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Working Paper

Do bankers sacrifice value to build empires? Managerial incentives, industry consolidation, and financial performance

Working Paper, No. 2001-17

Provided in Cooperation with:
Department of Economics, Rutgers University

Do Bankers Sacrifice Value to Build Empires?
Managerial Incentives, Industry Consolidation, and Financial Performance

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December 2001

Abstract

Bank consolidation is a global phenomenon. It may enhance the value of firms in the industry if, for example, it is driven by scale and scope economies, but skeptics often accuse bankers of sacrificing value to build empires. Using data on bank holding companies in the U.S., we find strong evidence of managerial entrenchment that influences how asset acquisitions and sales affect financial performance. We measure a bank's financial performance both by Tobin's *q* ratio and by the bank's failure to achieve its highest potential market value, which we estimate using a stochastic frontier technique.

We find evidence of entrenchment at banks with higher levels of managerial ownership, better growth opportunities, poorer financial performance, and smaller asset size. However, when managers are faced with better growth opportunities, they generally appear to have an elastic demand for agency goods (perquisites, shirking, risk avoidance, etc.). With regard to empire building, we find that an increase in asset size achieved by internal growth is associated with better performance at most banks, but an increase in *acquired assets* is associated with worse performance at banks with entrenched managers. In contrast, a larger amount of *sold assets* by banks with entrenched management is related to improved performance. We do not obtain this asymmetry between the effect of sales and acquisitions at banks not exhibiting entrenchment: larger sales and larger acquisitions both improve performance, a result predicted by Shleifer and Vishny (1989).

Our evidence is consistent with the often cited role of scale economies as a driver of bank consolidation, but it also suggests that the benefits of asset acquisitions are not obtained by entrenched managers, who may be able to resist market discipline to build empires.

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Key Words: consolidation, acquisitions, managerial incentives, efficiency, agency problems, corporate control, stochastic frontier
JEL Codes: G32, G21, G34, D24

1. Introduction

Bank consolidation is a global phenomenon. In the U.S. alone, over 8,000 bank mergers occurred from 1980 through 1998, while the largest acquisitions, accounting for one-half of the total consolidated assets for the 19-year period, occurred from 1995 through 1998 (Rhoades, 2000). Countries in Europe and elsewhere have experienced consolidation as well. A recent study by the Group of Ten found a high level of merger and acquisition activity in the 1990s among financial firms in 13 countries studied (Australia, Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, Switzerland, U.K., and the U.S.), with a noticeable acceleration in consolidation activity from 1997 through 1999. Of the 7,304 financial mergers documented in the study, nearly 61 percent involved banks. This consolidation activity created a number of large, complex financial institutions, and the number of banking firms declined in almost every country during the decade (Group of Ten Report, 2001).

Recent studies have shown that such consolidation may enhance the value of banks in the industry since there appear to be strong scale economies (Stiroh, 2000; Hughes, Lang, Mester, and Moon, 2000; and Hughes, Mester, and Moon, 2001).[1] The potential for scope economies between various product lines, although not supported by strong empirical evidence in the literature, could also drive value-enhancing consolidation.

Skeptics, on the other hand, often accuse bankers of sacrificing value to build increasingly larger institutions, or financial empires. Some bank mergers have been criticized for not producing the cost savings or increased revenues that were touted when the mergers were announced, and some academic studies of the effects of consolidation on cost efficiency confirm the critics' assessment (Peristiani, 1997). Other studies find it difficult to make a general statement about the efficiency of mergers (Shaffer, 1993). Studies of the effects of bank acquisitions on bank market value have generally been negative. In critical reviews of this literature, Pilloff and Santomero (1996) and Calomiris and Karceski (1998) note that, while some event studies find that acquirers increase their market value, more studies find that acquirers destroy value. The weight of the

[1]For a discussion of why empirical studies that fail to account for risk, risk diversification, and endogenous risk-taking often fail to find evidence of scale economies, see Hughes (1999), and for empirical evidence that higher scale economies are associated with better risk diversification and lower scale economies, with increased risk-taking and inefficient risk-taking, see Hughes, Mester, and Moon (2001).

evidence raises the question of whether the value-enhancing incentives to merge are being subordinated to the incentives to build a larger institution from which the managers could more easily take greater financial compensation and consume more agency goods, such as perquisites, reduced effort, and risk avoidance. Presumably, the ability of managers to act on these value-destroying incentives to merge depends on their ability to resist market discipline—that is, on the level of their entrenchment.

This paper seeks evidence on these incentives from data on publicly traded bank holding companies operating in the U.S. from 1992 through 1994. We proceed by characterizing managerial entrenchment and by looking for evidence of entrenchment in the association of ownership structure and investment opportunities with financial performance. We use two measures of financial performance: (1) a proxy for Tobin's *q* ratio and (2) a measure of lost market value, the shortfall of the actual market value of a bank's assets from their highest potential market value. We estimate the highest potential market value of a bank's investment in its assets by fitting a stochastic frontier of banks' market values to their investments in assets. The stochastic frontier yields a "best-practice" market value of each bank's investment in assets as well as the short-fall between this potential value and the bank's achieved market value. We then examine the relationship between financial performance and ownership structure to identify those structures that are associated with poorer performance. We term such structures "entrenched." Ownership structure is given by the proportion of the bank owned by insiders, an indication of their ability to resist market discipline, and by the proportion of the bank owned by outside block-holders, an indication of the incentive of these stake-holders to monitor management.

Using our measure of lost market value to gauge the value of managers' consumption of agency goods, we consider how the demand for agency goods varies with the potential value of investment opportunities. In particular, we examine the elasticity of demand for agency goods with respect to growth opportunities of an institution, and we investigate whether this elasticity is higher for entrenched managers. In addition, we consider how the association between financial performance and ownership structure is influenced by the value of investment opportunities.

Next, we investigate how current asset size, recent asset acquisitions, and recent asset sales are related to financial performance, and how these relationships differ between holding companies at which the management appears to be entrenched and companies at which management does not appear to be entrenched. We look for evidence of whether a larger amount of recently acquired assets and a larger total amount of assets are associated with worsened financial performance—especially at banks that exhibit managerial entrenchment. We term this association "empire building," although it could represent other more complex managerial objectives that erode financial performance.

Our empirical findings indicate that entrenchment at banks is associated with higher levels of managerial ownership, better growth opportunities, poorer financial performance, and smaller asset size. Moreover, managers in general appear to have an elastic demand for agency goods when faced with more valuable growth opportunities. With regard to empire building, we find that increased asset size obtained through internal growth, *not by acquisitions*, is associated with better performance at most banks. On the other hand, an increase in acquired assets appears to benefit banks with less entrenched management, while it worsens the performance of banks with more entrenched managers. While a larger amount of acquired assets is associated with worsened performance at banks with entrenched management, a larger amount of *sold* assets is related to improved performance. This asymmetry between the effect of sales and acquisitions is missing at banks in groups not exhibiting entrenchment: larger sales and larger acquisitions both improve performance, a result predicted by Shleifer and Vishny (1989). Our evidence is consistent with the often cited role of scale economies in bank consolidation, but it also suggests that the benefits of larger acquisitions are not obtained by entrenched managers, who may be using their ability to resist market discipline to build empires.

While many studies of bank consolidation focus either on the stock-price reaction to the announcement of the merger or on the merger's before-and-after effects on cost or profit efficiency, our technique shifts the investigative focus from the merger event to long-run performance and asks how the market value of bank assets is affected by size and recent acquisitions and sales of assets. Our paper also makes several contributions to the empirical methods used to measure firms' financial performance and to gauge the size of

their investment opportunity sets. While Tobin's *q* ratio measures *achieved* market value, the stochastic frontier technique gauges *potential* market value and *lost* market value. The failure of a firm to achieve its highest potential market value gives a different perspective on agency problems and control failures and their effect on firms' value. While many studies use Tobin's *q* ratio to measure managerial effectiveness, the *q* ratio is also used in some studies to measure the relative size of a firm's investment opportunity set,[2] but this measure is biased by managers' inefficiency. In principle, the stochastic frontier technique minimizes this bias by obtaining a measure of the highest potential value of a bank's investment opportunities, which doesn't depend on the performance of the particular bank's managers.

Section 2 reviews some of the literature on managerial ownership structure and agency problems in banking. Section 3 describes the empirical investigation. Section 4 discusses our evidence of managerial entrenchment. Section 5 discusses how bank asset size, asset acquisitions, and asset sales are related to performance and how these relationships vary with ownership structure and investment opportunities. Section 6 concludes.

2. Corporate Control Problems in Banking

Corporate control problems in U.S. commercial banking differ considerably from those of other industries. Bank regulation and the federal safety net account for many of these differences. First, explicit and implicit insurance of bank deposits and other forms of bank debt reduces or eliminates the incentive of debt-holders to monitor bank managers and increases the importance of monitoring by regulatory supervisors. In addition, restrictions on branching that existed in the U.S. until very recently, the continuing prohibition on the ownership of commercial banks by nonfinancial firms, and the requirement that acquisitions receive regulatory approval have significantly limited the number of potential acquirers in the takeover market for banks.[3] Prowse

[2]See, for example, Smith and Watts (1992), McConnell and Servaes (1995), and Gaver and Gaver (1993).

[3]In the 1980s, a large number of states began to relax branching restrictions. The Riegle-Neal Act introduced full interstate branching in 1997. Prowse (1997) discusses the effects of branching and ownership restrictions on the takeover market in banking.

(1997) and Mester (1989) note that these restrictions on potential buyers reduced the disciplinary role played by takeovers and have increased the importance of regulatory supervision as a disciplinary mechanism. Bank supervision has focused on preventing imprudent managerial risk-taking, not necessarily on discouraging managerial inefficiency that compromises stakeholders' wealth.[4] Thus, prudential regulation and safety-net protections place substantial restrictions on the market's ability to discipline bank managers.

While most studies of corporate control and agency problems focus on nonfinancial firms, an increasing number of studies are investigating commercial banks and other financial institutions. Some consider how ownership structure and managerial compensation influence risk-taking (Anderson and Fraser, 2000; Gorton and Rosen, 1995; Houston and James, 1995; Saunders, Stock, and Travlos, 1990).[5] Others examine the effect of ownership structure, compensation, and market discipline on market value and look for evidence of managerial entrenchment. Hubbard and Palia (1995) find a positive relationship between pay and performance, which is stronger in banking markets where interstate entry was permitted. Moreover, CEO turnover increases after interstate branching deregulation. Brook, Hendershott, and Lee (1998) examine the effects on value of the passage of the Interstate Banking and Branching Efficiency Act of 1994 (Riegle-Neal Act), which eliminated most restrictions on interstate market entry and branching by 1997, and find that banks obtained large, statistically significant abnormal announcement returns during the legislation's passage. Consistent with the expectation that a more active takeover market raises banks' value, they also find that the value of poorly performing banks reacts more positively, and that banks with higher insider ownership, lower levels of outside block-holder ownership, and less independent boards obtain lower returns. Apparently, managers' ability to resist market discipline reduces the benefits of a more active takeover market.

Hadlock, Houston, and Ryngaert (1999) confirm that banks with higher levels of managerial ownership are less likely to be acquired while Brook, Hendershott, and Lee (2000) find that higher levels of outside block-

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[4]DeYoung, Hughes, and Moon (2001) provide evidence that bank supervisory ratings account for the efficiency of banks in managing risk.

[5]Benston, Hunter, and Wall (1995) and Craig and Santos (1997) consider whether acquiring banks are seeking to become "too big to fail," that is, to exploit an implicit insurance guarantee of very large banks whose failure would threaten the safety of the payments system. Their evidence is not consistent with this supposition.

holder ownership and a more independent board increase the probability that a bank will be acquired. Evanoff and Örs (2001) examine the effect of liberalizing interstate entry laws and the effect of market entry on incumbent banks' cost efficiency. They find that both types of events are associated with an improvement in cost efficiency in the three years that follow liberalization. These various studies provide strong evidence that banking regulations, such as interstate branching restrictions, have limited market discipline, and they suggest that managerial objectives other than value maximization may play an important role in bank consolidation.

To the extent that managers are able to resist market discipline, they can consume agency goods. Agency goods can be defined broadly to include not just the consumption of perquisites, but also avoiding effort, avoiding risk, building empires, discriminating prejudicially, and implementing strategies to increase managers' control and to reduce the probability of takeover. These different "goods" can be complements or substitutes in managers' preference orderings. For example, empire building and shirking may not be complementary. Similarly, managers' avoidance of risk to protect their relatively undiversified human capital may not be complementary to a defensive capital strategy undertaken to enhance their control and job tenure.[6] Managers' consumption of agency goods reduces their firms' financial performance and can be undertaken only to the extent that managers are able to resist market discipline.

Our empirical strategy, which we describe in detail in the next section, first assesses how a bank's financial performance is related to its investment opportunities and its ownership structure in order to identify bank characteristics associated with entrenched management. We then investigate how recent acquisitions and sales of assets and current asset size are related to financial performance at banks with entrenched management and banks without entrenched management. We test for empire building by asking whether building a bigger bank worsens financial performance—especially at banks with entrenched managers.

[6]Defensive capital strategies reduce the probability of a takeover by increasing financial leverage to concentrate managerial ownership (Stulz, 1988) and by reducing the benefits to an acquirer of a takeover (see, e.g., Billet, 1996). Such strategies may commit managers to better performance, but they can also further entrench managers. The empirical evidence on how they effect performance is not conclusive.

3. The Strategy of the Empirical Investigation

To investigate the effect of a bank holding company's ownership structure and investment strategy on its financial performance, we use data on 169 highest-level bank holding companies in the U.S. that were publicly traded, that operated over the three-year period 1992-1994, and that had been in operation since June 1986. We exclude holding companies that started operating after June 1986 as being *de novo*, those that are headquartered in unit banking states, and those that consisted mainly of nonbank banks or special purpose banks. A "highest-level" holding company is not owned by another U.S. company.[7] Holding company data are taken from proxy statements, Compact Disclosure,[8] and the FR Y-9 Financial Statements filed with the Federal Reserve System. The 169 bank holding companies in our sample ranged in size from $160 million in assets to $215 billion in assets.

3.1. Measuring a Bank's Financial Performance

We use two different measures of a bank's financial performance. The first measure, *Tobin's q ratio*, focuses on a bank's *achieved* market value and is proxied by the ratio of the market value of the bank's assets (MVA_i) to their book value, adjusted to remove goodwill (BVA_i).[9] The second measure, the *shortfall ratio*, measures the shortfall of a bank's market value from its highest potential market value as a proportion of the bank's book-value investment in its assets, net of goodwill. This measure relies on stochastic frontier techniques to fit an upper envelope of market value to replacement cost to answer the question, what is the highest potential market value of a given investment in bank assets? The difference between the envelope value and the achieved market value of a bank's assets is its market-value shortfall, i.e., its lost market value.[10]

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[7]Unless otherwise indicated, the term "bank" will refer to a bank holding company.

[8]Compact Disclosure is a database and software package published by Thomson Financial.

[9]Since goodwill is an accounting of assets based on market value, it must be subtracted from book value to obtain a proxy for replacement cost. This point is explained by Demsetz, Saidenberg, and Strahan (1996).

[10]The concept of the market-value shortfall measured by stochastic frontier techniques was proposed by Hughes, Lang, Moon, and Pagano (1997, 2001) and was used by Hughes, Lang, Mester, and Moon (1999) to study bank consolidation and by Hughes, Mester, and Moon (2001) to evaluate bank scale economies measured as an expansion of bank output along the path that maximizes the bank's value. Note, this path is not generally equivalent

The highest potential value of a bank's investment in its assets can be determined by fitting an upper envelope of the market value of banks' assets to their replacement cost, proxied by their book value net of goodwill. Letting MVA_i denote the market value of the i-th bank's assets and BVA_i, their book value less goodwill, we fit the frontier relationship,

$$MVA_i = \alpha + \beta (BVA_i) + \gamma (BVA_i)^2 + \epsilon_i, \quad (1)$$

with maximum likelihood techniques, where $\epsilon_i = \nu_i - \mu_i$ is a composite error term used to distinguish statistical noise, $\nu_i \sim$ iid $N(0,\sigma_\nu^2)$, from the systematic shortfall, μ_i (≥ 0) $\sim$ iid $N(0,\sigma_\mu^2)$ — i.e., the shortfall from the bank's highest potential (frontier) market value. The quadratic specification allows the frontier to be nonlinear. The frontier value, $FMVA_i$, is defined by the deterministic kernel of the stochastic frontier,

$$FMVA_i = \alpha + \beta (BVA_i) + \gamma (BVA_i)^2, \quad (2)$$

while the stochastic frontier, $SFMVA_i$, is composed of the deterministic kernel and the two-sided error term: $SFMVA_i = FMVA_i + \nu_i$.

The difference between a bank's stochastic frontier market value and the observed market value defines the bank's market-value shortfall, μ_i, which is measured in dollars of lost market value. Formally, a bank's shortfall is defined by the difference between the value of the deterministic kernel and its noise-adjusted market value so that

$$\mu_i = SFMVA_i - MVA_i = FMVA_i - (MVA_i - \nu_i), \quad (3)$$

where $(MVA_i - \nu_i)$ is the noise-adjusted, observed market value of assets. The shortfall, μ_i, cannot be directly measured, so it is estimated as the expectation of μ_i conditional on ϵ_i:

$$E(\mu_i \mid \epsilon_i) = FMVA_i - (MVA_i - E(\nu_i \mid \epsilon_i)). \quad (4)$$

Bauer (1990) and Jondrow, Lovell, Materov, and Schmidt (1982) describe this technique in detail.

For ease of interpretation and comparison with Tobin's q ratio, we normalize a holding company's inefficiency by its adjusted book value. Hence, a bank's shortfall ratio gives its market-value shortfall as a proportion of its investment in assets:

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to the path that minimizes the bank's cost.

$$shortfall\ ratio_i = E(\mu_i \mid \epsilon_i) / BVA_i . \quad (5)$$

The shortfall ratio offers several advantages over Tobin's *q* ratio as a measure of financial performance. First, it removes the influence of luck on performance and measures a firm's systematic failure to achieve its highest potential (frontier) value. This systematic lost market value captures differences among firms in market advantages as well as differences in managerial consumption of agency goods. Since managers decide in which local markets their firm should operate, we consider market advantages as components of managerial effectiveness. Thus, the stochastic frontier technique provides a conceptually sound measure of managerial and firm performance. Another advantage of the shortfall ratio is that the frontier technique identifies *lost* market value rather than *achieved* market value; hence, it gauges more directly than Tobin's *q* ratio the extent of agency problems in an industry and permits a direct econometric investigation of the factors that contribute to firms' failure to achieve their highest potential market value.

3.2. Explaining a Bank's Financial Performance

We regress bank performance, **y**, on variables, ***x***, that characterize managerial incentives derived from bank ownership structure and investment opportunities and that characterize current asset size, recent asset acquisitions, and recent asset sales:

$$y_i = \alpha_0 + \sum_j \alpha_j x_j + (\tfrac{1}{2})\sum_j \sum_k \alpha_{jk} x_j x_k, \quad (6)$$

where $\alpha_{jk} = \alpha_{kj}\ \forall$ j, k. The quadratic specification of the regression allows for non-linear effects and interactions among the explanatory variables. For example, it allows the correlation between managerial ownership and performance and the correlation between asset acquisition and performance to differ by the level of managerial ownership of the bank. Ownership structure is characterized by the proportion of a bank owned by insiders, the proportion of the outstanding shares granted to insiders as options, and the proportion of shares owned by outside block-holders. These variables are used to determine groups of banks at which management appears to be entrenched. The details of these hypotheses are given in section 4. The variables characterizing

bank size and asset acquisitions and sales are used to investigate empire building. These hypotheses are detailed in section 5.

Our explanatory variables, **x**, are measured as follows:

Insider ownership = the fraction of outstanding shares held by officers and directors at the end of 1994;

Options granted = the fraction of outstanding shares represented by stock options granted to senior managers at the end of 1994;

Outside block-holder ownership = the fraction of outstanding shares held by outside block-holders (holders of more than 5 percent of outstanding shares) at the end of 1994;[11]

Size of investment opportunity set = the highest potential value of the bank's assets in the markets in which it operates, which is measured using stochastic frontier techniques (described below and defined in equation (8));

Assets acquired = book value of assets acquired over 1992-1994;

Assets sold = book value of assets sold over 1992-1994;

Number of institutions acquired over 1992-1994;

Number of institutions sold over 1992-1994;

Asset size = book value of total assets at the end of the 1994.

The data are summarized in Table 1.

3.3. Measuring the Size of a Bank's Investment Opportunity Set

The investment opportunity ratio has been proxied in the literature by the ratio of the market value of a firm's assets to their book value, i.e., by the firm's *q* ratio. However, managers' consumption of agency goods reduces a bank's achieved market value, and this consumption is influenced by the size of the investment opportunity set. Managers can create more firm value out of a larger opportunity set, but they can also

[11]The data for these three ownership variables were obtained from proxy statements and Compact Disclosure.

consume more agency goods. If agency goods are "normal" goods, a larger investment opportunity set increases their consumption; and if their demand is "income elastic," the value of the firm increases less than proportionately as the size of the opportunity set increases since the consumption of agency goods will increase more than proportionately. We use the stochastic frontier technique to derive a measure of a bank's potential value that minimizes the effects of the consumption of agency goods and other inefficiencies. We say "minimizes," since the frontier value of a firm's investment in its assets represents the "best practice" of the firm's peers defined by the same investment in assets. To the extent that even this "best practice" includes the consumption of agency goods, the potential value identified by the stochastic frontier will embody some relatively small level of lost value because of agency issues or other sources of inefficiency.

To measure the opportunity set from which managers consume agency goods, it is necessary to account for the investment opportunities afforded by banks' specific local market conditions. Hence, we gauge the size of a bank's investment opportunity set by asking: what is the bank holding company's highest potential value in the specific markets in which it operates?[12]

To account for the highest potential value of a bank holding company in its local markets, we fit a stochastic frontier of market values not just to adjusted book values, but also to local market conditions characterized by the macroeconomic growth rate in the bank's market and by the institution's market share of deposits. The macroeconomic growth rate a bank experiences is defined by a ten-year, weighted-average growth rate in the states in which it operates ($Growth_i$). The weights are calculated as the share of the bank holding company's assets that are held by its banks headquartered in that state. A bank's market power is measured by a weighted-average Herfindahl index of deposits for these states ($Herf_i$). These weights are calculated as the share of the bank holding company's deposits that are held by banks that operate branches in that state (as determined by the FDIC's Summary of Deposits data).

We estimate the following frontier:

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[12]Note that this frontier will differ from the frontier we used to estimate the shortfall ratio. That frontier did not control for local market conditions, since the decision of where to locate is a managerial decision and is a component of managerial effectiveness.

$$MVA_i = \alpha + \beta_A (BVA_i) + \gamma_{AA} (BVA_i)^2 + \gamma_{AG} (BVA_i)(Growth_i) + \gamma_{AG} (BVA_i)(Herf_i)$$
$$+ \beta_G (Growth_i) + \gamma_{GG} (Growth_i)^2 + \gamma_{GH} (Growth_i)(Herf_i)$$
$$+ \beta_H (Herf_i) + \gamma_{HH} (Herf_i)^2 + \epsilon_i , \quad (7)$$

where $\epsilon_i = \nu_i - \mu_i$, $\nu_i \sim$ iid N($0,\sigma_\nu^2$), and μ_i (≥ 0) ~ iid N($0,\sigma_\mu^2$). The frontier value, $NPVA_i$, gauges a bank's potential value in its local markets and is given by the deterministic kernel of the stochastic frontier:

$$NPVA_i = \alpha + \beta_A (BVA_i) + \gamma_{AA} (BVA_i)^2 + \gamma_{AG} (BVA_i)(Growth_i) + \gamma_{AG} (BVA_i)(Herf_i)$$
$$+ \beta_G (Growth_i) + \gamma_{GG} (Growth_i)^2 + \gamma_{GH} (Growth_i)(Herf_i)$$
$$+ \beta_H (Herf_i) + \gamma_{HH} (Herf_i)^2. \quad (8)$$

We use the frontier value, $NPVA_i$, as the measure of the size of a bank's investment opportunity set in the performance regressions (equation (6)).

In order to divide banks into groups defined by the relative size of their investment opportunities, we define a bank's *investment opportunity ratio* as the value of the deterministic kernel, $NPVA_i$, normalized by the adjusted book value of its assets:

$$Investment\ opportunity\ ratio_i = NPVA_i / BVA_i. \quad (9)$$

The deterministic kernel computed by this technique is also used by Hughes, Lang, Moon, and Pagano (2001) to measure a bank's charter value—the value of its charter in a competitive auction or, equivalently, the value of the charter to the most efficient potential acquirer. Either a bank's current market value or its Tobin's *q* is often used as a proxy for charter value, but, as we have previously argued, measures based on achieved market value are biased by the level of managerial inefficiency. This inefficiency is minimized by the frontier-based value. Thus, a bank's highest potential value in the markets in which it operates can be used to measure the value of its charter, which is the value of its investment opportunities (efficiently exploited).

3.4. Difference-in-Means Comparisons

Before discussing our results from estimating equation (6), Table 2A presents difference-in-means tests of the variables for banks first grouped by whether they are under-performers or better-performers (i.e., have

a shortfall ratio greater than or equal to its median or less than its median) and then grouped by whether they are a net acquirer of assets or either a net seller or inactive in buying and selling assets. As the wave of consolidation suggests, more banks are net acquirers (107) than are either net sellers or did not buy or sell assets (62). Table 2A indicates that under-performing banks (i.e., those with a high shortfall ratio) tend to be smaller and less involved in acquiring assets. Their higher proportion of insider ownership suggests that the management of under-performing banks enjoys a higher degree of control, and their lower proportion of outside block-holder ownership indicates that the discipline of outside monitoring may be weaker at these banks. While there is no significant difference in q ratios between under-performing and better-performing banks, the investment opportunity ratio of under-performing banks is significantly higher. Hence, the under-performing banks are potentially more valuable than the better-performing banks. The under-performance of these banks represents a relatively larger consumption of potential value by insiders in the form of agency goods. The mean shortfall ratio of the under-performing group is 32.5 percent compared to 5.5 percent for the better-performing group. Apparently, the relatively smaller level of outside block-holder monitoring and the larger degree of control by insiders results in proportionately more consumption of agency goods.

Notably, better-performing banks are larger and have recently acquired a larger proportion of their total assets than poorer-performing banks. A comparison of net acquirers and net sellers or inactive banks reveals that net acquirers have a much lower shortfall ratio (13.6 percent) than banks that are either net sellers or inactive in buying and selling (28.4 percent). Net acquirers also have a higher q ratio in spite of having relatively less valuable investment opportunities (i.e., a lower investment opportunities ratio). Hence, banks that are net acquirers tend to perform better. In fact, 81 percent of banks in the better-performing half of the sample are net acquirers. But, there are important differences in performance that seem to be correlated to managers' degree of control and the level of outside monitoring—i.e., to the level of managers' entrenchment. These differences suggest the possibility that banks may differ in their ability to turn acquisitions into a value enhancing activity.

In Table 2B we focus on those banks that are net acquirers of assets and compare under-performing and better-performing net acquirers. We find the same differences as we found in comparing all better-performing banks with all under-performing banks. Better-performing net acquirers are larger and have relatively less valuable investment opportunities, their managers own less of the firm, and they have a higher proportion of outside block-holder ownership. Hence, their managers appear less entrenched than those of under-performing net acquirers.

The difference-in-means tests reported in Tables 2A and 2B are suggestive, but could be misleading, since they fail to control for numerous relevant factors. We now turn to our multivariate analyses to determine whether the univariate comparisons are misleading or hold up in a more complex analysis.

4. Empirical Results on Entrenchment

Tables 3, 4, 5, and 6 present the effect of a change in an explanatory variable on financial performance as a semi-elasticity,

$$(\partial y_i/\partial x_h)(x_h) = \partial y_i/\partial \ln x_h = [\alpha_h + (\tfrac{1}{2})\textstyle\sum_j \alpha_{jh}\, x_j]x_h, \qquad (10)$$

which shows *the change in performance (the shortfall ratio or Tobin's q ratio) due to a proportional change in the explanatory variable.*[13] Note that because the regression equation (6) is quadratic, these effects will vary across banks. The tables report the mean semi-elasticity of the bank-specific observations in the designated subsample of banks. We construct subsamples to investigate how the effects on performance of managerial incentive variables and asset size variables differ for holding companies grouped by the level of insider ownership, the size of their investment opportunity sets measured by the frontier technique and by Tobin's *q* ratio, the market-value shortfall ratio (i.e., inefficiency), and asset size. There are 16 subsamples in all.

[13]To save space we do not report the regression coefficients here, but they are available upon request from the authors.

In this section, we discuss our evidence related to managerial entrenchment. In the next section, we detail evidence related to whether holding companies with entrenched management fail to obtain the benefits of size and asset acquisition that accrue to other companies.

4.1. Evidence of Managerial Entrenchment: Ownership Structure

4.1.1. Insider Ownership

An increase in insider ownership influences insiders' consumption of agency goods in at least three ways. First, there is a *"price" effect*: the increase in insider ownership increases the opportunity cost of agency goods, since a dollar more of agency goods reduces the value of insiders' stake in the firm by the larger ownership proportion (Jensen and Meckling, 1976). Second, there is an *"income" effect*: the increase in insider ownership increases the insiders' claim on the potential value of the firm, from which insiders consume agency goods and produce value for both themselves and for outsiders. Third, there is a *control effect*: the increase in insider ownership increases the insiders' control over the firm's assets and, hence, their ability to consume agency goods.

The literature on the effects of an increase in insider ownership has emphasized two effects: an *alignment-of-interests effect* and a contrasting *entrenchment effect*.[14] While an increase in insider ownership better aligns the incentives of outside and inside owners and reduces managers' incentive to consume agency goods, it also confers more control on insiders and gives them better ability to resist market discipline and, hence, to consume agency goods. Thus, the alignment-of-interest effect is analogous to the "price" effect, while the entrenchment effect includes the control effect and its associated "income" effect.

A number of studies of nonfinancial firms have adopted three divisions of their sample by the level of insider ownership, 0 to 5 percent, 5 to 25 percent, and at least 25 percent, to test these contrasting hypotheses about the effect on performance of insider ownership.[15] Using Tobin's *q* ratio to measure performance, they

[14]See, for example, Morck, Shleifer, and Vishny (1988), McConnell and Servaes (1990), Barclay, Holderness, and Pontiff (1993), and Holderness, Kroszner, and Sheehan (1999).

[15]See, for example, Morck, Shleifer, and Vishny (1988) and Holderness, Kroszner, and Sheehan (1999).

typically find that performance and insider ownership are positively related over the range 0 to 5 percent, negatively related over the range 5 to 25 percent, and either positively or insignificantly related above 25 percent. These studies emphasize that the two hypotheses are not mutually exclusive but, instead, represent concurrent incentives. They usually attribute the improvement in performance at lower levels of ownership to the dominance of the alignment-of-interest effect and the decline at higher levels to the dominance of the entrenchment effect. Stulz (1988) suggests a related interpretation: at low levels of ownership, managers have a stronger incentive to promote the interests of atomistic outside owners in a potential acquisition of their firm while, at higher levels of ownership, managers can make an acquisition more difficult, perhaps to protect their control. Consequently, their firm's *ex ante* value is higher at lower levels of ownership than at higher levels.

Our evidence of the effects of insider ownership on performance are qualitatively similar to those found by these studies of nonfinancial firms. The derivative of the shortfall ratio with respect to a proportional change in insider ownership is displayed in the second column of Table 3. The mean semi-elasticity for the entire sample of holding companies is not statistically significant, but most of the mean semi-elasticities for the subsamples are significant and suggestive. We follow the common practice of dividing the sample into the three insider ownership groups. An increase in insider ownership is associated with a smaller market-value shortfall ratio (i.e., better performance) when insider ownership is in the 0 to 5 percent range. It is associated with a larger shortfall ratio (i.e., worse performance) when inside ownership is at least 25 percent.[16] This suggests managerial entrenchment in banking occurs, and it occurs at higher levels of ownership than is typically found for nonfinancial firms. Thus, *our evidence suggests that the entrenchment effect increases with insider ownership.*

How the effect of insider ownership varies with the value of investment opportunities. We also examine how the relationship between insider ownership and bank performance varies with the value of the firm's investment opportunities. To sort our sample, we use both the investment opportunity ratio and Tobin's

[16]DeYoung, Spong, and Sullivan (2001) used profit efficiency to gauge performance at small, closely held banks and found that entrenchment becomes apparent at the 17 percent level of insider ownership.

q ratio to measure the value of investment opportunities. We report the *q* ratio since it is often used for this purpose; however, we prefer the investment opportunity ratio as a proxy for investment opportunities because it minimizes measurement error owing to managerial inefficiency. We divide the sample into thirds defined by the size of each of these ratios.[17] The two ratios tell the same story. A proportional increase in insider ownership at holding companies with the lowest investment opportunity ratio is associated with a lower market-value shortfall ratio. The same is true for banks with the lowest *q* ratio. In contrast, a proportional increase in insider ownership at banks in the two groups with higher investment opportunities is associated with a higher shortfall ratio, and the magnitude of the increase is greater in the third with the highest investment opportunity ratio and *q* ratio.

Since, at any given investment in assets, a higher shortfall ratio implies greater consumption of agency goods, an increase in ownership in the lowest third is negatively associated with the consumption of agency goods while, in the highest third, it is positively associated with their consumption. Thus, an increase in ownership at banks with poorer investment opportunities appears to align the interests of insiders and outsiders more than it entrenches insiders. Conversely, an increase in ownership at banks with better investment opportunities is associated with greater entrenchment. *Dividing the sample by the relative size of the investment opportunity set reveals that the entrenchment effect of an increase in managerial ownership is strongest among banks with better investment opportunities.*

The dichotomy in effect between banks with poorer and better investment opportunities suggests that an increase in insider ownership interacts with the magnitude of a bank's investment opportunities to influence managers' incentives to consume agency goods. That is, the value of a bank's investment opportunities affects the relative sizes of the contrasting alignment-of-interest (*price*) effect and entrenchment (*income* plus *control*) effects. Consider two banks with the same investment in assets and the same level of insider ownership but different investment opportunities. As noted previously, an increase in insider ownership increases the

[17]The groups ordered by the investment opportunity ratio are defined by the following values: lowest third, 1.006 to 1.042; middle third, 1.042 to 1.078; highest third, 1.079 to 1.319. The groups ordered by the *q* ratio are defined as follows: lowest third, 0.970 to 1.024; middle third, 1.024 to 1.044; highest third, 1.044 to 1.173.

opportunity cost of consuming agency goods and, consequently, better aligns the interests of outside and inside owners. The higher opportunity cost tends to discourage the consumption of agency goods, but its effect is mitigated by the income and control effects, whose magnitudes are influenced by the value of a bank's investment opportunities (i.e., the level of "income"). An increase in insider ownership has a larger "income" effect on the consumption of agency goods at the bank with the better investment opportunities, since the increase in ownership is multiplied by a larger potential value from which agency goods are consumed. That is, the increased ownership of managers is worth more at the bank with more valuable investment opportunities; hence, it produces a larger "income" effect on managers' consumption of agency goods. Similarly, the enhanced control implied by the increase in ownership reinforces the larger "income" effect by improving the insiders' ability to exploit the larger opportunity set. Thus, the sum of these two effects, which is more commonly called the entrenchment effect, is likely to be larger for managers whose banks enjoy a more valuable set of investment opportunities. Our evidence indicates that the alignment-of-interests (price) effect dominates the entrenchment (income plus control) effect for banks with the least valuable investment opportunities—an increase in insider ownership is associated with improved performance (reduced consumption of agency goods) at these banks. On the other hand, the entrenchment effect dominates for the two-thirds with the most valuable investment opportunities—an increase in insider ownership is related to worsened performance (increased consumption of agency goods) at these banks.

How the effect of insider ownership varies with bank inefficiency. We also examine how the sum of the alignment-of-interest effect and entrenchment effect varies between more and less inefficient banks by dividing the banks into two groups by their shortfall ratio.[18] A proportional increase in insider ownership among banks in the less inefficient half is associated with a reduction in the shortfall ratio, which implies that the alignment-of-interest effect dominates the entrenchment effect in this relatively more efficient group of banks. On the other hand, an increase in insider ownership among banks in the more inefficient half is

[18]The shortfall ratio for the group with higher inefficiency ranges from 0.149 to 0.697 and for the group with lower inefficiency, from 0.001 to 0.148.

associated with an increase in the shortfall ratio, which suggests that the entrenchment effect dominates the alignment-of-interest effect in this relatively inefficient group. Hence, *higher inefficiency is associated with greater entrenchment*, which is sensible, since the causality is likely to run from entrenchment to inefficiency.

How the effect of insider ownership varies with bank size. Finally, we divide the sample into five groups by asset size.[19] Insider ownership is found to be positively associated with the shortfall ratio in the smallest three size groups, and negatively related in the largest size group. Thus, *entrenchment appears to be stronger at smaller banks*.

Summary of the effects of insider ownership. The effects of a proportional increase in insider ownership on the shortfall ratio strongly suggest that managers are entrenched at banks where they hold at least 25 percent of common shares outstanding, where investment opportunities are in the upper two-thirds of the sample, and in the three-fifths of the sample with the smallest total assets. The evidence of entrenchment obtained from a variation in insider ownership is further reinforced by the positive association between the shortfall ratio and insider ownership for the more inefficient half of the sample and the negative relationship for the more efficient half.

4.1.2. Options Granted to Management

The third column of Table 3 reports the mean response of the shortfall ratio to a proportional change in the fraction of outstanding common shares granted as options to insiders. The effect of options on the shortfall ratio is similar to that of ownership in most of the subsamples. Notably, options are positively associated with the shortfall ratio among banks in the higher two-thirds of the sample with better investment opportunities measured both by the investment opportunity ratio and by Tobin's q ratio, in the more inefficient half of the sample, and in the smallest three-fifths of the sample. Options are negatively associated with the shortfall ratio among banks in the third of the sample with the lowest investment opportunity and q ratios, in the less inefficient half, and in the largest two-fifths of banks, although these relationships are not statistically

[19]The five size categories are the following (in thousands of dollars): smallest 1/5, from $159,860 to $642,930; 2/5, from $653,644 to $1,361,236; 3/3, from $1,361,236 to $3,322,174; 4/5, from $3,322,174 to $11,472,871; and (largest) 5/5, from $11,472,871 to $221,764,250.

significant at conventional levels. Note, though, that when bank performance is measured by Tobin's *q* ratio (see Table 4), we find that there is a significantly positive relationship between options granted and performance for banks in the third of the sample with the lowest investment opportunities and for the less inefficient half of the sample.[20] This suggests that *an increase in options granted to insiders reduces agency conflicts between insiders and outsiders among banks with lower investment opportunities and among banks that are relatively efficient, while it worsens performance at relatively inefficient banks, at banks with better investment opportunities, and at smaller banks.* The similarity in effect between ownership and options suggests that a high proportion of options during this time period may have been in the money.

4.1.3. Block-holder Ownership

The fourth columns of Tables 3 and 4 report the mean response of performance to a proportional change in the fraction of outstanding shares held by outside block-holders, i.e., holders of more than 5 percent of outstanding shares. Our regression results indicate that block-holder ownership does not have a significant pattern of influence on bank performance whether it is measured by the shortfall ratio or by Tobin's *q* ratio. This lack of significance is striking given the apparent importance of block-holders in the univariate comparisons.

4.2. Evidence of Managerial Entrenchment: Investment Opportunities

An increase in the size of the investment opportunity set increases the potential value of the firm's assets and, hence, the size of the managers' opportunity set for consuming agency goods, as well as for producing asset value. It also reduces the probability of financial distress and, thus, further enhances

[20]The reader might be wondering why the significance seems to differ by insider ownership across the two performance measures we use. First, while Tobin's *q* ratio can be noisy, the stochastic frontier technique minimizes the noise in the performance measure based upon it. Second, the relationship between insider ownership and performance may be of higher order than quadratic. For example, if performance increases with insider ownership, then decreases, then increases again as insiders own a large amount of the bank, the quadratic form we estimate can capture one of these "turns" in performance but not both. Hence, it may be that the shortfall and *q* ratio regressions capture different "turns." One picks up significance for less entrenched groups and the other, more entrenched. Adding more variables to the regression equations could potentially pick this up, but the degrees of freedom would be stretched very far.

managers' ability to consume agency goods and to engage in defensive capital strategies. The effect of an increase in the potential value of the firm (measured by the size of the investment opportunity set) on the firm's shortfall ratio depends on the "income" elasticity of insiders' demand for agency goods. *The potential market value of the firm is the sum of its actual market value and the value that is consumed by managers as agency goods.* If the demand for agency goods increases more than proportionately when the potential value of the firm increases (i.e., if this demand is "income" elastic), then the actual market value of the firm must increase less than proportionately. Thus, the difference between the potential value and the actual value (i.e., the shortfall) must increase more than proportionately. Holding constant the denominator of the shortfall ratio (i.e., the book value of assets net of goodwill), this would mean the shortfall *ratio* would also increase more than proportionately. In contrast, when the demand is inelastic, the shortfall and the shortfall ratio must increase less than proportionately.

The fifth column of Table 3 presents the mean effect of a proportional change in the value of a bank's investment opportunities on performance measured by the shortfall ratio. For the full sample and for all subsamples where the semi-elasticity is statistically significant, a proportional increase in investment opportunities is associated with a more than proportional increase in the shortfall ratio. The increased shortfall ratio occurs for the subsamples in which our previous results suggest managerial entrenchment is low: the group with the smallest insider ownership, the smallest investment opportunity set, the less inefficient, and the largest asset sizes. It might seem surprising to find that the consumption of agency goods by relatively efficient managers, managers with low levels of ownership, and managers with less valuable investment opportunities *elastically* responds to an increase in the value of their investment opportunities. But an analogy to consumer theory provides some intuition for this result. Consider the demand for a luxury good such as steak. The income elasticity of the demand for steak is likely to be greater for a consumer with low income than with high income—i.e., with less opportunity to consume steak. Similarly, the demand for agency goods appears to be elastic among managers with less "income" and fewer opportunities to consume them.

The results reported in Table 4 for performance measured by Tobin's *q* ratio give mixed evidence in support of this intuition. The semi-elasticities for managers with low levels of ownership and low investment opportunity ratios are not significant at conventional levels, but their magnitudes suggest that the managers in these groups of banks have an elastic demand for agency goods and are consistent with the magnitudes of the corresponding effects measured by the shortfall ratio. On the other hand, the three statistically significant semi-elasticities in this column of results occur in subsamples where entrenchment has appeared strong—the more inefficient half of the sample and the two-thirds of the sample with the highest investment opportunities. The semi-elasticities for these groups indicate that an increase in the value of investment opportunities is associated with poorer performance (a lower *q* ratio). Thus, *the combined evidence from the shortfall ratio and the q ratio suggests that managers across all types of holding companies have an elastic demand for agency goods when faced with an improved investment opportunity set*.

5. Empirical Results on Empire Building

The effects on financial performance of ownership structure and the size of the investment opportunity set provide evidence of managerial entrenchment at smaller banks, at banks with better investment opportunity sets, and at banks with relatively high insider ownership. The consumption of agency goods at banks with entrenched management might include *empire building.* Empire building would be suggested by a negative association between the firm's financial performance and the level of recently acquired assets and, perhaps, the level of current total assets.

We characterize a bank's acquisition strategy with five measures: current total assets (at the end of 1994), the amount of assets acquired over the three year period 1992-1994, the amount of assets sold over 1992-1994, the number of institutions acquired over 1992-1994, and the number of institutions sold over 1992-1994. During this three-year period, all banks that acquired assets also acquired at least one institution, and all banks that sold assets also sold at least one institution. Of the total of 169 banks, 72 banks acquired assets but did not sell assets, 6 banks sold assets but did not acquire assets, 37 banks both acquired and sold assets,

and the remaining 54 banks neither acquired nor sold assets. A total of 107 banks are net acquirers of assets, and 8 banks are net sellers of assets. On average, banks that were net acquirers of assets, acquired assets over the three-year period equal to 20 percent of their assets at year-end 1994 and sold assets equal to 1.5 percent of year-end 1994 assets. For net acquirers, the average number of institutions acquired is 6.78 and sold, 0.67. For net sellers of assets the average proportion of total assets acquired is 0.9 percent, and the average sold is 9.2 percent. For net sellers, the average number of institutions acquired is 0.38 and sold, 1.38.

We estimate three size-related effects on performance: (i) the effect of a proportional change in the total assets of a bank, controlling for the amount of acquired and sold assets, which is equivalent to *a proportional change in previously held assets—assets that are "home-grown" or that were acquired before 1992*; (ii) the effect of a proportional change in the amount of acquired assets, controlling for the amount of total assets, which is equivalent to *a change in the proportion of recently acquired assets to previously held assets* (since the amount of total assets is held constant); and (iii) the effect of a proportional change in the amount of recently sold assets, controlling for the amount of total assets. In measuring these effects, we also control for the number of institutions acquired and sold. The effects on the shortfall ratio of these three types of variations are presented in Table 5, and the effects on Tobin's *q* ratio, in Table 6.

5.1. Effect of a Change in Total Assets

The first column of Table 5 and of Table 6 report the effect on performance of a proportional increase in total assets, holding constant the amount of acquired and sold assets. This represents internal growth of the bank, or, more precisely, growth in *previously held assets*—assets that are "home-grown" or acquired before 1992. In the case of the market-value shortfall ratio, the pattern of statistical significance and the sign of the semi-elasticities of the subsamples is similar to the pattern displayed by a variation in insider ownership. For the entire sample, an increase in total assets is associated with a large reduction in the market-value shortfall ratio. That is, an increase in assets is associated with better performance. This is also true for banks in the groups with the lowest level of insider ownership, the lowest growth opportunities measured both by the

stochastic frontier technique (i.e., the investment opportunity ratio) and by Tobin's *q* ratio, the lowest shortfall ratio, and the largest fifth of the sample—*evidence against empire building in these groups of banks*. Our earlier results suggest that these are groups in which managerial entrenchment does not appear to be a problem.

When performance is measured by Tobin's *q* ratio, increased asset-size is significantly associated with better performance in banks with larger investment opportunities as measured by Tobin's *q* and for less efficient banks, two groups where entrenchment appears to be a problem given our earlier results relating to ownership structure.[21] Combining the results for both of our measures of performance, *it appears that an increase in assets (not obtained by acquisition) is associated with better financial performance at most banks.* This might reflect the existence of scale economies for "home-grown" assets, or the causality may work in the opposite direction: better performing banks gain customers and grow larger while poor performers fail to grow or even lose customers.

5.2. Effect of a Change in Acquired Assets

The effect on performance of a proportional increase in the amount of acquired assets is shown in the second column of Table 5 and of Table 6. In contrast to an increase in total assets, some banks appear to worsen their performance by acquiring assets. Since total assets are held constant when we measure this semi-elasticity, it is also equivalent to a change in the composition of total assets, where recently acquired assets increase at the expense of previously held assets. This shift in the proportion allows us to compare the

[21]Some care must be taken when comparing the effects of an increase in assets on the *q*-ratio and on the market-value shortfall, since the *q* ratio measures achieved value and the shortfall measures lost market value. An increase in the book-value investment in total assets leads to an increase in the assets' highest potential value, which is their frontier value, and also to an increase in their achieved market value. Suppose both the *q*-ratio and the ratio of the frontier value to the book-value investment increase, and suppose that the frontier-value ratio increases more than the *q*-ratio. Then the market-value shortfall ratio will increase. That is, the shortfall ratio and the *q*-ratio need not move in opposite directions—an increase in a bank's investment in assets can make it more inefficient *relative to its potential value* even though it increases its *q*-ratio. In the case at hand, such a possibility can be ruled out, since the *q*-ratio semi-elasticities are not only positive, but also very large. In fact, they are virtually identical to the full elasticities, which indicate that a one percent increase in total assets increases the *q*-ratio by 3.87 percent for banks in the more inefficient half of the sample, by 5.16 percent for banks in the middle third sorted by Tobin's *q*-ratio, and by 1.48 percent for banks in upper third.

This problem does not arise for any of the other explanatory variables, such as the amounts of acquired assets and sold assets, because the effect on performance of these variables holds constant total assets, which is measured as the book-value investment in assets against which the shortfall is computed.

contribution to value of previously held assets and recently acquired assets. A proportional increase in acquired assets is associated with an increase in the market-value shortfall ratio (i.e., worse performance) for banks in groups in the middle level of insider ownership, the middle and highest levels of investment opportunities measured both by the investment opportunity ratio and by the *q* ratio, the more inefficient half of banks, and the smallest four-fifths of banks in the sample. Hence, the assets these banks acquire seem less valuable than the assets they hold. These groups of banks are essentially the same ones for which an increase in insider ownership is associated with an increase in the shortfall ratio, which suggests that the positive relationship between the amount of acquired assets and the shortfall ratio may be associated with entrenched management.

Further evidence for this entrenchment hypothesis from the effects on the shortfall ratio is weaker. It is true that the groups for which entrenchment does not appear to be a problem, i.e., where an increase in insider ownership is associated with a decline in the shortfall ratio—the lowest level of insider ownership, the smallest investment opportunity sets, the less inefficient half, and the largest one-fifth—all exhibit a negative relationship between acquired assets and the shortfall ratio, i.e., their acquisition of assets appears to be value enhancing. However, none of these semi-elasticities is statistically significant. Strikingly, though, as shown in Table 6, the weakness of this evidence disappears when Tobin's *q* ratio is used to measure performance: a proportional increase in acquired assets is associated with a statistically significant, improved financial performance for these groups in which entrenchment appears low. Only the effect for the less inefficient group is insignificantly positive.

This evidence suggests that the assets less entrenched managers acquire are more valuable than the assets they hold. Thus, it appears that banks where increased insider ownership is associated with poorer financial performance are also banks where acquired assets are associated with poorer performance and *vice versa*. *The benefits of acquired assets appear to accrue to banks whose insiders are not entrenched.*

5.3. Effect of Selling Assets

Selling assets raises the question of how such an activity contributes to an acquisition strategy and whether it really reflects poor performance. Most banks in our sample that sell assets also acquire assets (37 sell and acquire while 6 only sell assets). For the 37 banks that engaged in both acquiring and selling of assets, on average, the acquired assets over 1992-1994 equal to 21.9 percent of their total assets as of the end of 1994, while they sold assets equal to only 4.9 percent of year-end 1994 assets. These banks sold an average of 2.03 institutions, and acquired an average of 11.1 institutions. They are relatively efficient. Compared to the full sample whose mean shortfall ratio is 19.1 percent and whose median is 14.9, their average shortfall ratio is 7.4 percent, and their median, 4.5 percent. In contrast, the 6 banks that only sell assets, sold an average 8.7 percent of their assets and an average of 1.33 institutions. Their mean shortfall ratio is 25.3 percent. *These efficiency differences suggest that relatively efficient managers may be using sales to finance acquisitions, while relatively inefficient managers are shrinking their asset portfolios.*

The third column of Table 5 and of Table 6 gives the effect on performance of a proportional change in the amount of sold assets. Interestingly, an increase in the amount of sold assets is associated with a smaller shortfall ratio, i.e., with better performance, for all groups except for those in the largest two-fifths by asset size and the middle third of the investment opportunity ratio. This effect is statistically significant at the 0.10 or better level for the groups that exhibit managerial entrenchment. For the other groups where entrenchment is not as apparent, the reduction in the shortfall is much larger, but not statistically significant at conventional levels (the p-values are 0.177 or lower). However, when performance is measured by the *q* ratio (as shown in Table 6), the significance levels increase to conventional levels. Here, the groups showing the least entrenchment—the less inefficient half, the lowest insider ownership, and the lowest investment opportunities—all show a statistically significant, positive association between asset sales and performance. In addition, this significant positive association is found for many of the groups exhibiting entrenchment. In short, *a larger amount of sold assets is associated with improved financial performance at all but the largest banks in the sample.*

Not only are the qualitative results based on the shortfall ratio and the *q* ratio in agreement, the quantitative results are also similar. Comparing the magnitude of the effect on the *q* ratio between groups with high and low levels of insider ownership and large and small investment opportunity sets, it is clear that *a larger amount of sold assets is associated with a larger increase in the q ratio for the groups with less entrenched managers*. Although these differences in magnitudes suggest that a larger amount of sold assets is associated with a larger improvement in performance at banks with less entrenched managers, even banks with more entrenched managers obtain improved performance from asset sales. This evidence is clear for all but the largest banks in the sample.

Why are asset sales so generally beneficial for all but the largest banks? While selling assets would superficially seem at odds with exploiting scale economies, there are a variety of reasons asset sales might be associated with better financial performance. Shleifer and Vishny (1989) argue that a manager only divests assets that others can manage better and that competition among potential buyers will drive up the price of these assets to their highest market value, which may represent the willingness of an entrenched buyer to overpay. Consequently, they contend that asset sales should improve the seller's performance. On the other hand, the performance effects of asset acquisitions depend on whether managers are entrenched. Entrenched managers are likely to sacrifice value to acquire assets that further their own objectives. Lang, Poulson, and Stulz (1995) find evidence that sellers benefit on average from sales, but they note that the market discounts the announcement returns of sellers whom it expects to use the proceeds to pursue non-value-maximizing managerial objectives. John and Ofek (1995) also find that sellers of assets improve their financial performance in the three years following the sale, provided the divested assets increase the firm's focus.[22]

We obtain an interesting asymmetry of effect between acquisitions of assets and sales of assets for banks with entrenched management, which confirms Shleifer and Vishny's contention: *while a larger amount of acquired assets is associated with worsened performance at banks with entrenched management, a larger*

[22]An increase in a firm's focus involves an increase in its return risk. Entrenched managers who avoid risk to protect their relatively undiversified human capital are not likely to increase the focus of their firms.

amount of sold assets is related to improved performance. This asymmetry is not observed at banks in the groups not exhibiting entrenchment: both larger amounts of acquired assets and larger amounts of sold assets are associated with improved performance.

While nearly all groups of banks seem to benefit from an increase in the amount of sold assets, it should not be forgotten that the positive performance effect is much smaller at banks with entrenched management. Apparently, entrenched managers do not manage the proceeds of their sales as well as other managers.

6. Conclusions

The relationship between insider ownership and financial performance suggests that managerial entrenchment is present at banks with higher levels of managerial ownership, better investment opportunities, higher inefficiency, and smaller asset size. While an increase in asset size not obtained by acquisition is associated with improved performance for most banks, an increase in the amount of acquired assets is associated with improved performance at banks not exhibiting managerial entrenchment and with worsened performance at banks exhibiting entrenchment. Moreover, while an increase in the amount of sold assets is related to improved performance for most banks, the performance effect is much stronger for banks not exhibiting managerial entrenchment. The interesting asymmetry of effect for asset sales and acquisitions for entrenched managers—sales are associated with improved performance, while acquisitions are related to worsened performance—is consistent with empire building strategies that sacrifice value. In contrast, both asset sales and asset acquisitions are associated with improved performance at banks not exhibiting managerial entrenchment. Nevertheless, entrenched and non-entrenched managers appear to have an elastic demand for agency goods when the value of their investment opportunities increases.

Our results suggest that while scale and scope economies have likely been driving forces of the consolidation in the banking industry, not all mergers and acquisitions that lead to larger banks are value-

enhancing. When bank management is entrenched, some of this acquisition activity has likely been associated with empire building, i.e., with poorer bank performance.

References

Anderson, Ronald C., and Donald Fraser, 2000, "Corporate Control, Bank Risk Taking, and the Health of the Banking Industry," *Journal of Banking and Finance* 24, 1383-1398.

Barclay, Michael J., Clifford G. Holderness, and Jeffrey Pontiff, 1993, "Private Benefits from Block Ownership and Discounts on Closed-End Funds," *Journal of Financial Economics* 33, 263-291.

Bauer, Paul W., 1990, "Recent Developments in the Econometric Estimation of Frontiers," *Journal of Econometrics* 46, 39-56.

Benston, George J., William C. Hunter, and Larry D. Wall, 1995, "Motivations for Bank Mergers and Acquisitions: Enhancing the Deposit Insurance Put Option versus Earnings Diversification," *Journal of Money, Credit, and Banking* 27, 777-788.

Brook, Yaron, Robert Hendershott, and Darrell Lee, 1998, "The Gains from Takeover Deregulation: Evidence from the End of Interstate Banking Restrictions," *Journal of Finance* 53, 2185-2204.

Brook, Yaron, Robert Hendershott, and Darrell Lee, 2000, "Corporate Governance and Recent Consolidation in the Banking Industry," *Journal of Corporate Finance* 6, 141-164.

Calomiris, Charles W., and Jason Karceski, 1998, "Is the Bank Merger Wave of the 90s Efficient? Lessons from Nine Case Studies," in S. Kaplan (editor), *Mergers and Productivity*, University of Chicago Press, Chicago, IL.

Craig, Ben, and João Cabral dos Santos, 1997, "The Risk Effects of Bank Acquisitions," *Economic Review* 33, Federal Reserve Bank of Cleveland, 25-35.

DeYoung, Robert, Joseph P. Hughes, and Choon-Geol Moon, 2001, "Efficient Risk-Taking and Regulatory Covenant Enforcement in a Deregulated Banking Industry," *Journal of Economics and Business* 53, 255-282.

DeYoung, Robert, Kenneth Spong, and Richard J. Sullivan, 2001, "Who's Minding the Store? Motivating and Monitoring Hired Managers at Small, Closely Held Commercial Banks," *Journal of Banking and Finance* 25, 1209-1243.

Evanoff, Douglas D., and Evren Örs, 2001, "Local Market Consolidation and Bank Productive Efficiency," Working Paper, Federal Reserve Bank of Chicago.

Gaver, J. J., and K. M. Gaver, 1993, "Additional Evidence on the Association between the Investment Opportunity Set and Corporate Financing, Dividends, and Compensation Policies," *Journal of Accounting and Economics* 16, 125-160.

Gorton, Gary, and Richard Rosen, 1995, "Corporate Control, Portfolio Choice, and the Decline of Banking," *Journal of Finance* 50, 1377-1420.

Group of Ten Report, January 2001, "Consolidation in the Financial Sector."

Hadlock, Charles, Joel Houston, and Michael Ryngaert, 1999, "The Role of Managerial Incentives in Bank Acquisitions," *Journal of Banking and Finance* 23, 221-249.

Holderness, C.G., R.S. Kroszner, and D.P. Sheehan, 1999, "Were the Good Old Days That Good? Changes in Managerial Stock Ownership Since the Great Depression," *Journal of Finance* 54, 435-469.

Houston, Joel F., and Christopher James, 1995, "CEO Compensation and Bank Risk: Is Compensation in Banking Structured to Promote Risk-Taking?" *Journal of Monetary Economics* 36, 405-431.

Hubbard, R. Glenn, and Darius Palia, 1995, "Executive Pay and Performance: Evidence from the U.S. Banking Industry," *Journal of Financial Economics* 39, 105-130.

Hughes, Joseph P., 1999, "Measuring Efficiency When Competitive Prices Aggregate Differences in Product Quality and Risk," Proceedings of the Conference on the Microeconomics of Financial Intermediation, University of Venice, *Research in Economics/Ricerche Economiche* 53, 47-76.

Hughes, Joseph P., William Lang, Loretta J. Mester, and Choon-Geol Moon, 2000, "Recovering Risky Technologies Using the Almost Ideal Demand System: An Application to U.S. Banking,"*Journal of Financial Services Research* 18, 5-27.

Hughes, Joseph P., William Lang, Choon-Geol Moon, and Michael Pagano, 1997 (revised 2001), "Managerial Incentives and the Efficiency of Capital Structure," Department of Economics, Rutgers University, Working Paper 2001-02.

Hughes, Joseph P., Loretta J. Mester, and Choon-Geol Moon, 2001, "Are Scale Economies in Banking Elusive or Illusive? Incorporating Capital Structure and Risk into Models of Bank Production," *Journal of Banking and Finance* 25, 2169-2208.

Jensen, Michael C., and William H. Meckling, 1976, "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure," *Journal of Financial Economics* 5, 305-360.

Jondrow, J., C.A. Knox Lovell, I.S. Materov, and Peter Schmidt, 1982, "On the Estimation of Technical Efficiency in the Stochastic Frontier Production Function Model," *Journal of Econometrics* 19, 233-238.

John, Kose, and Eli Ofek, 1995, "Asset Sales and Increase in Focus," *Journal of Financial Economics* 37, 105-126.

Lang, Larry, Annette Poulsen, and René Stulz, 1995, "Asset Sales, Firm Performance, and the Agency Costs of Managerial Discretion," *Journal of Financial Economics* 37, 3-37.

Marcus, Alan J., 1984, "Deregulation and Bank Financial Policy," *Journal of Banking and Finance* 8, 557-565.

McConnell, John J., and Henri Servaes, 1990, "Additional Evidence on Equity Ownership and Corporate Value," *Journal of Financial Economics* 27, 595-612.

McConnell, John J., and Henri Servaes, 1995, "Equity Ownership and the Two Faces of Debt," *Journal of Financial Economics* 39, 131-157.

Mester, Loretta J., May/June 1989, "Owners versus Managers: Who Controls the Bank?" *Business Review*, Federal Reserve Bank of Philadelphia, 13-23.

Morck, Randall, Andrei Shleifer, and Robert W. Vishny, 1988, "Management Ownership and Market Valuation," *Journal of Financial Economics* 20, 293-315.

Peristiani, Stavros, 1997, "Do Mergers Improve the X-Efficiency and Scale Efficiency of U.S. Banks? Evidence from the 1980s," *Journal of Money, Credit, and Banking* 29, 326-337.

Pilloff, Steven J., and Anthony M. Santomero, 1998, "The Value Effects of Bank Mergers and Acquisitions," in *Bank Mergers and Acquisitions*, Yakov Amihud and Geoffrey Miller, eds., New York University Salomon Center Series on Financial Markets and Institutions, vol. 3, Dordrecht and London: Kluwer Academic, 59-78.

Prowse, Stephen, 1997, "Corporate Control in Banking," *Journal of Financial Research* 20, 509-527.

Rhoades, Stephen A., 2000, "Bank Mergers and Banking Structure in the US, 1980-98," Board of Governors of the Federal Reserve System, Staff Study 174.

Saunders, Anthony, Elizabeth Strock, and Nickolaos G. Travlos, 1990, "Ownership Structure, Deregulation, and Bank Risk Taking," *Journal of Finance* 45, 643-654.

Shaffer, Sherrill, 1993, "Can Megamergers Improve Bank Efficiency?" *Journal of Banking and Finance* 17, 423-436.

Shleifer, Andrei, and Robert W. Vishny, 1989, "Managerial Entrenchment: The Case of Manager-Specific Investments," *Journal of Financial Economics* 25, 123-139.

Smith, Clifford W., and Ross L. Watts, 1992, "The Investment Opportunity Set and Corporate Financing, Dividend, and Compensation Policies," *Journal of Financial Economics* 32, 263-292.

Stiroh, Kevin J., 2000, "How Did Bank Holding Companies Prosper in the 1990s?" *Journal of Banking and Finance* 24, 1703-1745.

Welch, B.L., 1933, "The Significance of the Difference Between Two Means When the Population Variances Are Unequal," *Biometrika* 29, 350-362.

Table 1

Summary Statistics

169 bank holding companies. Data pertain to 1994 unless otherwise stated. All dollars in thousands.

Variable	Sample Mean	Median	Standard Deviation
Book-value of assets	$ 11,863,901.25	$ 1,976,286.00	$ 27,609,893.29
Book-value of assets, net of goodwill	$ 11,796,318.97	$ 1,972,085.00	$ 27,384,207.94
Market-value shortfall = Frontier market-value of assets – Actual market-value of assets, net of goodwill	$ 429,071.75	$ 364,043.56	$ 351,753.86
Shortfall ratio = Market-value shortfall / Book-value of assets, net of goodwill	0.191	0.149	0.164
Tobin's *q* ratio = Market-value of assets / Book-value of assets, net of goodwill	1.036	1.033	0.033
Insider ownership = Percentage of outstanding shares held by officers and managers	12.885	7.264	13.449
Options granted = Percentage of outstanding shares represented by stock options granted to senior managers	0.341	0.148	0.576
Outside block-holder ownership = Percentage of outstanding shares held by outside block-holders (holders of 5 percent or more of outstanding shares)	3.307	0.000	6.555
Size of investment opportunity set = Frontier market-value of assets (given the geographic location of the holding company's operations)	$12,102,031.87	$2,073,815.00	$27,758,651.86
Investment opportunity ratio = Size of the investment opportunity set / Book-value of assets, net of goodwill, at end of 1994	1.073	1.057	0.054
Assets acquired, 1992-1994	$ 2,314,368.51	$ 169,712.00	$ 9,120,196.28
Assets acquired, 1992-1994 / Book-value of assets, net of goodwill, at end of 1994	0.127	0.076	0.142
Assets sold, 1992-1994	$ 153,261.78	$ 0.00	$ 610,395.64
Assets sold, 1992-1994 / Book-value of assets, net of goodwill, at end of 1994	0.014	0.000	0.036
Number of institutions acquired, 1992-1994	4.308	2.000	8.362
Number of institutions sold, 1992-1994	0.491	0.000	1.145

Table 2A

Difference-in-Means Tests Across Subsamples

The first two columns compare under-performing banks to better-performing banks. The second two columns compare banks that were net acquirers of assets to those that were net sellers of assets or that did not engage in buying or selling assets. Values in bold are significantly different from each other at the 0.05 level. (Note that we used a standard t-test to compare means when an F-test did not reject the hypothesis of equal variances across the subsamples, and we used Welch's (1933) t-test when an F-test did reject the hypothesis of equal variances.) All dollars in thousands.

Variable	Under-Performing Banks (Shortfall Ratio ≥ Median)	Better-Performing Banks (Shortfall Ratio < Median)	Banks that are Net Acquirers of Assets	Banks that are Net Sellers of Assets or Neither Acquirers nor Sellers
Number of banks	85	84	107	62
Book-value of assets	**$ 904,908.39**	**$ 22,953,358.32**	$ 14,701,751.18	$ 6,966,321.55
Book-value of assets, net of goodwill	**$ 901,818.08**	**$ 22,820,516.30**	$ 14,601,319.66	$ 6,955,430.67
Market-value shortfall	**$ 361,673.78**	**$ 497,272.07**	$ 418,307.34	$ 447,649.01
Shortfall ratio	**0.325**	**0.055**	**0.136**	**0.284**
Tobin's *q* ratio	1.036	1.037	**1.041**	**1.029**
Insider ownership	**18.131**	**7.577**	**10.535**	**16.940**
Options granted	**0.439**	**0.241**	**0.212**	**0.563**
Outside block-holder ownership	**1.738**	**4.895**	3.395	3.154
Size of investment opportunity set	**$ 980,036.35**	**$ 23,356,432.11**	**$ 14,985,624.43**	**$ 7125509.23**
Investment opportunity ratio	**1.109**	**1.037**	**1.059**	**1.098**
Assets acquired, 1992-1994	**$ 107,134.20**	**$ 4,547,879.42**	**$ 3,654,424.54**	**$ 1,691.16**
Assets acquired, 1992-1994 / Book-value of assets, net of goodwill, at end of 1994	**0.101**	**0.154**	**0.200**	**0.001**
Assets sold, 1992-1994	**$ 7,272.34**	**$ 300,987.16**	**$ 227,692.20**	**$ 24,809.27**
Assets sold, 1992-1994 / Book-value of assets, net of goodwill, at end of 1994	0.010	0.017	0.015	0.012
Number of institutions acquired, 1992-1994	**1.106**	**7.548**	**6.776**	**0.048**
Number of institutions sold, 1992-1994	**0.118**	**0.869**	**0.673**	**0.177**

Table 2B

Difference-in-Means Tests for Under-Performing and Better-Performing Net Acquirers

The two columns compare under-performing and better-performing banks that are net acquirers to gain evidence on the potential for empire building among under-performing banks. Values in bold are significantly different from each other at the 0.05 level. (Note that we used a standard t-test to compare means when an F-test did not reject the hypothesis of equal variances across the subsamples and we used Welch's (1933) t-test when an F-test did reject the hypothesis of equal variances.) All dollars in thousands.

Variable	Net Acquirers that are Under-Performing Banks (Shortfall Ratio ≥ Median)	Net Acquirers that are Better-Performing Banks (Shortfall Ratio < Median)
Number of banks	39	68
Book-value of assets	**$ 1,070,206.36**	**$ 22,519,843.06**
Book-value of assets, net of goodwill	**$ 1,065,656.96**	**$ 22,364,420.43**
Market-value shortfall	**$ 358,628.33**	**$ 452,535.01**
Shortfall ratio	**0.281**	**0.053**
Tobin's *q* ratio	1.048	1.036
Insider ownership	**16.046**	**7.375**
Options granted	0.212	0.212
Outside block-holder ownership	**1.657**	**4.391**
Size of investment opportunity set	**$ 1,150,420.54**	**$ 22,920,520.78**
Investment opportunity ratio	**1.095**	**1.038**
Assets acquired, 1992-1994	**$ 231,641.33**	**$ 5,617,491.38**
Assets acquired, 1992-1994 / Book-value of assets, net of goodwill, at end of 1994	0.218	0.190
Assets sold, 1992-1994	**$ 3,134.82**	**$ 356,477.29**
Assets sold, 1992-1994 / Book-value of assets, net of goodwill, at end of 1994	**0.005**	**0.021**
Number of institutions acquired, 1992-1994	**2.385**	**9.294**
Number of institutions sold, 1992-1994	**0.077**	**1.015**

Table 3

The Effects of Managerial Incentives on the Market-Value Shortfall Ratio

This table reports the estimated change in market-value shortfall ratio due to a proportional change in the incentive variable, $(\partial y_i/\partial x_j)(\ln x_j)$, based on equation (6). The reported values are means over bank holding companies in the full sample or in the designated subsample. The values in parentheses are two-tailed probabilities. Values in bold are significant at least at the 0.10 level.

	Change in Shortfall Ratio due to a proportional change in...							
Mean semi-elasticity for the subsample . . .	**Insider Ownership**		**Options Granted**		**Outside Block-Holder Ownership**		**Size of Investment Opportunity Set**	
All BHCs	−0.011	(0.407)	−0.009	(0.796)	−0.025	(0.502)	**12.551**	(0.053)
Insider ownership								
0 to 5 %	−**0.098**	(0.003)	−0.041	(0.597)	−0.080	(0.470)	**38.148**	(0.053)
5 to 25 %	−0.004	(0.781)	0.006	(0.654)	−0.000	(0.975)	0.859	(0.450)
≥ 25 %	**0.133**	(0.017)	0.003	(0.838)	0.000	(0.983)	0.843	(0.426)
Investment opportunity ratio								
lowest 1/3	−**0.127**	(0.000)	−0.079	(0.242)	−0.071	(0.542)	**37.592**	(0.050)
middle 1/3	**0.024**	(0.034)	**0.018**	(0.007)	−0.010	(0.127)	−0.310	(0.702)
highest 1/3	**0.070**	(0.000)	**0.034**	(0.000)	0.005	(0.403)	−0.082	(0.746)
Tobin's *q* ratio								
lowest 1/3	−**0.119**	(0.001)	−0.075	(0.268)	−0.080	(0.469)	**37.485**	(0.049)
middle 1/3	0.017	(0.132)	**0.015**	(0.026)	0.002	(0.742)	−0.265	(0.707)
highest 1/3	**0.069**	(0.000)	**0.033**	(0.014)	0.003	(0.507)	−0.014	(0.958)
Market-value shortfall								
lower 1/2	−**0.078**	(0.001)	−0.047	(0.300)	−0.054	(0.472)	**25.425**	(0.049)
higher 1/2	**0.054**	(0.000)	**0.028**	(0.001)	0.003	(0.512)	−0.172	(0.585)
Asset size								
smallest 1/5	**0.081**	(0.001)	**0.048**	(0.051)	0.004	(0.490)	0.052	(0.842)
2/5	**0.043**	(0.001)	**0.012**	(0.084)	−0.001	(0.761)	−0.230	(0.483)
3/5	**0.014**	(0.236)	**0.018**	(0.003)	0.006	(0.352)	−0.632	(0.278)
4/5	−0.011	(0.517)	−0.005	(0.816)	−0.015	(0.382)	0.076	(0.964)
largest 5/5	−**0.183**	(0.001)	−0.120	(0.228)	−0.119	(0.500)	**63.098**	(0.046)

Table 4

The Effects of Managerial Incentives on Tobin's *q* Ratio

This table reports the estimated change in market-value shortfall ratio due to a proportional change in the incentive variable, $(\partial y_i/\partial x_j)(\ln x_j)$, based on equation (6). The reported values are means over bank holding companies in the full sample or in the designated subsample. The values in parentheses are two-tailed probabilities. Values in bold are significant at least at the 0.10 level.

	Change in Tobin's *q* Ratio due to a proportional change in...							
Mean semi-elasticity for the subsample . . .	**Insider Ownership**		**Options Granted**		**Outside Block-Holder Ownership**		**Size of Investment Opportunity Set**	
All BHCs	−0.005	(0.385)	0.004	(0.460)	0.005	(0.602)	−1.730	(0.402)
Insider ownership								
0 to 5 %	−0.003	(0.726)	0.010	(0.566)	0.015	(0.528)	−5.911	(0.345)
5 to 25 %	−0.003	(0.449)	0.002	(0.570)	−0.002	(0.458)	0.114	(0.764)
≥ 25 %	−0.011	(0.687)	−0.000	(0.999)	0.004	(0.163)	0.396	(0.320)
Investment opportunity ratio								
lowest 1/3	−0.004	(0.713)	0.019	(0.258)	0.015	(0.562)	−5.332	(0.378)
middle 1/3	−0.005	(0.328)	−0.001	(0.703)	−0.000	(0.899)	0.140	(0.616)
highest 1/3	−0.005	(0.542)	**−0.005**	(0.045)	−0.002	(0.305)	0.067	(0.477)
Tobin's *q* ratio								
lowest 1/3	−0.013	(0.255)	**0.014**	(0.042)	0.026	(0.539)	1.167	(0.801)
middle 1/3	−0.005	(0.265)	0.002	(0.882)	−0.003	(0.365)	**−5.373**	(0.008)
highest 1/3	0.004	(0.446)	−0.002	(0.374)	0.004	(0.440)	**−1.563**	(0.023)
Market-value shortfall								
lower 1/2	−0.013	(0.131)	**0.011**	(0.054)	0.007	(0.616)	0.617	(0.889)
higher 1/2	0.004	(0.401)	−0.003	(0.746)	0.002	(0.680)	**−4.050**	(0.014)
Asset size								
smallest 1/5	−0.005	(0.586)	−0.006	(0.395)	−0.001	(0.386)	0.037	(0.689)
2/5	−0.002	(0.742)	−0.001	(0.790)	0.001	(0.680)	0.102	(0.383)
3/5	−0.006	(0.164)	−0.002	(0.471)	**−0.003**	(0.035)	0.124	(0.529)
4/5	−0.000	(0.993)	−0.001	(0.852)	−0.006	(0.223)	−0.250	(0.611)
largest 5/5	−0.009	(0.564)	0.032	(0.199)	0.032	(0.419)	8.610	(0.392)

Table 5

The Effects of Asset Size, Acquisitions, and Sales on the Market-Value Shortfall Ratio

This table reports the estimated change in market-value shortfall ratio due to a proportional change in bank holding company size, acquisitions, and sales, $(\partial y_i/\partial x_j)(\ln x_j)$, based on equation (6). The effect of a proportional change in two variables is the sum of their semi-elasticities. The reported values are means over bank holding companies in the full sample or in the designated subsample. The values in parentheses are two-tailed probabilities. Values in bold are significant at least at the 0.10 level.

	Change in Shortfall Ratio due to a proportional change in...		
Mean semi-elasticity for the subsample . . .	**Total Assets**	**Acquired Assets**	**Sold Assets**
All BHCs	−**12.483** (0.055)	−0.021 (0.834)	−0.140 (0.167)
Insider ownership			
0 to 5 %	−**37.766** (0.056)	−0.117 (0.722)	−0.424 (0.176)
5 to 25 %	−0.944 (0.400)	**0.025** (0.005)	−**0.010** (0.070)
≥ 25 %	−0.889 (0.383)	0.013 (0.225)	−**0.009** (0.045)
Investment opportunity ratio			
lowest 1/3	−**37.263** (0.053)	−0.093 (0.757)	−0.413 (0.167)
middle 1/3	0.208 (0.784)	**0.024** (0.040)	**0.006** (0.091)
highest 1/3	0.052 (0.834)	**0.007** (0.011)	−**0.007** (0.002)
Tobin's *q* ratio			
lowest 1/3	−**37.167** (0.052)	−0.089 (0.770)	−0.403 (0.175)
middle 1/3	0.172 (0.804)	**0.021** (0.017)	−0.005 (0.240)
highest 1/3	−0.013 (0.957)	**0.005** (0.041)	−**0.008** (0.002)
Market-value shortfall			
lower 1/2	−**25.246** (0.052)	−0.052 (0.802)	−0.272 (0.177)
higher 1/2	0.130 (0.663)	**0.009** (0.010)	−**0.009** (0.002)
Asset size			
smallest 1/5	−0.071 (0.763)	**0.004** (0.042)	−**0.012** (0.002)
2/5	0.183 (0.557)	**0.009** (0.012)	−**0.009** (0.002)
3/5	0.545 (0.338)	**0.017** (0.003)	−**0.006** (0.036)
4/5	−0.255 (0.878)	**0.048** (0.017)	**0.031** (0.012)
largest 5/5	−**62.434** (0.060)	−0.183 (0.715)	0.699 (0.159)

Table 6

The Effects of Asset Size and Acquisitions on Tobin's *q* Ratio

This table reports the estimated change in Tobin's *q* ratio due to a proportional change in bank holding company size, acquisition variables, $(\partial y_i/\partial x_j)(\ln x_j)$, based on equation (6). The effect of a proportional change in two or more variables is the sum of their semi-elasticities. A *scaled* proportional change in total assets considers the effect of a change in total assets that is due only to a change in acquired assets, that is, it assumes no internal growth. The reported values are means over bank holding companies in the full sample or in the designated subsample. The values in parentheses are two-tailed probabilities. Values in bold are significant at least at the 0.10 level.

	Change in Tobin's *q* Ratio due to a proportional change in...		
Mean semi-elasticity for the subsample . . .	**Total Assets**	**Acquired Assets**	**Sold Assets**
All BHCs	1.643 (0.428)	**0.048** (0.076)	**0.041** (0.063)
Insider ownership			
0 to 5 %	5.637 (0.370)	**0.161** (0.068)	**0.124** (0.073)
5 to 25 %	-0.119 (0.751)	-0.004 (0.151)	**0.003** (0.008)
≥ 25 %	-0.388 (0.311)	-0.004 (0.261)	**0.003** (0.002)
Investment opportunity ratio			
lowest 1/3	5.071 (0.404)	**0.147** (0.068)	**0.119** (0.071)
middle 1/3	-0.140 (0.607)	-0.005 (0.196)	0.001 (0.401)
highest 1/3	-0.063 (0.460)	-0.001 (0.204)	**0.002** (0.001)
Tobin's *q* ratio			
lowest 1/3	-1.856 (0.774)	**0.108** (0.103)	**0.104** (0.014)
middle 1/3	**5.334** (0.008)	0.038 (0.240)	0.016 (0.548)
highest 1/3	**1.581** (0.021)	-0.004 (0.600)	0.003 (0.529)
Market-value shortfall			
lower 1/2	-0.783 (0.860)	0.074 (0.137)	**0.070** (0.015)
higher 1/2	**4.041** (0.013)	0.021 (0.359)	0.013 (0.539)
Asset size			
smallest 1/5	-0.034 (0.678)	-0.001 (0.266)	**0.003** (0.001)
2/5	-0.099 (0.373)	-0.001 (0.226)	**0.002** (0.002)
3/5	-0.124 (0.517)	-0.003 (0.143)	**0.003** (0.000)
4/5	0.247 (0.610)	-0.008 (0.191)	-0.001 (0.814)
largest 5/5	8.173 (0.419)	**0.249** (0.063)	**0.198** (0.071)