) Either party was a newly established or nonoperating bank; (2) either party was not a bank holding company or a commercial bank; (3) either party was a foreign bank with no operations in the United States; (4) the acquired and acquiring firms were commonly owned prior to the acquisition; (5) the acquisition was judged from the regulator's description to be of a failed or potentially failing bank; or (6) less than 25 percent of the bank was acquired.

Acquisitions from the latter half of 1982 and 1983 which met these additional requirements were selected for the sample:

1. The acquired bank must have been listed in the Report of Financial Condition and Income and Dividend Statements compiled by the FDIC.

2. All banks in the sample must have been in existence on December 31, 1980, the beginning of the sample period, and on December 31, 1985, the end of the sample period.

3. The acquired bank must be operated as a separate reporting entity within a bank holding company to insure the availability of information on changes in financial characteristics subsequent to acquisition.

4. Information must be available on characteristics of the market in which the acquired bank operates, which is necessary to construct certain market-related variables used in the model. Since markets are defined by the FDIC in terms of counties or Standard Metropolitan

Statistical Areas (SMSAs), and since information on FDIC reports is collected for each bank by head office only, it is difficult to collect financial information on branches when they are located outside the SMSA or county of the head office.

The latter two requirements were met by limiting the sample of acquisitions to those which occur in unit banking states which in 1983 had no restriction on expansion by multi-bank holding companies. These states are Colorado, Iowa, Minnesota, Missouri, Montana, Texas and Wyoming.

Banks will be divided into two categories based on capital ratios, with those ranking above the median in one category and those ranking below the median in the other category. This is done in order to isolate those acquisitions in which either informational asymmetry (lower category) or latent debt capacity (upper category) are expected to dominate.

Since observations for banks are taken from the quarter, or quarters, preceding acquisition, it was necessary to sort the sample to ensure a uniformity of preacquisition and postacquisition measurement intervals. Each acquired bank was separated into six grouping depending on quarter of acquisition (second quarter, 1982 to fourth quarter, 1983), while each grouping also received an equal number of randomly selected, nonacquired banks. (The number of acquisitions in each quarter was relatively uniform during the six-quarter period. (See Table 2.)

Table 2

Frequency of Acquisitons by Quarter of Acquisition

Time Period	Number of Acquisitions
Third quarter, 1982	27
Fourth quarter, 1982	19
First quarter, 1983	24
Second quarter, 1983	21
Third quarter, 1983	23
Fourth quarter, 1983	26

The final sample consists of 140 acquired banks and 3,856 non-acquired banks. Of those 140 acquired banks, 4 were in Colorado, 19 in Iowa, 9 in Minnesota, 36 in Missouri, 2 in Montana, 67 in Texas and 3 in Wyoming. Low capital banks acquired in outside acquisitions accounted for 36 of the acquisitions; low capital banks acquired in inside acquisitions accounted for 26 acquisitions; high capital banks acquired in outside acquisitions accounted for 48 acquisitions; and high capital banks acquired in inside acquisitions accounted for 30 acquisitions. (See Table 3.)

Limiting the sample to states which have both unit banking structure and unlimited expansion by bank holding companies means that each potential acquiror in each state has a large number of acquisition targets and that each acquisition target faces a large number of potential acquirors. Hannan and Rhoades [17] say that "these characteristics make tenable the assumption, implicit in the estimation procedure, that one bank's acquisition experience is independent of others."

Hannan and Rhoades also point out that states with similar banking laws experienced substantial acquisition activity. This makes the sample relatively representative of the type of state in which much bank acquisition activity has occurred.

3. The Preacquisition Model

The following variables will be used in the model, similar to the one used by Hannan and Rhoades [17], which in the present case is

Table 3

Frequency Distribution of Acquisitions
by Inside or Outside

	LOWCAP	HGHCAP	Total
Inside	26	30	56
Outside	36	48	84
Total	62	78	140

constructed to allow for the simultaneous existence of capital motives based on latent debt capacity and informational asymmetry:

$$\text{Acquisition Status} = f(X)$$

where

Acquisition Status = Acquired, inside; Acquired, outside; Nonacquired

X =
HGHCAP, LOWCAP, LOAN, INFO, NETA, EXP, CRAT, SHR, MSA, SIZE

The X explanatory variables are defined as follows:

HGHCAP--the difference between the capital/asset ratio of an upper category bank and the median ratio for all banks at the end of the quarter prior to acquisition (or, if nonacquired, at the end of quarter prior to the one in which it was randomly assigned). The sign of this variable, a positive number, should be positive if latent debt capacity is a motive for acquisition.

The t-test for the significance of this variable will be a one-tailed test since the hypothesized sign is in one direction only.

LOWCAP--the absolute value of the difference between the capital/asset ratio of a lower category bank and the median ratio for all banks at the end of the quarter prior to acquisition (or, if nonacquired, at the end of quarter prior to the one in which it was randomly assigned). The sign of this variable, also a positive number, should be positive if informational asymmetry is a motive for acquisition.

The t-test for the significance of this variable will be a one-tailed test since the hypothesized sign is in one direction only.

Alternate specifications of the model include ratios for HGHCAP and LOWCAP based on measures using primary capital and total capital. The primary capital measure consists of common stock, perpetual preferred stock, surplus, undivided profits, contingency and other capital reserves and allowance for possible loan and lease losses. Total capital consists of primary capital plus limited life preferred stock and subordinated notes and debentures.

LOAN--The expected growth of loans for low-capital banks, which is estimated by the percentage loan growth for low-capital banks during the seven quarters prior to acquisition (or, if nonacquired, for the seven quarters prior to the quarter in which it was randomly assigned).

This variable, constructed as a dummy with LOAN multiplied by 1 if low capital bank, 0 if high capital bank, is limited to low capital banks because it is those banks in which the informational asymmetry motive for acquisition is expected to operate. If informational asymmetry influences acquisitions, its sign should be positive.

Other motives may also affect this variable. It should be negative, for instance, to the extent that replacement of incompetent management is a predominant motive. The t-test for the significance of this variable will be a two-tailed test since the hypothesized sign is indeterminate.

An alternate specification of the model considers another form of this variable, which is constructed as an interaction of LOWCAP multiplied by LOAN. This is a continuous variable for low capital banks.[19]

INFO--a measure of the degree of informational asymmetry associated with low capital banks. This measure is constructed through the utilization of two different proxies:

A. INFA--a measure constructed by use of a recent proposal by the Federal Reserve on identifying risk characteristics of banks.[20] This measure is an overall indicator of the risk characteristics of bank assets, with larger values associated with higher degrees of risk. (As previously described, Myers and Majluf postulate an explicit relationship between risk and informational asymmetry.)

B. INFB--A measure of informational asymmetry constructed from an examination of the rate of return on a bank's asset portfolio.

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[19]See Footnote 24.

[20]The aggregate dollar value of the assets in each category is multiplied by the weight assigned to that category. The sum of these weighted asset values is the weighted risk total.

The categories are:

1. Cash and equivalent--weight, zero percent. Includes assets generally considered to be riskless, such as cash and cash items in process of collection.

2. Money market risk--weight, 30 percent. Includes assets which have little or no risk of default and a high degree of liquidity, such as U.S. Government securities.

3. Moderate risk--weight, 60 percent. Includes assets having more credit and liquidity risk than money market risk items such as municipal securities and commercial letters of credit.

4. Standard risk--weight 100 percent. Includes assets generally found in a bank's loan portfolio.

Construction of such a measure requires a theoretical justification for a correlation between rate of return and risk.[21,22]

The INFO variables, constructed as a dummy with INFA or INFB multiplied by 1 if low capital bank, 0 if high capital bank, are limited to low capital banks because it is in those banks in which the informational asymmetry motive is expected to operate. The impact of these variables should be positive if informational asymmetry is a motive for acquisition.

Other motives may also affect this variable. If an acquiring bank holding company desires defensive or some other form of diversification through acquisition of a conservative portfolio, the sign of this

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[21]This correlation can be justified by use of a generally accepted financial principle which asserts that, in competitive markets, higher rates of return on assets can only be achieved by accepting additional risk. This theory is based on the assumptions that economic units prefer higher returns to lower returns, are averse to risk and associate risk with divergence from expected return.

If divergence from expected return is defined as the standard deviation of return, these assumptions lead to the following conclusion: rational economic units will choose from among portfolios of risky assets only those which have the highest expected return for a given standard deviation. This means that portfolios of assets with higher returns are characterized by greater risk.

This theory appears to be applicable to assets held by acquired banks: The markets in which banks operate are rendered competitive by regulators; their managements, in the absence of conflicts of interest between managers and stockholders, generally can be described as "rational" in the context of previously identified assumptions; and their asset portfolios are marked by a wide range of choice with respect to risk and return.

[22]The rate of return measure is adjusted to account for the general level of interest rates by subtracting from it the yield on U.S. Treasury securities during the comparable time period.

variable should be negative. The t-test for the significance of this variable will be a two-tailed test since the hypothesized sign is indeterminate.

An alternate specification of the model considers another form of these variables, which is constructed as an interaction of LOWCAP multiplied by INFA or INFB. This is a continuous variable for low capital banks.[23]

SIZE--total assets for a bank at the end of the quarter prior to acquisition (or, if nonacquired, at the end of the quarter prior to the one in which it was randomly assigned).

Although no direct impact on size is expected to result from latent debt capacity or informational asymmetry, other motives and factors may also be associated with this variable. If managerial motives are important, the size variable should be positive since larger banks convey more perquisities. If economies of scale are important, it should be negative since it is in the acquisition of smaller banks that greater relative benefits of affiliation with a bank holding company occur.

The t-test for the significance of this variable will be a two-tailed test since the hypothesized sign is indeterminate.

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[23]Construction of LOAN, INFA and INFB using continuous capital measures rather than restricting the variables to low capital banks creates a more exact specification because, in a strict sense, the motive for acquisition based on informational asymmetry occurs only when all three variables--loan growth, risk and low capital levels--interact. However, these interactions create extreme collinearity problems that makes results difficult to interpret. See Footnote 28.

NETA--a bank's net earnings/total assets for the seven quarters prior to acquisition (or, if nonacquired, for the seven quarters prior to the one in which it was randomly assigned). NETA was chosen rather than other profitability measures because of evidence cited by Rhoades [56] indicating that this measure is a good guide as to how successful a bank's management has been in generating profits.

No clear impact on this variable is predicted by either the latent debt capacity or informational asymmetry motives. The sign should be positive if the defensive diversification motive is important and negative if replacement of incompetent management is important.

The t-test for the significance of this variable will be a two-tailed test since the hypothesized sign is indeterminate.

EXP--a bank's total noninterest expenses/total operating revenues for the seven quarters prior to acquisition (or, if nonacquired, for the seven quarters prior to the quarter in which it was randomly assigned).

No clear impact is predicted by the latent debt capacity or informational asymmetry motives. The sign should be negative if defensive diversification is important, positive if replacement of incompetent management is important and positive if economies of scale or other operational efficiencies are achievable.

The t-test for the significance of this variable will be a two-tailed test since the hypothesized sign is indeterminate.

CRAT--market concentration, which is estimated by the three-firm concentration ratio for the market in which the acquired bank operated

at the end of the quarter prior to acquisition (or, for nonacquired banks, at the end of the quarter prior to the one in which it was assigned).

This variable should be positive, particularly in outside acquisition, if increased market power is a predominant motive for acquisition; a more concentrated market may result in an increased ability of a bank to influence prices, collude or otherwise obtain what is sometimes referred to as "monopoly profits." It should be negative in inside acquisitions to the extent that acquisitions of banks in concentrated markets are more likely to meet regulatory resistance.

The t-test for the significance of this variable will be a two-tailed test since the hypothesized sign is indeterminate.

SHR--market share of a bank, measured by bank deposits/market deposits at end of quarter prior to acquisition (or, for nonacquired banks, at the end of the quarter prior to the one in which it was randomly assigned).

This variable should be negative to the extent that inside acquisitions of banks with large market shares are less likely to gain regulatory approval. A positive influence may be exerted by defensive diversification motive if it is true, as Smirlock [68] claims, that banks with high market shares are efficient and profitable. A negative influence may occur to the extent that low market share banks, as Harris [19] says, are unable to generate a large enough presence to compete effectively as an independent bank.

The t-test for the significance of this variable will be a two-tailed test since the hypothesized sign is indeterminate.

MSA--a dummy variable representing whether a bank operated in a rural (0) or urban (1) market at the end of the quarter prior to acquisition (or, in the case of nonacquired banks, at the end of the quarter prior to the one in which it was randomly assigned).

There is no theoretical rationale for this variable, aside from product diversification, which is impossible to measure without considering the composition of the acquiring bank holding company. It is included in the model because of its significance in previous studies. The t-test for the significance of this variable will be a two-tailed test since the hypothesized sign is indeterminate.

4. The Postacquisition Model

The methodology is based on the regression model used by Heggestad and Mingo [23] to determine the impact of holding company affiliation on bank capital levels. This study has as the dependent variable the percentage change in total capital, FLTCAP, during a nine-quarter postacquisition period for two samples of banks, those with total capital ratios above the median and those with capital ratios below the median.[24] The two samples are composed of the 140 acquired banks and 3856 nonacquired banks used in the logit test of

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[24]The postacquisition period begins subsequent to the quarter prior to acquisition (or, if nonacquired, at the end of the prior to its quarter of random assignment). The end points of these periods range from June 31, 1984 (for acquisitions occurring in the third quarter of 1982) to September 31, 1985 (for acquisitions occurring in the fourth quarter of 1983).

preacquisition differences. (Heggestad and Mingo use a single capital measure rather than the split measure used in this study.)

The main independent variable is ACQUIRED, a binary variable denoting acquisition (1 if acquired, 0 if nonacquired). Variables included to control for other factors affecting capital changes are: NETA, net income/total assets; AFSIZE, percentage change in total assets; DDTD, demand deposits/total deposits; TCAP, total capital/total assets; MSA, a dummy variable denoting geographic location (1 if urban area, 0 otherwise); and HOLD, a dummy variable denoting holding company affiliation (1 if owned by a bank holding company, 0 otherwise).[25]

The model is also run using primary capital rather than total equity capital.

Support for the theory that acquisitions are motivated by latent debt capacity would be provided with a finding of a reduction in the capital level of the acquired banks with high capital ratios relative to nonacquired banks with high capital ratios. Support for the theory that acquisitions are motivated by informational asymmetry would be

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[25]The model of Heggestad and Mingo had the same variables, with the following exceptions: (1) I deleted from my model a dummy variable representing Federal Reserve membership because of changes in regulations since publication of their study which make this distinction obsolete; (2) I deleted a variable for percentage of insured deposits because of its insignificance in their model and because almost all banks have insurance; (3) I added MSA to control for flows of capital to banks in rural or urban areas; and (4) I replaced the two separate risk measures in their analysis with INFA, a more complete measure, which was described earlier.

provided with a finding of an increase in the capital level of the acquired banks with low capital ratios relative to nonacquired banks with low capital ratios.[26]

The test also will provide evidence on the impact of bank holding company acquisitions on the capital positions of affiliate banks. Most research on the subject, according to Frieder and Aplilado [14], generally has "found little evidence that bank holding companies improve the capital positions of their affiliates." This test has the capability to detect outflows, as well as inflows, of capital occurring in acquired banks relative to nonacquired banks.

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[26]Evidence of such an infusion, however, is not essential to the informational asymmetry argument; because of increased debt capacity attained through diversification within the bank holding company, or because the bank holding company is seen as a "safety valve" capable of providing support if needed, the act of acquisition itself may be tantamount to a capital infusion.

CHAPTER 4

RESULTS

Empirical results for the preacquisition and postacquisition models will be presented separately. Accompanying each set of results is a summary of specific hypotheses and their testable implications. The concluding chapter will integrate the two sets of results.

A. Preacquisition Differences/Empirical Results

The hypotheses previously described have the following testable implications:

1. Some acquired banks should exhibit high capital ratios relative to nonacquired banks. Evidence of this phenomena requires that acquired banks in the high capital group have greater capital ratios than nonacquired banks in the high capital group.

2. Some acquired banks should exhibit low capital ratios in conjunction with a high degree of informational asymmetry and significant growth opportunities. These factors should be more noticeable in outside acquisitions rather than in inside acquisitions.

Preliminary evidence based on univariate comparisons is listed in Table 4. A comparison using the total capital variables, TCAP, indicates that, as expected, acquired banks in the high capital groups have higher capital ratios than nonacquired banks in the high capital groups. Banks acquired in inside acquisitions, banks acquired in outside acquisitions and nonacquired banks have mean capital ratios of

Table 4

Means of Variables Grouped by Type of Acquisition

	ACQ OUTS LOW	ACQ INS LOW	NON LOW	ACQ OUTS HGH	ACQ INS HGH	NON HGH	ALL NON	ALL ACQ
CRAT	.714	.498	.662	.758	.448	.696	.679	.632
SHR	.165	.035	.152	.206	.012	.166	.159	.122
SIZE[1]	96.8	82.6	88.5	30.1	64.2	46.1	67.4	64.3
LOAN	.289	.181	.232	.113	.355	.192	.212	.222
PCAP	.078	.073	.078	.115	.113	.109	.093	.097
TCAP	.079	.078	.080	.116	.115	.112	.096	.099
INFA	.671	.728	.706	.687	.717	.695	.700	.697
INFB	.006	.007	.006	.008	.006	.006	.007	.007
EXP	.005	.005	.005	.005	.006	.005	.005	.005
NETA	.001	.006	.001	.001	.001	.001	.001	.001
AFSIZE	.202	.577	.220	.253	.417	.240	.230	.316
DDTD	.210	.205	.198	.239	.253	.2135	.205	.228
FLPCAP	.300	.617	.260	.059	.141	.186	.223	.223
FLTCAP	.299	.613	.256	.054	.122	.171	.214	.217

[1]Measured in millions of dollars.

.115, .116 and .112, respectively. These ratios, however, are not significantly different from each other at the 10 percent level using t-test comparisons of means.

Acquired banks in the low capital group, also as expected, have lower--but only slightly lower--total capital ratios than nonacquired banks in the low capital group. Banks acquired in inside acquisitions, banks acquired in outside acquisitions and nonacquired banks have mean capital ratios of .078, .079 and .080, respectively. These ratios also are not significantly different from each other at the 10 percent level.

The banks in both high and low capital groups have high capital ratios relative to banks nationally. These high ratios reflect the facts that banks in the sample are relatively small and that smaller banks generally have higher capital ratios than larger banks. The size disparity results from the selection criterion limiting banks in this sample to those in unit banking states. Banks in unit banks states often are smaller than banks in states which permit branching because of the inability to consolidate the operations of many bank offices into a single entity.

The growth variable, LOAN, in outside acquisitions of banks in the low capital group, .289, is greater than the same measure for nonacquired banks in the low capital group, .232, although these values are not significantly different from one another at the 10 percent level. This is also as hypothesized.

The informational asymmetry proxy measures are less encouraging. INFA for banks acquired in inside acquisitions in the low capital group is greater than the same measure for nonacquired banks in the low capital group, although these values are not significantly different from one another at the 10 percent level. But the reverse is true for outside acquisitions in the low capital group, with INFA being significantly lower at the 5 percent level for banks acquired in outside acquisitions relative to nonacquired banks.

There is no significant differences between any of the groups on INFB.

Results for the regular logit model using the total capital measure to derive HGHCAP and LOWCAP are listed in Table 5.[27] The likelihood ratio test statistic is computed by:

$$-2 \log \lambda = -2 (\log L_o - \log L_{max})$$

where L_o is the likelihood function when all parameters except the constant are zero and L_{max} is the function at the maximum.

Both capital ratios, HGHCAP and LOWCAP, have the expected signs, although there is significance only in the case of HGHCAP in inside acquisitions, implying that bank holding companies consider high capital banks operating in their markets to be particularly attractive acquisition targets.

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[27]Use of primary equity capital rather than total equity capital failed to result in any significant changes in the results.

Table 5

Multinomial Logit Models Using INFA and INFB

	INFA			INFB	
	OUTSIDE MARKET	INSIDE MARKET		OUTSIDE MARKET	INSIDE MARKET
INT	-5.340[1]	-1.062	INT	-5.493[1]	-1.059
	(.751)	(1.07)		(.752)	(1.17)
LOWCAP	14.88	13.30	LOWCAP	4.567	8.688
	(18.7)	(21.0)		(20.8)	(36.4)
HGHCAP	4.790	8.742[3]	HGHCAP	6.171[3]	9.390[3]
	(4.91)	(6.06)		(4.56)	(5.80)
SIZE	-.1140	-.0422	SIZE	-.0830	-.0732
	(.507)	(.560)		(.470)	(.471)
MSA	.7127[2]	.4238	MSA	.7298[2]	.4138
	(.336)	(.556)		(.337)	(.558)
NETA	6.495[3]	7.616[2]	NETA	6.640[2]	7.532[2]
	(3.43)	(3.61)		(3.32)	(3.60)
EXP	-71.53	-106.4	EZP	-66.00	-110.2
	(64.7)	(74.5)[2]		(65.1)	(75.9)[2]
SHR	-.3569	-8.542[2]	SHR	-.3511	-8.583[2]
	(.673)	(4.34)[1]		(.670)	(4.35)[1]
CRAT	2.521[1]	-4.275[1]	CRAT	2.555[1]	-4.297[1]
	(.864)[2]	(1.49)		(.868)	(1.49)
INFA	-.8195[2]	.0543	INFB	-38.82	20.6
	(.484)	(.577)[3]		(30.5)	(34.2)[3]
LOAN	.4057	-1.458[3]	LOAN	.2076	-1.397[3]
	(.340)	(.847)		(.386)	(.791)
LRT	108		LRT	104	

[a]The coefficients of LOWCAP and HGHCAP are analyzed using one-tailed t-tests; the coefficients of all other variables are analyzed using two-tailed t-tests.

[1]Significant at 1 percent.

[2]Significant at 5 percent.

[3]Significant at 10 percent.

[b]LRT is the likelihood ratio test statistic

[c]Standard errors are in parentheses.

[d]Size is scaled by 10E-6.

LOAN has a positive but insignificant sign in outside acquisitions, which provides some evidence that fast loan growth is associated with acquisitions, as hypothesized by the informational asymmetry motive. LOAN is negative and significant in inside acquisitions, which supports a motive for acquisition based on replacement of incompetent management. These banks may have managers who are unable to take advantage of loan opportunities.

INFA and INFB are negative in outside acquisitions and positive in inside acquisitions, which implies that bank holding companies acquire risky banks in the same markets and conservative banks in different markets.

These results, considered collectively, support the latent debt capacity motive for acquisition. The lack of significance for LOWCAP, in conjunction with signs on the coefficients of INFA and INFB which, in outside acquisitions, are the opposite of what was hypothesized, provides little evidence in support of a motive based on informational asymmetry.

Using the continuous variables together with the total capital variable yields results listed in Table 6. The results are generally similar to the results for models using the dummy variable format as a restriction to low capital banks. But in this model LOWCAP is positive and significant in outside acquisitions, as hypothesized. The INFA

Table 6

Multinomial Logit Models Using Continuous Measures for INFA and INFB

	INFA			INFB	
	OUTSIDE MARKET	INSIDE MARKET		OUTSIDE MARKET	INSIDE MARKET
INT	-5.514[1]	-1.126	INT	-5.340[1]	-1.062
	(.753)	(1.07)[2]		(.751)	(1.07)
LOWCAP	96.43[3]	-237.1[2]	LOWCAP	14.88	13.30
	(59.7)	(135)[2]		(18.7)	(21.0)
HGHCAP	6.429[3]	10.08[2]	HGHCAP	4.790	8.742[3]
	(4.42)	(5.57)		(4.91)	(6.06)
SIZE	.0497	.1258	SIZE	-.0749	-.0623
	(.460)	(.585)		(.477)	(.556)
MSA	.7257[2]	.4490	MSA	.7127[2]	.4238
	(.338)	(.556)		(.336)	(.556)
NETA	6.244[3]	7.879[2]	NETA	6.495[2]	7.616[2]
	(3.36)	(3.63)		(3.43)	(3.51)
EXP	-66.33	-118.9	EZP	-71.53	-105.4
	(64.5)	(75.9)[3]		(64.7)	(74.5)[3]
SHR	-.3295	-8.666[3]	SHR	-.3569	-8.542[3]
	(.669)	(4.37)[1]		(.673)	(4.34)[1]
CRAT	2.558[1]	-4.186[1]	CRAT	2.521[1]	-4.275[1]
	(.869)[3]	(1.49)		(.864)	(1.49)
INFA	-164.2[3]	365.2[2]	INFB	.8195[2]	-.0543
	(93.2)	(182)[3]		(.484)	(.577)[2]
LOAN	22.52	-97.69[3]	LOAN	.4057	-1.458[2]
	(18.0)	(54.1)		(3.40)	(.847)
LRT	112		LRT	106	

[a]The coefficients of LOWCAP and HGHCAP are analyzed using one-tailed t-tests; the coefficients of all other variables are analyzed using two-tailed t-tests.

[1]Significant at 1 percent.

[2]Significant at 5 percent.

[3]Significant at 10 percent.

[b]LRT is the likelihood ratio test statistic

[c]Standard errors are in parentheses.

[d]Size is scaled by 10E-6.

and INFB variables, however, fail to exhibit the hypothesized effects.[28]

The failure of the model to identify a motive based on informational asymmetry may result from a lack of investment opportunities which can be considered unique to each bank, which means that other banks in a market may be able to meet the growing loan demand of an undercapitalized bank, or it may result from an ability of undercapitalized banks to make loans in its market through participations with better-capitalized banks. In either case, the "foregone investment opportunity" of Myers and Majluf is eliminated.

Alternately, the INFO measures may be a poor proxies for informational asymmetry. Or it may be that INFO is measuring the impact of other motives, such as a defensive or other type of diversification into conservative portfolios, which confounds the impact of informational asymmetry.

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[28]A serious problem with this specification is extreme multicollinearity among LOWCAP, LOAN, INFA and INFB. These variables have Pearson correlation coefficients which range from a minimum of 40 percent, in the case of LOAN and LOWCAP, to a maximum of 98 percent, in the case of INFA and LOWCAP.

I have been unable to determine whether the results in the models using continuous variables reflect a better specification or merely the effects of multicollinearity. Because of a greater uniformity of results in the other tests, and also because of a failure of corrective methods designed to cope with collinearity--including principal components analysis and experimentation with a variety of alternate specifications intended to capture the impact of nonlinearities on LOWCAP--I am inclined to consider the results of the model using continuous variables as spurious.

Using the model which restricts the LOAN, INFA and INFB to low capital banks reduces the maximum correlation to 67 percent.

Another effect may be exerted by the concern of bank regulatory agencies for bank safety and the soundness of the financial system. The result of this concern for safety is regulations intended to create conservative portfolios of assets held by banks; it also serves to create uniformity in the portfolios of assets held by banks relative to the portfolios of assets held by industrial companies.

The conservative and uniform nature of bank assets may undermine the applicability of the Myers/Majluf theory to banking because of an associated reduction in risk perceptions. In the Myers/Majluf model, reduced risk is directly linked to the degree of informational asymmetry. Thus it may be that investors perceive little difference among banks in terms of risk profile. As risk is reduced, so is the degree of informational asymmetry. As informational asymmetry decreases, the gains to acquisition motivated by the interaction of loan growth, low capital levels and informational asymmetry are similarly lessened.

SHR is negative and significant in inside acquisitions, which is expected since inside acquisitions of banks with high market share would likely be rejected by bank regulators because of anticompetitive effects. The same is true of CRAT--regulators aren't likely to approve mergers leading to further concentration of an already concentrated market.

SHR is negative, but insignificant, in outside acquisitions, which provides slight evidence for the argument of Harris [19] that banks with low market shares can be attractive targets because of their

inability, in the absence of acquisition, to achieve a large enough market share to compete effectively. When considered jointly with CRAT a further insight is gained: Bank holding companies apparently desire low market share banks in concentrated markets.

The coefficient of CRAT is positive and significant in outside acquisitions, indicating that concentrated markets are attractive to bank holding companies. This motive may exist because, as Hannan and Rhoades postulate, of the presence of "monopoly rents which may be obtainable in the more concentrated markets." It is possible that a bank holding company would be in a better position to exploit these monopoly rents because of a more aggressive management.

SIZE has an insignificant coefficient, indicating that bank holding companies fail to exhibit a preference for either small or large banks in their acquisition decisions.

NETA is positive and significant, which provides evidence that bank holding companies may be attempting a defensive diversification by acquiring profitable banks. MSA is positive and significant in outside acquisitions, which indicates that bank holding companies seek expansion into urban areas.

Another possible specification would be to use all nonacquired banks in each quarter--without random assignment--since, theoretically, at each measurement interval all of them are prospective acquisition targets. Balanced against this advantage is the fact that repeated observations on these banks violates assumptions of independence.

A more fundamental reason for using the randomized design, however, is that my time frame for acquisition was constructed as a six-quarter interval, not a one-quarter interval. Because of difficulties in utilizing the sample to measure postacquisition differences, the pool of nonacquired banks was not updated each quarter to reflect the acquisition activity of the previous quarter.

From a practical standpoint the differences appear to be minor; in a separate estimations, both sample designs produced nearly identical results. Results using the sample of multiple observations on nonacquired banks are listed in Table 7.

The results for the lower stage choice in the nested logit model, between acquired by inside acquisition and acquired by outside acquisition, are listed in Table 8. The dependent variable is constructed as acquired, outside = 1 and acquired, inside = 0.

Positive values for CRAT and SHR are associated with outside acquisitions. This is logical considering that inside acquisitions of banks operating in concentrated markets, or of banks with high market shares, would be resisted by regulators concerned with potential competitive effects.

The results for the upper stage choice in the nested model, between acquired and nonacquired, are listed in Table 9. The dependent variable is constructed as acquired = 1 and nonacquired = 0. The EST parameter was constructed from results generated in the lower stage choice as previously described.

Table 7

Multinomial Logit Models Using INFA and INFB Repeated Measures Taken on Nonacquired Banks

	INFA			INFB	
	OUTSIDE MARKET	INSIDE MARKET		OUTSIDE MARKET	INSIDE MARKET
INT	-7.221[1]	-2.866[1]	INT	-7.380[1]	-2.861[1]
	(.751)	(1.06)		(.743)	(1.05)
LOWCAP	17.96	9.780	LOWCAP	6.010	4.100
	(18.6)	(21.6)		(17.0)	(20.5)
HGHCAP	3.919	8.061[3]	HGHCAP	5.342[3]	8.819[3]
	(4.80)	(5.88)		(4.41)	(5.63)
SIZE	-.1062	.0404	SIZE	.0073	.0534
	(.491)	(.508)		(.460)	(.517)
MSA	.7020[2]	.3955	MSA	.7145[2]	.3869
	(.331)	(.552)		(.331)	(.553)
NETA	1.548	2.666[2]	NETA	1.554	2.843[2]
	(1.05)	(1.18)		(1.03)	(1.24)
EXP	-61.04	-93.72	EXP	-56.21	-101.3
	(64.1)	(73.3)		(64.6)	(73.8)
SHR	-.3020	-8.482[2]	SHR	-.3154	-8.504[2]
	(.665)	(4.38)		(.669)	(4.39)
CRAT	2.523[1]	-4.275[1]	CRAT	2.570[1]	-4.414[1]
	(8.56)	(1.44)		(.850)	(1.40)
INFA	-.8603[3]	.1309	INFB	-39.02	30.88
	(.480)	(.583)		(30.5)	(33.9)
LOAN	.4468	-1.485[3]	LOAN	.2708	-1.385[3]
	(.296)	(.877)		(.357)	(.808)
LRT					

[a]The coefficients of LOWCAP and HGHCAP are analyzed using one-tailed t-tests; the coefficients of all other variables are analyzed using two-tailed t-tests.

[1]Significant at 1 percent.

[2]Significant at 5 percent.

[3]Significant at 10 percent.

[b]LRT is the likelihood ratio test statistic

[c]Standard errors are in parentheses.

[d]Size is scaled by 10E-6.

Table 8

Nested Logit Model Using INFA Lower Stage Choice

INT	-3.917[1]
	(.922)
CRAT	6.529[1]
	(1.82)
SHR	8.248[2]
	(4.04)
LRT	69.4

[a]LRT is the likelihood ratio test statistic.

[1]Significant at 1 percent (two-tailed test).

[2]Significant at 5 percent (two-tailed test).

[b]Standard errors are in parentheses.

Table 9

Nested Logit Model Using INFA and INFB Upper Stage Choice

INFA		INFB	
INT	-3.299[1]	INT	-3.391[1]
	(.272)		(.262)
LOWCAP	13.44	LOWCAP	5.318
	(14.3)		(13.5)
HGHCAP	6.636[2]	HGHCAP	7.922[2]
	(3.85)		(3.62)
SIZE	.2343	SIZE	-.2209
	(.427)		(.410)
MSA	.7283[1]	MSA	.7288[1]
	(.274)		(.274)
NETA	7.173[1]	NETA	7.113[1]
	(2.55)		(2.52)
EXP	-65.23	EXP	-64.37
	(48.6)		(48.0)
INFA	.5540	INFB	15.57
	(.373)		(23.2)
LOAN	.0602	LOAN	.2464
	(.381)		(.401)
EST	-.1174	EST	-.1204
	(.220)		(.220)
LRT	32	LRT	30

[a]LRT is the likelihood ratio test statistic.

[b]The coefficients for LOWCAP and HGHCAP are analyzed using one-tailed t-tests; the coefficients of all other variables are analyzed using two-tailed t-tests.

[1]Significant at 1 percent.

[2]Significant at 5 percent.

[3]Significant at 10 percent.

[c]Standard errors are in parentheses.

EST is relatively small and insignificant, which establishes that the regular multinomial logit model represents an appropriate description of the acquisition process. Since there is not impact on the upper stage choice, between acquired and nonacquired, of SHR and CRAT, which distinguish between inside and outside acquisitions, the three alternatives can be viewed as independent. This implies that managers of bank holding companies make simultaneous acquisition decisions rather than sequential decisions--in other words, they decide to acquire a bank in the same market, acquire a bank in another market or forego acquisition rather than decide to acquire a bank, and once that decision is made, then make a second decision on acquiring a bank within the market or outside the market.

B. Postacquisition Changes/Empirical Results

A motive for acquisition based on capital position would be supported by a finding that acquired banks, after acquisition, experience adjustments in their capital positions--specifically, acquired banks with high capital ratios should experience an outflow of capital relative to nonacquired banks with high capital ratios and acquired banks with low capital ratios should experience an inflow of capital relative to nonacquired banks with low capital ratios.

Reductions in capital for high capital banks would confirm the motive for acquisition based on high capital levels which was identified in the preacquisition test, while an increase in capital for low capital banks would support a motive for acquisition based on low capital

levels--despite the fact the preacquisition test failed to provide statistically significant evidence of a motive based on low capital levels or any evidence at all of a motive based on informational asymmetry.

The latter finding of capital increases for low capital banks would have the added benefit of limiting, to some extent, the scope of previous findings, summarized in Frieder and Apilado [14], that bank holding companies seldom increase the capital positions of affiliate banks. Because of the way the sample is structured, this finding of increases in capital for some acquired banks can be achieved without discarding the notion that banks, in aggregate, tend to reduce the capital levels of affiliate banks.

The results of the postacquisition test are listed in Table 10, with the percentage change in the capital levels of banks over a nine-quarter postacquisition interval being the dependent variable. Emphasis will be placed on the test using total capital because of its more encompassing breadth; also, because most researchers, including Heggestad and Mingo [23], emphasize this construction of the capital variable.

Acquired banks with high capital ratios, relative to other non-acquired banks with high capital ratios, experienced less of an increase in capital during the postacquisition period. The coefficients of ACQUIRED, when measured against mean percentage changes in capital levels for all banks in the high capital group, indicate that acquired banks had an approximate 7 percent increase in capital during the postacquisition period while nonacquired banks had a nearly

Table 10

Postacquisition Regression Analysis of Percentage Changes in Capital

	Primary Capital			Total Capital	
	LOWCAP GROUP	HGHCAP GROUP		LOWCAP GROUP	HGHCAP GROUP
INT	1.006[1]	.5242[1]	INT	1.129[1]	.5123[1]
	(.061)	(.039)		(.061)	(.040)
ACQUIRED	.0198	-.0871[1]	ACQUIRED	.0391[3]	-.0984[1]
	(.029)	(.022)		(.029)	(.022)
PCAP	-8.083[1]	-1.647[1]	TCAP	-9.998[1]	-1.585[1]
	(.585)	(.182)		(.592)	(.183)
INFA	-.3993[1]	-.4152[1]	INFA	-.3266[1]	-.4101[1]
	(.055)	(.045)		(.054)	(.045)
MSA	-.0485[1]	-.0260[1]	MSA	-.0332[1]	-.0265[1]
	(.010)	(.009)		(.010)	(.009)
NETA	.3997[1]	.220[1]	NETA	.2721[3]	.1918[2]
	(.155)	(.087)		(.145)	(.088)
HOLD	.0236[3]	.0726[1]	HOLD	.0211[3]	.0702[1]
	(.012)	(.008)		(.012)	(.008)
AFSIZE	1.021[1]	.4777[1]	AFSIZE	.9107[1]	.4683[1]
	(.012)	(.013)		(.012)	(.013)
DDTD	-.1712[1]	-.0084	DDTD	-.1253[2]	-.0081
	(.064)	(.040)		(.063)	(.039)
R-SQUARE	.791	.421	R-SQUARE	.752	.427
F-VALUE	921	179	F-VALUE	739	183

[a]The coefficients of PCAP and TCAP are analyzed using one-tailed t-tests; the coefficients of all other variables are analyzed using two-tailed t-tests.

[1]Significant at 1 percent.

[2]Significant at 5 percent.

[3]Significant at 10 percent.

[b]Standard errors are in parentheses.

17 percent increase. This corroborates other acquisition studies which find that acquired banks have lower capital ratios than independent banks.

There a less powerful, but significant, relationship between capital changes in acquired banks with low capital ratios relative to non-acquired banks with low capital ratios. The sign of ACQUIRED in this sample, when measured against the mean capital change, suggests that these banks experience a relative increase. Acquired banks had about a 30 percent increase in capital during the postacquisition period, while nonacquired banks had about a 26 percent increase.

Using primary capital flows rather than total capital flows are essentially the same, except that in the low capital group the coefficient on the ACQUIRED variable is smaller and insignificant. This may suggest that in this group, at least, some capital transfers are effected through changes in preferred stock and subordinated debt rather than through changes in primary capital.[29]

The results for the control variables very closely match the results of the study by Heggestad and Mingo [23]. The latter study showed a positive relationship between the percentage change in bank capital and bank earnings (which in this study is captured by the NETA variable), asset growth (AFSIZE) and portfolio risk (INFA). The signs of these variables match the signs for the variables

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[29]Supporting this theory would be the study by Frieder and Apilado [14], which identified a lack of subordinated and other types of debt in the capital structure of acquired banks.

generated by this study, with the exception of INFA. This study shows a negative relationship between capital flows and risk.

Heggestad and Mingo identified a negative relationship between deposit volatility (DDTD) and capital ratio (PCAP or TCAP). These relationships are confirmed in this study. Their results also indicate that banks which are part of a bank holding company experience less of an increase in capital compared to independent banks. This finding is confirmed in the finding in this study of a negative relationship between ACQUIRED and capital flows in the group of high capital banks.

The explanatory power of the two models is similar. The Heggestad and Mingo study had an R-square of .583, while the two components of this study using total capital had R-squares of .752 and .427.

CHAPTER 5

SUMMARY AND CONCLUSIONS

In this study, I have examined the preacquisition characteristics of acquired banks and changes in these banks subsequent to acquisition in an attempt to identify motives for acquisition based on capital considerations.

The study uses a sample of 140 banks which were acquired by bank holding companies from July 1982 to December 1983, along with a control group of 3856 nonacquired banks. All the banks were in seven states with unit banking regulations. Financial characteristics for the banks and the markets in which they operated were measured during a seven-quarter interval prior to acquisition (or, in the case of nonacquired banks, during a seven quarter interval prior to the quarter in which they were matched with acquired banks) and during a nine-quarter interval after acquisition.

The study addresses the questions of whether bank holding companies acquire banks because of latent debt capacity and whether bank holding companies acquire banks because of informational asymmetry. Both motives are based on synergies which can be used to explain acquisitions without discarding assumptions of financial theory.

The latent debt capacity motive occurs because of a suboptimal utilization of capital by acquired banks which maintain excessively high capital positions. This excess capital can be "upstreamed," subsequent to acquisition, from the acquired bank to an acquiring bank

holding company through payment mechanisms including dividends, service fees, interest, management fees and advances.

The resulting increased debt capacity at the bank holding company level is more valuable than the excessive capital position of the acquired bank because of the ability of bank holding companies to leverage extensively without increasing the cost of borrowing; as Heggestad and Mingo [23] point out, this means that funds passed up to the bank holding company are worth more than dividends issued to shareholders of independent banks, who do not have a similar ability to leverage.

The informational asymmetry motive occurs because of difficulties faced by many banks in tapping capital markets. In this context, acquisition is one of several alternative methods of reallocating capital from bank holding companies to undercapitalized acquired banks.

The synergy created by informational asymmetry corrects the problem of capital market access by bringing together under common ownership a bank with little capital and abundant growth opportunities and a bank holding company with a lot of capital but limited growth opportunities. This interplay of resources and opportunities creates value--or, described differently, at least avoids an erosion of value which would otherwise occur in the absence of acquisition.

The potential erosion in value is caused by an informational asymmetry between what investors know about a bank and what management knows about it. In the presence of informational asymmetry, a decision by management of a "loaned-up" bank to finance an

investment in a valuable loan opportunity with the proceeds of an external equity issue conveys a negative signal about the value of the bank's existing assets, which, if it is large enough, can exceed the benefits of issuance and investment. This means that positive net present value loans sometimes are foregone, reducing potential bank value.

The latent debt capacity and informational asymmetry motives for acquisition lead to two specific hypotheses which are tested in this study: That bank holding companies acquire banks on the basis of high capital levels; and that bank holding companies acquire banks on the basis of low capital levels in conjunction with significant loan growth opportunities and high degrees of informational asymmetry.

The study consists of a preacquisition test and a postacquisition test. The preacquisition tests uses a multinomial logit model to distinguish between the likelihood of a bank being acquired on the basis of capital position and other independent variables thought to influence acquisition decisions. The postacquisition test uses a regression analysis to measure changes in the capital positions of acquired banks subsequent to acquisition.

The methodologies used in the study have several advantages: (1) The sampling period is 18 months, rather than the more extended periods used in previous preacquisition studies, which avoids problems involved with mixing together acquisitions which occur as much as several years apart; (2) the sampling period, 1982 and 1983, is relatively recent, occurring after significant changes in the banking

environment, which prior studies using older data are unable to consider; (3) the data used in the analysis is collected quarterly, rather than annually, which provides a greater degree of uniformity in measurements taken surrounding the acquisition; (4) the motives studied are founded on financial theory rather than on the "ad hoc" reasoning or practioner opinions used in some previous studies; and (5) the capital measure is split into two components, a high capital measure for banks with capital ratios above the median capital ratio for all banks and a low capital measure for banks with capital ratios below the median. This differentiation captures the effects of low-capital and high-capital motives simultaneously.

Results of the preacquisition test provide evidence for the high capital acquisition motive with a finding that the capital ratios of acquired banks with high capital ratios are significantly higher than the capital ratios of nonacquired banks with high capital ratios. This evidence is supported by a finding in the postacquisition test that acquired banks with high capital ratios experience a decrease in capital relative to nonacquired banks with high capital ratios.

These results support the latent debt capacity motive for acquisition and, in a finding which may be of more practical relevance, identify a relationship between this motive and postacquisition reallocations of capital from acquired banks to their respective holding companies.

The preacquisition test provides some evidence supporting a motive for acquisition based on informational asymmetry in a finding which confirms the hypothesized relationships of capital levels and loan

growth for low capital banks in outside acquisitions--acquired banks with low capital ratios have lower capital ratios and a higher degree of loan growth than nonacquired banks with low capital ratios. This evidence is supported by the postacquisition analysis which indicates that acquired banks with low capital ratios experience an increase in capital relative to nonacquired banks with low capital ratios.

This evidence, however, is qualified by the statistical insignificance of coefficients on the capital and loan measures and the failure of the proxy measure for informational asymmetry to exhibit the hypothesized effect.

The main result of this study is the insight gained by splitting the capital measure. This split helps explain why previous research has generated contradictory evidence regarding the role of capital in bank acquisitions; some studies conclude that incidence of acquisition is associated with high capital ratios, while other studies conclude that incidence of acquisition is associated with low capital ratios.

If both motives operate simultaneously, however, studies using a unified capital measure are vulnerable to which of the two motives dominates in a particular sample. This study shows that the instability of the relationship between capital and acquisition may arise because of an improper specification of the models used by previous researchers rather than because of sampling anomolies or changes over time in the impact of capital.

The existence of simultaneous capital motives for acquisition also is relevant to the postacquisition test. Previous research has provided

strong and relatively consistent evidence that bank holding companies reduce the capital level of their affiliates following acquisition. This study confirms this reduction. But it also indicates that the dominance of this tendency to reduce capital masks less powerful but significant evidence that bank holding companies in some cases increase the capital level of acquired banks with low capital ratios.

The increase in capital for low capital banks appears relevant to the regulatory issue of whether communities are better served by independent banks or by bank holding companies. An inference of this study is that in some cases, at least, acquisitions may help rectify problems of undercapitalization.

The study has further implications in three areas:

1. It provides some support in a banking environment for the previously untested merger motive presented by Myers/Majluf in an industrial setting. An acquisition target's lack of "financial slack" and significant investment opportunities appear to be an attractive combination to acquirors.

2. It indicates that the assumption of irrelevant alternatives on which the multinomial logit model relies is met in the choice process of bank acquisitions, which eliminates the need to consider nested models. Bankers apparently view the alternatives of inside acquisition, outside acquisition and not making an acquisition independently.

3. It provides evidence on the existence of other motives for acquisitions. The higher profitability of acquired banks relative to nonacquired banks supports the idea of defensive diversification, while

the fact that acquired banks tend to be located in concentrated markets (in outside acquisitions where regulatory competitive concerns are less) supports the idea of monopoly profits which may be obtainable in these markets.

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