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Agency Problems and Risk Taking at Banks

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Abstract

The moral hazard problem associated with deposit insurance generates the potential for excessive risk taking on the part of bank owners. The banking literature identifies franchise value -- a firm's profit-generating potential -- as one force mitigating that risk taking. We argue that in the presence of owner/manager agency problems, managerial risk aversion may also offset the excessive risk taking that stems from moral hazard. Empirical models of bank risk tend to focus either on the disciplinary role of franchise value or on owner/manager agency problems. We estimate a unified model and find that both franchise value and ownership structure affect risk at banks. More important, we identify an interesting interaction effect: The relationship between ownership structure and risk is significant only at low-franchise value banks -- those where moral hazard problems are most severe and where conflicts between owner and manager risk preferences are therefore strongest. For these banks, insider holdings affect risk taking through asset risk while ownership concentration affects risk taking through leverage. This is consistent with the idea that outside blockholders more readily control managerial risk-taking by influencing leverage than by influencing asset risk.

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1. Introduction

The banking literature has emphasized two types of agency problems. First, limited liability gives shareholders an incentive to expropriate wealth from bondholders by increasing risk. Since the financial safety net shields bondholders (particularly depositors) from the consequences of bank risk taking, their incentive to monitor and constrain such risk taking is severely limited. The absence of such monitoring is known as “moral hazard” or the “moral hazard problem associated with deposit insurance” in the banking literature. Second, absent appropriate monitoring and discipline by shareholders, managers may pursue their own objectives at the expense of shareholders (Berle and Means 1932, Jensen and Meckling 1976). This paper jointly examines the importance of moral hazard and the owner/manager agency problem at commercial banks.

Both agency problems have been examined extensively for depository institutions, particularly in explaining increased risk taking and the consequent high failure rates in the 1980s. Kane (1988), Barth (1991), White (1991) and others attribute the thrift crisis to the moral hazard problem associated with deposit insurance. Keeley (1990) appeals to moral hazard to explain the high failure rates for banks in the aftermath of deregulation and the associated loss in bank franchise value. Gorton and Rosen (1995) argue instead that the owner/manager agency problem provides the explanation for increased risk taking at banks in the 1980s. According to their model, bank managers faced with declining prospects for future profits increased portfolio risk as a way of concealing poor prospects from shareholders.

More typically, the owner/manager agency problem is characterized by excessively *safe* behavior on the part of the manager, who pursues his own objectives at the expense of better

diversified shareholders. In this second characterization, the owner/manager agency problem may actually help solve the moral hazard problem, aligning the interests of risk-averse bank managers with those of bank supervisors.

The moral hazard and owner/manager agency problems are by no means mutually exclusive in banking.¹ Nevertheless, the banking literature has sought evidence of each agency problem in isolation.² Recent theoretical work by Acharya (1996) and empirical work by Demsetz, Saidenberg, and Strahan (1996) follow Marcus (1984) and Keeley (1990) in analyzing the effect of franchise value on risk taking at banks. These papers demonstrate that banks with more franchise value (greater profit-making potential) take less risk. Franchise value works to reduce the moral hazard problem by increasing the cost of financial distress and thereby lowering shareholders' desired level of risk.

A separate set of papers allows for the possibility that bank managers do not act in the interest of shareholders. Studies that find a statistically significant relationship between ownership structure and bank risk taking conclude that an owner/manager agency problem exists in banking. Unchecked, that agency problem will lead to sub-optimal risk taking on the part of bank managers. Owners align managerial interests with their own interests via optimal ownership

¹ Recent legislative initiatives seem to recognize the importance of both types of agency problems at banks. The Prompt Corrective Action provisions of the FDIC Improvement Act (FDICIA) place increasing constraints on bank activities as capital falls, a direct attempt to address the moral hazard problem associated with deposit insurance. The Act also strengthens regulatory oversight of compensation to senior bank managers, perhaps in attempt to thwart owners' efforts to induce greater risk taking on the part of bank managers.

² There are exceptions in studies that focus on other types of financial institutions. See Brewer and Saidenberg (1996) and Brewer, Mondschean, and Strahan (1997) for treatments of both agency problems in the context of the thrift industry and the insurance industry, respectively.

structure, which may be achieved by granting appropriate ownership shares to bank managers through stock- or stock option-based compensation. The owner/manager agency literature lacks consensus, however, on the exact relationship between ownership structure and risk taking. Saunders, Strock and Travlos (1990) impose linearity and find that risk rises with insider holdings. Gorton and Rosen (1995) estimate a non-parametric relationship between ownership structure and risk taking and find that risk first rises and then falls as insiders gain ownership share. Houston and James (1995) find no relationship between the percentage of stock held by bank CEOs and the level of risk taking.

We argue that the moral hazard problem and the owner/manager agency problem in banking should be examined jointly. The two agency problems may act simultaneously, with risk-aversion on the part of managers counteracting owners' risk preferences associated with moral hazard. The two agency problems may even be interrelated, since owner and manager interests may be more closely aligned at high franchise-value banks than at low franchise-value banks. Moreover, franchise value and ownership structure have been shown to be empirically related in nonfinancial firms (Mork, Shleifer, and Vishny 1988) and in banks (DeYoung, Spong, and Sullivan 1996). Hence, there are both theoretical and empirical reasons to estimate a unified model of bank risk taking that includes both franchise value *and* ownership structure as regressors *and* allows for any interaction effects. This is the empirical strategy of our paper.³

Our empirical analysis is based on a large dataset that tracks the risk taking behavior,

³ Houston and James include measures of franchise value, ownership structure, and risk in their model, but they treat risk as exogenous and consequently ignore any potential interaction between franchise value and the ownership share of bank managers. Moreover, their empirical framework imposes linearity on the relationship between risk and managerial shareholdings, whereas ours does not.

franchise value, and ownership structure of over 400 publicly traded bank holding companies (BHCs) throughout the 1991-1995 period. We focus on the 1990s because data on ownership structure is more readily available in this period. As a result, we are careful about drawing inferences regarding the motivations for bank risk taking in the 1980s. Instead our results speak to the moral hazard and owner/manager agency problems in a period of relative stability.

We find a robust negative relationship between franchise value and risk, even after controlling for ownership structure (insider holdings and large block holdings). Absent franchise value, the incentives for risk taking are strong. Franchise value serves to discipline bank risk taking by increasing the costs of financial distress, thereby offsetting the moral hazard problem. When we split our sample into low- and high-franchise value subsamples, we find that the explanatory power of franchise value comes from the subsample of banks with low franchise value, those for which the moral hazard problem should be most severe.

We find a statistically significant relationship between ownership structure and risk *only for banks with relatively low franchise value*. For these banks, risk increases significantly at low levels of insider shareholdings but remains relatively stable thereafter. Risk also increases with large blockholdings. Our results are consistent with the presence of owner/manager agency problems but also emphasize the important interaction between these agency problems and the moral hazard problem at banks. It appears that ownership structure is used to align the risk taking incentives of managers with those of owners *only when franchise value is low*. We infer that the incentives of managers and owners do *not* diverge greatly when high profit-generating potential mitigates moral hazard. This may help explain why previous studies of owner/manager agency problems at banks reach such varied conclusions.

In the final section of our paper, we take a closer look at the strategies used by management to increase or decrease risk taking at banks. In particular, we measure the sensitivity of leverage and asset risk to franchise value and ownership structure. We find that the risk reduction associated with franchise value operates through both leverage and asset risk. The fraction of stock held by insiders affects asset risk at low-franchise value banks, but has no effect on leverage. The fraction of stock held by large blockholders is related to leverage at low-franchise value banks, but bears no relationship to asset risk. We interpret these results below.

2. Agency Problems in Banking

This section takes a closer look at both moral hazard and the owner/manager agency problem, as well as the empirical evidence linking each agency problem to bank risk.

Moral Hazard and Franchise Value

Limited liability allows shareholders to keep all *upside* gains while *sharing* their losses with bondholders. Shareholders therefore have a strong incentive to increase risk. The moral hazard problem associated with deposit insurance refers to the fact that depositors, being fully insured, have very weak incentives to monitor shareholders and prevent them from increasing risk (Merton 1977). The monitoring function therefore falls on the deposit insurer.

Franchise value -- the present value of a firm's future economic profits as a going concern -- helps alleviate moral hazard by reducing shareholders' incentives to take risk. Franchise value increases the costs of financial distress (bankruptcy) because it is not fully marketable. This is true in both financial and non-financial firms but is particularly important in banking, where lending relationships based on private information are not easily transferred to third parties. By raising the costs of financial distress, franchise value reduces the value-maximizing choice of both

leverage and asset risk. Franchise value therefore helps solve the moral hazard problem by decreasing the extent of monitoring required to induce high franchise value banks to operate with a given level of risk.

Keeley (1990) claims that declining franchise value in the 1960s and 1970s can explain the increased risk taking at banks during the 1980s. He argues that risk was low for the first 45 years of the FDIC's history because regulations restricted entry into banking markets (e.g. unit banking laws) and reduced price competition (e.g. Regulation Q), thus keeping bank franchise value high. In the 1960s and 1970s, franchise value fell because of increased competition from nonbank sources (such as money market mutual funds and finance companies) and increased competition within the banking industry (a consequence of deregulation). The decline in franchise value led to a reduction in the cost of financial distress, and a corresponding increase in bank shareholders' desired level of risk in the 1980s.⁴

The Owner/manager Agency Problem and the Structure of Ownership

The owner/manager agency problem may also work to offset the moral hazard problem. Managers who have built up a stock of firm-specific human capital and therefore have an undiversified stake in the firm that employs them may act in a risk-averse rather than value

⁴ The thrift industry followed the same pattern. Thrift franchise value fell in the 1970s, both because of increased competition from money market mutual funds and because the development of secondary markets in mortgage securities reduced their ability to earn profits from mortgage lending. Moreover, unlike banks, thrifts faced a very large reduction in capital in the late 1970s and early 1980s because the value of their mortgage portfolios, which dominate thrift balance sheets, fell sharply in response to increased interest rates. With minimal franchise value, thrift owners had little incentive to rebuild their capital positions. Saddled with little capital and little or no franchise value, thrift owners had an incentive to gamble. Many responded to this incentive by using insured deposits to increase their holdings of high-risk assets such as junk bonds and commercial real estate. This risky behavior led to a large number of thrift failures and ultimately to the taxpayer bailout of the thrift insurance fund.

maximizing manner. Absent shareholder discipline, they may choose safer assets or choose to operate with higher capital than shareholders would desire. In this sense, the owner/manager agency problem helps “solve” the moral hazard problem.

Two forces may counteract this tendency. First, if outside (non-managerial) ownership is sufficiently concentrated, outsiders have a strong incentive to keep managerial behavior in check. Second, if managers have a sufficient ownership stake in the firm, then their incentives will be aligned with those of outside shareholders and the agency problem will be minimized (Demsetz and Lehn 1985, Jensen and Meckling 1976).

Saunders, Strock, and Travlos (1990) look for evidence that ownership structure can mitigate agency problems at banks. In particular, they find a positive relationship between insider holdings and firm-specific risk, consistent with the idea that managers’ incentives become more aligned with those of outside shareholders as the proportion of insider holdings rises. Saunders, Strock, and Travlos (1990), however, impose linearity on the relationship between insider holdings and risk. This approach presumes that the only effect of increasing insider holdings is to align insider and outsider incentives. It ignores the possibility that increasing insider ownership may also lead to managerial “entrenchment”, thereby increasing the cost of disciplining managers.

Gorton and Rosen (1995) focus on the entrenchment problem in their study of risk and ownership structure at large bank holding companies. In contrast to most models of banks with access to insured deposits, their model assumes that in a declining industry stockholders prefer *safe* assets to *risky* assets. They develop a model in which “bad” managers in “unhealthy” industries take excessive risk in order to mimic the behavior of “good” managers. Their model predicts that risk first increases and then decreases as insider ownership increases. Gorton and

Rosen find a piecewise linear relationship between insider holdings and risk that they argue is consistent with their model of entrenchment but not with a model of moral hazard.

While we remain agnostic as to the direction of the insider ownership/risk relationship, we recognize that the alignment and entrenchment effects can both be at work and can work in opposite directions. Following Morck, Shleifer and Vishny (1988), who argue that *a priori* it is not possible to predict which effect will dominate at a given level of insider holdings, we allow insider holdings to affect risk in both a linear and piecewise linear fashion. We also use a set of indicator variables associated with successive levels of insider ownership to allow for unconstrained non-monotonicity in the relationship between insider holdings and risk.

Allowing for an Interaction

Finally, we consider the *interaction* between franchise value and insider holdings in our model of bank risk. The conflict between owners and managers, at least with respect to the choice of risk, may be less severe at high franchise value banks because shareholders (along with managers) see high costs to financial distress. Consequently, we expect the relationship between ownership structure and risk taking to be *weakest* at high franchise-value banks. We expect that relationship to be *strongest* at low franchise-value banks, where the risk preferences of owners and managers are most likely to diverge. To our knowledge, we are the first to allow for this interactive effect in a model of bank risk taking.

3. Empirical Methods

This section describes our empirical framework. Using panel data from 1991 to 1995, we estimate a reduced form regression which relates bank holding company (BHC) risk to franchise value and insider ownership. We control for the asset size of the BHC and the growth in personal

income in states where the BHC operates. Asset size affects risk both because larger banks tend to be better diversified than smaller banks and because larger banks engage in different types of activities than smaller banks.⁵ Growth in personal income is included to control for regional business cycles that can affect lending opportunities and risk at all banks in a given area. We estimate our model using our entire sample (described below) and using low- and high-franchise value subsamples.

Data

We identified over 400 publicly traded BHCs by comparing institutions' names in both 1986 and 1995 regulatory reports to names on the Center for Research in Security Prices (CRSP) tapes. We built our data set by tracking the 1986 and 1995 subsamples throughout the intervening years. This minimizes survivorship bias in our final sample. Our analysis draws on data from the 1991-95 period, since readily available data on ownership structure are available only since 1991. We limit our analysis to those BHCs that traded for at least 30 weeks in a given calendar year and for which we could retrieve (1) data from consolidated financial statements (the Y-9C Reports) describing BHC characteristics, and (2) usable ownership data from Compact Disclosure. This resulted in a sample of 367 BHCs.⁶ The annual sample size ranges from a low of 240 (in 1991) to a high of 292 (in 1994).

⁵ See Demsetz and Strahan (1997) for further discussion of the relationship between size, diversification, and risk at BHCs.

⁶ The only identifier common to regulatory reports and CRSP is the company's name. Our sample includes only those BHCs for which the match between the name provided by CRSP and that appearing in regulatory reports was unambiguous. Compact Disclosure and CRSP both use "cusip" numbers and ticker symbols as company identifiers.

Measuring risk

Our primary measure of risk is the annualized standard deviation of the weekly stock return for a given BHC in a given year.⁷ This “all-in risk” measure incorporates risks associated with all of the BHC’s assets, liabilities and off-balance sheet positions, reflects any diversification across those positions, and reflects BHC leverage. We also decompose our all-in risk measure into two components, systematic risk and firm-specific risk. The systematic risk component captures risks that are related to underlying economic conditions affecting the banking industry as a whole. The firm-specific risk component captures equity return variability unique to each company.

Our risk decomposition is accomplished using yearly factor analysis. Applied to our sample of BHC stocks, factor analysis endogenously derives a set of vectors (in this case five) whose linear combination best explains the returns on the stocks in our sample. Though these five vectors are not interpretable economically, they can be considered systematic factors common to the returns on the BHCs in our sample in a given year. One advantage of the factor analysis approach over a market model approach is that the risks systematic to banks (including regulatory risks such as changes in capital requirements or deposit insurance premia) are captured by our systematic risk component rather than our firm-specific risk component. Of course, our systematic risk component will also capture return volatility related to interest rate risk, in contrast to the firm-specific risk component, which will capture return volatility unique to a given

⁷ We constructed weekly (Friday-to-Friday) returns using daily CRSP return data from 1991 through 1995. Daily returns are adjusted by CRSP to account for dividend payouts and stock splits. In cases where Friday was a holiday and no stocks were traded, we used the Thursday-to-Friday or Friday-to-Thursday returns instead.

bank, such as that related to the industrial mix in a bank's loan portfolio.

Measuring franchise value

Stock price data from publicly traded BHCs also facilitate measurement of franchise value, which we define as the ratio of market value to replacement cost. While replacement cost is difficult to measure in general, it is particularly problematic at banks. We use the book value of tangible assets as a proxy for replacement cost, and measure franchise value with the following ratio:

$$Q_{it} = \frac{\text{Market value of equity} + \text{book value of liabilities}}{\text{book value of tangible assets}}$$

The future profitability of the bank as a going concern -- profitability stemming from efficiency, market power, or lending relationships -- will contribute to the numerator of this ratio but not to its denominator.⁸ Thus Q_{it} captures the present value of the bank as a going concern in a way that permits comparability across banks of different sizes. The components of Q_{it} are measured using beginning-of-year data.⁹

Measuring ownership structure

Data on the ownership structure of BHCs are constructed from SEC filings and are made available by Disclosure, Inc. through Compact Disclosure and CDA Spectrum. The Compact Disclosure data reflects information from firms' most recent proxy statements while the Spectrum

⁸ We use tangible assets rather than total assets in the denominator because goodwill in part reflects franchise value derived from a bank's prior acquisitions. Tangible assets equals tangible accounting principal (TAP) capital plus debt, where TAP capital equals GAAP capital minus goodwill and other intangible assets.

⁹ Q_{it} is highly correlated with the market-to-book equity ratio, and our empirical results are robust to use of this alternative measure.

data is updated using other SEC filings. We use the Spectrum data in our analysis because there are fewer missing observations.

Our insider holdings variable measures the shares held by officers and directors of the BHCs, as a fraction of shares outstanding. Included in the holdings of insiders are all family shares beneficially owned by insiders as well as all outstanding options to purchase shares. The ownership data used each year in our analysis are from the fourth quarter of the previous year.

We first estimate a linear relationship between insider holdings and risk and then allow for nonlinearities in order to capture both alignment and entrenchment effects. Following Morck, Shleifer and Vishny (1988), we allow the insider holdings slope to change at 5 percent and 25 percent in our second specification. In particular we use the following variables:

Insider Holdings 0-5%	= Insider holdings = 0.05	if insider holdings < 0.05 if insider holdings ≥ 0.5
Insider Holdings 5-25%	= 0 = Insider holdings-0.05 =0.2	if insider holdings ≤ 0.05 if 0.05 < insider holdings < 0.25 if insider holdings ≥ 0.25
Insider Holdings > 25%	= 0 = Insider holdings-0.25	if insider holdings ≤ 0.25 if insider holdings > 0.25.

A third specification imposes even less structure on the relationship between insider holdings and risk. Here we include indicator variables for banks with six levels of insider holdings: banks with no insider holdings, banks with insider holdings between 0 and 5 percent, between 5 and 10 percent, between 10 and 20 percent, between 20 and 40 percent and over 40 percent.

We also include another ownership structure variable, large block holdings. Blockholders

are individuals who control 5 percent or more of the outstanding shares, and consequently have a strong incentive to keep managerial behavior in check. Large block holdings are measured as the sums of the shares of all blockholders and are included only in a linear fashion.

Control variables

We include two control variables: a measure of BHC size and a measure of economic conditions in the region where the BHC operates. BHC size is measured each year as the log of total assets, using data from the end of the previous year. Economic conditions are measured using state-level personal income growth for each year. Because many of the BHCs in our sample operate in more than one state, we measure personal income growth using an asset-weighted average of growth for the states in which a BHC has one or more commercial bank subsidiaries.

Summary statistics

The mean, standard deviation, minimum, and maximum of all of the variables used in our analysis are presented in Table 1. There are 1,328 BHC-year observations.¹⁰ The BHCs in the sample range from just under \$102 million to \$250 billion in assets, averaging over \$8 billion in assets. The average standard deviation of weekly stock returns equals 30 percent (on an annualized basis) and ranges from 6 percent to 258 percent. The average systematic risk is just under 15 percent while the average firm-specific risk is 25 percent. The average capital to assets ratio is 7.9 percent.

Our measure of franchise value averages 1.02; that is, the market value of assets exceeds the book value of assets by 2 percent on average. This ratio ranges from 0.92 to 1.49. Insider

¹⁰ Factor analysis permits a risk decomposition only for BHCs that trade each week within a given calendar year. This leads to a slightly smaller sample when systematic or firm specific risk are used as dependent variables in place of all-in risk.

ownership averages 12 percent of the outstanding shares of the BHCs, ranging from 0 to 100 percent. Approximately one-sixth of the observations lie in each of the six insider holdings groups that underly our indicator variable approach. Large block holdings average 12 percent of the outstanding shares of the BHCs, ranging from 0 to 100 percent.¹¹

Estimation

To summarize, we use panel data to estimate the following equations:

Linear Specification

$$Risk_{it} = \alpha_t + \alpha_1 Q_{it} + \alpha_2 (Insider\ Holdings)_{it} + \alpha_3 (Large\ Block\ Holdings)_{it} + \alpha_4 Size_{it} + \alpha_5 Personal\ Income\ Growth_{it} + \epsilon_{it}$$

Piecewise Linear Specification

$$Risk_{it} = \alpha_t + \alpha_1 Q_{it} + \alpha_2 (Insider\ Holdings\ 0-5\%)_{it} + \alpha_3 (Insider\ Holdings\ 5-25\%)_{it} + \alpha_4 (Insider\ Holdings\ >25\%)_{it} + \alpha_5 (Large\ Block\ Holdings)_{it} + \alpha_6 Size_{it} + \alpha_7 Personal\ Income\ Growth_{it} + \epsilon_{it}$$

Indicator Variable Specification

$$Risk_{it} = \alpha_t + \alpha_1 Q_{it} + \alpha_2 (Insider\ Indicator\ 0-5\%)_{it} + \alpha_3 (Insider\ Indicator\ 5-10\%)_{it} + \alpha_4 (Insider\ Indicator\ 10-20\%)_{it} + \alpha_5 (Insider\ Indicator\ 20-40\%)_{it} + \alpha_6 (Insider\ Indicator\ >40\%)_{it} + \alpha_7 (Large\ Block\ Holdings)_{it} + \alpha_8 Size_{it} + \alpha_9 Personal\ Income\ Growth_{it} + \epsilon_{it}$$

Variables named “Insider Indicator” in the third specification are simple dummy variables, in

¹¹ Large block holdings may include insider holdings if an insider holds at least 5 percent of outstanding shares.

contrast to the “Insider Holdings” variables defined earlier for the piecewise linear specification. The omitted category includes BHCs with no insider ownership.

In each specification, dependent variables (alternative measures of risk) are measured in logs.¹² We include time fixed effects to control for changes in the average level of risk and estimate a random effects specification to control for BHC-specific time invariant factors relating to risk taking that are not modeled elsewhere.¹³ After estimating each equation using our entire sample, we split the sample into low- and high-franchise value subsamples and repeat each estimation. Each year, low franchise value BHCs are defined as those with franchise values below the yearly sample median.

4. Results

Table 2 presents estimations of each of the three equations, using all-in risk, systematic risk, and firm-specific risk as dependent variables. Each dependent variable is regressed on our measure of franchise value, insider holdings and large block holdings, controlling for firm size and personal income growth. The first three columns contain the all-in risk results, columns 4-6 present the results for systematic risk, and columns 7-9 for firm-specific risk.

Reading across the first row, we see a robust negative relationship between franchise value and all three measures of stock systematic risk. The effect of franchise value is both statistically and economically meaningful, with coefficients significant at the one percent level using all-in risk as the dependent variable or using either of its two components as dependent variables. The

¹² Our results are qualitatively similar using the levels of each risk measure.

¹³ The results for the variables of interest -- those measuring franchise value and ownership structure -- are qualitatively similar in a model with BHC fixed effects in place of random effects.

estimated coefficients imply that a one standard deviation increase in franchise value (a 0.04 increase in Q_{it}) leads to an 8 to 13 percent decrease in risk. As hypothesized, risk taking is lower at BHCs with more franchise value.¹⁴

The effect of insider holdings on BHC risk appears to be driven by differences in the risk taking propensities of BHCs with no insider holdings compared to those with some insider holdings. In each of the linear specifications, the coefficient on insider holdings is positive but not statistically significant. In the piecewise linear specifications, the 0 to 5 percent linear terms are positive, the 5 percent to 25 percent linear terms are negative and the over 25 percent terms are positive. The signs in the piecewise linear specification are consistent with Morck, Shleifer and Vishny in that they suggest an alignment effect followed by an entrenchment effect followed by alignment again. The insider holdings variable, however, is statistically significant only in the 0 to 5 percent range in the piecewise linear specification and only with all-in risk or firm-specific risk as dependent variables.

The specification that uses indicator variables to measure insider holdings shows that BHCs with some insider holdings take about 10 percent more risk than BHCs with no insider holdings (the omitted category). Among those BHCs with positive insider holdings, however,

¹⁴ One complication that arises when measuring franchise value at banks is that the market value of equity will include the subsidy associated with deposit insurance, which *increases* with risk taking. Since we seek evidence of an *inverse* relationship between franchise value and risk taking, this complication works against us, making it more difficult for us to find empirical support for the hypothesis we test. A second complication is that bank franchise value stems in part from the unique relationship which develops between the bank and its borrowers. (See Petersen and Rajan 1995 and Berger and Udell 1995 for discussions of relationship lending). If “relationship lending” is a relatively risky activity, which seems likely, the direction of causation may run, at least in part, *from* risk to franchise value. Again, this would tend to counteract the hypothesized negative influence of franchise value, biasing the coefficient up (towards zero).

there appears to be no relationship between the amount of insider holdings and risk. Formally, we can not reject the null hypothesis that each of the coefficients on the insider indicator variables are equal, but we can reject the hypothesis that each of these coefficients equals zero. We have also estimated this specification splitting the 0 to 5 percent insider indicator into two indicator variables, one for insider holdings from 0 to 2 percent and one from 2 to 5 percent. In this alternative specification, we again find a significant increase in risk beyond zero insider holdings, but no significant differences among the BHCs with some insider holdings. Our findings with respect to insider holdings contrast with Saunders et al. in that we find an insider holdings effect on both firm-specific and systematic risk.

Across the equations in Table 2 we consistently observe a positive relationship between large block holdings and risk; however, that relationship is never statistically significant. The effect of regional economic conditions, as measured by state personal income growth, is also consistent across the table. In each case, economic growth is significantly negatively related to risk -- BHCs operating in stronger economic environments exhibit less stock return variability. The effect of asset size differs depending on what risk measure is used as the dependent variable. Asset size is negatively and significantly related to all-in risk and firm-specific risk, but positively and significantly related to systematic risk. What at first may appear to be an inconsistency can be reconciled by noting that larger BHCs are generally better diversified than smaller BHCs, but are more highly leveraged than smaller BHCs and engage in certain risky activities more intensively than smaller BHCs. As Demsetz and Strahan (1997) explain, size-related diversification leads to lower firm-specific risk at larger BHCs, which offsets their higher systematic risk. In this sample, the net result is a lower level of all-in risk at larger BHCs.

The two panels of Table 3 repeat the Table 2 specifications, splitting the sample into low and high franchise value BHCs. Each year, low franchise value BHCs are defined as those with franchise value below the median for all BHCs in our sample in that year. Franchise value and insider holdings both exhibit a tighter relationship with risk for low-franchise value BHCs than for high-franchise value BHCs. For low-franchise value BHCs, the coefficient on franchise value rises in magnitude to about -8.5 in the all-in risk regressions, suggesting that a one standard deviation increase reduces risk by more than 30 percent (Table 3A). Since low franchise value BHCs are closer to insolvency, we are not surprised that the effect of a change in franchise value is more important for the low franchise value subsample. By contrast, we see no statistically significant effect of franchise value on risk for the high franchise value subsample (Table 3B).

Table 3 also shows a marked difference between the effect of ownership structure in the low- and high-franchise value subsamples. In particular, ownership structure affects risk taking only in the low-franchise value subsample, the set of BHCs where the interests of owners and managers are least likely to be aligned. Low franchise value BHCs with some insider holdings take about 20 percent more risk than those with no insider holdings. Once insider holdings exceeds 40 percent, risk falls. For the low-franchise value subsample, we *can* reject the hypothesis that all of the coefficients on the insider holdings dummy variables are equal.

On its face, this last finding appears consistent with Gorton and Rosen (1995), who argue that entrenched managers at BHCs with poor prospects (that is, managers with some insider holdings but not enough to be fully aligned) take “too much” risk. We note, however, that most of the BHCs with insider holdings beyond 40 percent are very small, with median total assets of \$600 million, as compared to \$1.3 billion for the sample as a whole. We suspect that the

relatively low risk for these BHCs actually reflects their size.¹⁵ If we drop BHCs with assets below \$250 million, we still find that BHCs with some insider holdings have significantly more risk than those with none, but we can not reject the hypothesis that all of the coefficients on the insider holdings dummy variables are equal.

How do low franchise value BHCs increase risk?

Tables 2 and 3 show that bank managers pursue less risky strategies when franchise value is high. Among low-franchise value BHCs, they pursue more risky strategies when their equity stake is positive. Next we take a closer look at the way risk-enhancement or reduction is accomplished. In particular, we determine whether risk is adjusted through leverage, asset risk, or both. In Table 4, we estimate the effect of our right-hand-side variables on BHC leverage. To get at asset risk, we again use stock return variability to measure risk but now include the capital-asset ratio as an independent variable to control for the effects of leverage (Table 5). We recognize that the capital-asset ratio is endogenous but use it as a right-hand-side variable in the Table 5 specification in order to isolate the effects of franchise value and insider holdings on *asset risk*.¹⁶

The effect of franchise value on the capital-asset ratio is positive and significant for the full sample (Table 4), consistent with the notion that BHCs seek to preserve a valuable franchise

¹⁵ Small BHCs tend to hold more capital than larger BHCs and their stocks tend to be less liquid. Both factors will reduce measured equity risk. Though we control for size in each of our regressions, we may not be adequately capturing this "small bank" effect.

¹⁶ Another way to estimate the effect of franchise value on asset risk -- without including capital as a regressor -- is to "unlever" equity risk by multiplying stock return variance by the capital-asset ratio. We have tried unlevering all-in risk, systematic risk, and firm-specific risk in this manner. We find that franchise value is negatively and significantly related to all three unlevered risk measures.

through reductions in leverage. As with all-in risk, the relationship is statistically significant (now at the ten percent level) only for the low franchise value sub-sample.¹⁷

Turning to ownership structure, we observe a significant positive relationship between insider holdings and the capital-asset ratio. The piecewise linear and indicator variable specifications show why: there is a sharp increase in capital at BHCs with very *high* levels of insider holdings. The result is driven entirely by the smaller BHCs in our sample, whose insiders hold a large fraction of outstanding shares. When these BHCs are dropped from the sample, we see no relationship between insider holdings and capital.

We do, however, find a significant negative relationship between large block holdings and the capital-asset ratio. This is consistent with managerial risk-aversion and suggests that owners may discipline that risk aversion by influencing managers' (observable) capital choice when ownership is concentrated. Consistent with this interpretation, we see that the relationship between large block holdings and capital is significant only at low-franchise value BHCs, those for which owner and manager incentives regarding risk taking are most likely to diverge.

The negative relationship between franchise value and asset risk is also robust and is again driven by the low franchise value BHCs (Table 5). The effect continues to be economically, as well as statistically, important, and suggests that risk reduction related to franchise value occurs not only through capital enhancement but also through reductions in asset risk.

The ownership structure results in Table 5 look much like those presented in Table 3. The coefficient on insider holdings is positive in the linear specifications but statistically significant

¹⁷ The average capital-asset ratio is 0.8 percentage points higher for the high franchise value subsample than for the low franchise value subsample. This difference is significant at the one percent level.

only in the 0 to 5 percent range. The indicator variables show that the effect comes from increased asset risk for BHCs with some insider holdings, compared to those with none. Again, the explanatory power comes from the low franchise value BHCs -- those with the most substantial owner/manager conflicts.

Discussion

The relationship between franchise value and risk confirms our expectations and calls for no additional discussion. Our results regarding ownership structure -- consistent with models in which managers are more risk-averse than owners -- do raise a few questions.

First, in contrast to Morck, Shleifer and Vishny, we find no evidence that insider holdings entrench management in banking. In particular, we find no statistically significant decline in risk taking at intermediate levels of insider holdings, as one would expect if managerial stockholdings help entrench bank management. A possible explanation is that entrenchment in banks may simply be unrelated to insider holdings because of the scarcity of hostile takeovers. Prowse (1995) finds that hostile takeovers occur about five times more frequently in non-financial industries than in banking and that replacement of managers by boards of directors is twice as frequent in non-financial firms, even though the equity stakes of insiders on boards of directors at BHCs are not larger than at non-financial firms. A weak market for corporate control may make the percent of stock owned by insiders a poor proxy for management entrenchment in banking.¹⁸

Second, if bank managers are entrenched regardless of their stock holdings, we should expect increases in insider holdings to continue to align managers' and shareholders' interests at

¹⁸ Note that within the banking industry Prowse finds that the equity stake of insiders on boards of directors does affect management turnover.

all levels -- that is, we should expect a monotonically increasing relationship between insider holdings and BHC risk. In contrast, we find significant differences in risk at BHCs with no insider holdings and those with positive insider holdings, but no significant differences *among* BHCs with positive insider holdings.

We offer the following explanation for this second result. Suppose BHCs can be sorted into two groups: those whose managers receive performance-based compensation of some form (managerial equity holdings are one such form) and those whose managers do not receive performance-based compensation. In our sample, BHCs in the first group are identified only on the basis of their positive managerial shareholdings. If these BHCs are in fact addressing their owner/manager agency problems using a variety of performance-based compensation instruments, we should not necessarily expect their risk taking to reflect their *level* of insider holdings. In our sample, BHCs in the second group are identified on the basis of their lack of managerial shareholdings. At these BHCs -- with no observable tendency toward performance-based compensation -- risk taking is in fact lower, suggesting that owner/manager agency problems may indeed persist.

Third, we find that at low franchise value BHCs, insiders with no equity stake take on less *asset risk*; they do not, however, hold more capital. Conversely, concentrated ownership is associated with increased leverage but *no more asset risk*. This is consistent with the idea that outside blockholders more readily control managerial risk taking by influencing leverage than by influencing asset risk.

As a final caveat, we note that Demsetz and Lehn (1985) offer an alternative interpretation of the relationship between risk and ownership structure. They suggest that

ownership structure is endogenous -- that the degree of risk to which a firm is exposed is one factor that determines the ownership structure that it will have. In particular, firms operating in a high-risk environment may require a greater concentration of ownership since managerial behavior may be harder to monitor and control.

5. Conclusion

Our empirical evidence shows that both franchise value and ownership structure affect risk at banks. Franchise value disciplines the risk taking associated with moral hazard by increasing the costs of financial distress. Asset risk is higher at banks with positive insider ownership, consistent with the notion that managerial shareholdings work to align the interests of otherwise risk-averse managers with less risk-averse owners. Capital is lower (but asset risk no higher) at BHCs with concentrated ownership, suggesting that outside blockholders more readily control managerial risk taking by influencing leverage than by influencing asset risk.

Our results also emphasize an important interaction: The relationship between ownership structure and risk taking is significant only for the set of banks with relatively low franchise value. These results suggest that the risk preferences of owners and managers are well aligned at high franchise value banks. Only at low franchise value banks -- where owners' risk preferences are not tempered by high costs of financial distress -- do concentrated ownership structure and managerial equity stakes affect managers' choices regarding risk.

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Table 1
Summary Statistics^a

	Mean	Standard Deviation	Minimum	Maximum
	(1)	(2)	(3)	(4)
All-In Risk (Annualized Standard Deviation of Weekly Stock Returns)	0.30	0.20	0.06	2.58
Systematic Risk	0.15	0.10	0.01	0.99
Firm-Specific Risk	0.25	0.16	0.05	2.39
Capital-Asset Ratio	0.08	0.02	-0.03	0.15
Franchise Value (Market-to-Book Asset Ratio)	1.02	0.04	0.92	1.49
Insider Holdings	0.12	0.14	0	1.00
Large Block Holdings	0.12	0.18	0	1.00
Total Assets (\$ billions)	8.27	23.83	0.10	250.49
Economic Growth (Growth in Personal Income) ^b	0.02	0.02	-0.02	0.08

^a Based on pooled data from 1991 to 1995. N = 1328 except in the case of Systematic and Firm-Specific risk, where N = 1297.

^b Growth in personal income for each BHC is computed as the asset-weighted average of the growth in real personal income for each state in which the BHC has one or more commercial bank subsidiaries.

Table 2

Regressions of the Logs of All-In Risk, Systematic Risk and Firm-Specific Risk on Franchise Value (Market-to-Book Asset Ratio), Insider Holdings, Large Block Holdings, Firm Size (Log of Total Assets) and Economic Growth (Growth in Personal Income). Regressions include Time Fixed Effects and BHC-Specific Random Effects. Pooled Data from 1991 to 1995. Standard errors in parentheses; “***” indicates statistical significance at the 1 percent level, “**” indicates statistical significance at the 5 percent level.

	All-In Risk			Systematic Risk			Firm-Specific Risk		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Franchise Value	-2.25 ^{***} (0.32)	-2.26 ^{***} (0.32)	-2.26 ^{***} (0.32)	-3.02 ^{***} (0.41)	-3.01 ^{***} (0.41)	-3.01 ^{***} (0.41)	-1.93 ^{***} (0.31)	-1.94 ^{***} (0.31)	-1.93 ^{***} (0.31)
Insider Holdings	0.05 (0.09)			0.02 (0.12)			0.08 (0.09)		
Insider Holdings 0-5%		1.53 [*] (0.77)			0.90 (1.01)			1.57 [*] (0.75)	
Insider Holdings 5-25%		-0.12 (0.23)			-0.33 (0.30)			-0.10 (0.22)	
Insider Holdings >25%		0.01 (0.15)			0.19 (0.20)			0.04 (0.15)	
Insider Indicator 0-5%			0.11 [*] (0.05)			0.16 ^{***} (0.06)			0.12 ^{***} (0.05)
Insider Indicator 5-10%			0.12 ^{***} (0.04)			0.12 [*] (0.06)			0.12 ^{***} (0.04)
Insider Indicator 10-20%			0.11 [*] (0.04)			0.09 (0.06)			0.13 ^{***} (0.04)
Insider Indicator 20-40%			0.11 [*] (0.05)			0.09 (0.07)			0.12 [*] (0.05)
Insider Indicator >40%			0.03 (0.07)			0.09 (0.09)			0.04 (0.07)
Large Block Holdings	0.08 (0.07)	0.07 (0.07)	0.07 (0.07)	0.12 (0.09)	0.11 (0.09)	0.11 (0.09)	0.09 (0.07)	0.08 (0.07)	0.08 (0.07)
Firm Size	-0.03 ^{***} (0.01)	-0.03 ^{***} (0.01)	-0.04 ^{***} (0.01)	0.08 ^{***} (0.01)	0.07 ^{***} (0.01)	0.06 ^{***} (0.01)	-0.08 ^{***} (0.01)	-0.08 ^{***} (0.01)	-0.09 ^{***} (0.01)
Economic Growth	-1.55 (0.83)	-1.53 (0.83)	-1.53 (0.83)	-2.93 ^{***} (1.13)	-2.86 [*] (1.13)	-2.76 [*] (1.13)	-1.98 [*] (0.83)	-1.95 [*] (0.83)	-1.97 [*] (0.83)
N	1328	1328	1328	1297	1297	1297	1297	1297	1297
R ²	0.25	0.24	0.25	0.23	0.22	0.23	0.30	0.30	0.30

Table 3A (Low Franchise Value BHCs)

Regressions of the Logs of All-In Risk, Systematic Risk and Firm-Specific Risk on Franchise Value (Market-to-Book Asset Ratio), Insider Holdings, Large Block Holdings, Firm Size (Log of Total Assets) and Economic Growth (Growth in Personal Income). Regressions include Time Fixed Effects and BHC-Specific Random Effects. Pooled Data from 1991 to 1995. Standard errors in parentheses; “***” indicates statistical significance at the 1 percent level, “**” indicates statistical significance at the 5 percent level.

	All-In Risk			Systematic Risk			Firm-Specific Risk		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Franchise Value	-8.71 ** (1.00)	-8.67 ** (1.00)	-8.54 ** (0.99)	-9.79 ** (1.28)	-9.77 ** (1.28)	-9.58 ** (1.28)	-7.85 ** (1.02)	-7.83 ** (1.02)	-7.69 ** (1.02)
Insider Holdings	-0.09 (0.13)			-0.12 (0.16)			-0.004 (0.13)		
Insider Holdings 0-5%		2.25 * (1.09)			1.28 (1.36)			2.29 * (1.09)	
Insider Holdings 5-25%		-0.25 (0.30)			-0.38 (0.38)			-0.13 (0.31)	
Insider Holdings >25%		-0.21 (0.21)			-0.07 (0.27)			-0.15 (0.21)	
Insider Indicator 0-5%			0.24 ** (0.07)			0.27 ** (0.08)			0.24 ** (0.07)
Insider Indicator 5-10%			0.28 ** (0.07)			0.22 ** (0.08)			0.29 ** (0.07)
Insider Indicator 10-20%			0.20 ** (0.06)			0.19 * (0.08)			0.23 ** (0.07)
Insider Indicator 20-40%			0.20 ** (0.07)			0.14 (0.09)			0.23 ** (0.07)
Insider Indicator >40%			0.03 (0.10)			0.05 (0.13)			0.08 (0.10)
Large Block Holdings	0.21 * (0.10)	0.20 * (0.10)	0.20 * (0.10)	0.24 (0.13)	0.24 (0.13)	0.22 (0.13)	0.19 (0.10)	0.19 (0.10)	0.18 (0.10)
Firm Size	-0.02 (0.01)	-0.02 (0.01)	-0.03 * (0.01)	0.09 ** (0.01)	0.09 ** (0.02)	0.08 ** (0.02)	-0.07 ** (0.01)	-0.07 ** (0.01)	-0.08 ** (0.01)
Economic Growth	-2.54 * (1.21)	-2.56 * (1.21)	-2.51 * (1.20)	-4.31 ** (1.57)	-4.24 ** (1.57)	-4.06 ** (1.56)	-3.30 ** (1.25)	-3.30 ** (1.25)	-3.18 ** (1.24)
N	665	665	665	651	651	651	651	651	651
R ²	0.35	0.34	0.36	0.32	0.31	0.33	0.37	0.37	0.39

Table 3B (High Franchise Value BHCs)

Regressions of the Logs of All-In Risk, Systematic Risk and Firm-Specific Risk on Franchise Value (Market-to-Book Asset Ratio), Insider Holdings, Large Block Holdings, Firm Size (Log of Total Assets) and Economic Growth (Growth in Personal Income). Regressions include Time Fixed Effects and BHC-Specific Random Effects. Pooled Data from 1991 to 1995. Standard errors in parentheses; “***” indicates statistical significance at the 1 percent level, “*” indicates statistical significance at the 5 percent level.

	All-In Risk			Systematic Risk			Firm-Specific Risk		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Franchise Value	0.19 (0.38)	0.20 (0.38)	0.21 (0.38)	0.05 (0.52)	0.09 (0.52)	0.02 (0.52)	0.38 (0.36)	0.39 (0.36)	0.42 (0.36)
Insider Holdings	0.17 (0.11)			0.19 (0.16)			0.13 (0.11)		
Insider Holdings 0-5%		-0.77 (0.94)			-0.95 (1.30)			-0.06 (0.89)	
Insider Holdings 5-25%		0.25 (0.29)			-0.09 (0.40)			0.07 (0.28)	
Insider Holdings >25%		0.21 (0.21)			0.56 (0.29)			0.20 (0.20)	
Insider Indicator 0-5%			-0.06 (0.06)			0.01 (0.08)			-0.05 (0.05)
Insider Indicator 5-10%			-0.10 (0.05)			-0.04 (0.08)			-0.09 (0.05)
Insider Indicator 10-20%			-0.05 (0.05)			-0.08 (0.08)			-0.01 (0.05)
Insider Indicator 20-40%			0.01 (0.06)			0.05 (0.09)			-0.01 (0.06)
Insider Indicator >40%			-0.01 (0.09)			0.12 (0.12)			-0.02 (0.08)
Large Block Holdings	-0.15 (0.09)	-0.14 (0.09)	-0.14 (0.09)	-0.18 (0.12)	-0.16 (0.12)	-0.17 (0.12)	-0.10 (0.08)	-0.10 (0.08)	-0.08 (0.08)
Firm Size	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)	0.10 ^{**} (0.02)	0.09 ^{**} (0.02)	0.09 ^{**} (0.02)	-0.07 ^{**} (0.01)	-0.07 ^{**} (0.01)	-0.07 ^{**} (0.01)
Economic Growth	-0.25 (1.08)	-0.31 (1.08)	-0.40 (1.08)	-0.21 (1.53)	-0.28 (1.53)	-0.07 (1.54)	0.14 (1.02)	0.13 (1.03)	-0.06 (1.03)
N	663	663	663	646	646	646	646	646	646
R ²	0.13	0.14	0.14	0.18	0.19	0.19	0.20	0.20	0.20

Table 4

Regressions of the Log of the Capital-Asset Ratio on Franchise Value (Market-to-Book Asset Ratio), Insider Holdings, Large Block Holdings, Firm Size (Log of Total Assets) and economic growth (Growth in Personal Income). Regressions include Time Fixed Effects and BHC-Specific Random Effects. Pooled Data from 1991 to 1995. Standard errors in parentheses; “***” indicates statistical significance at the 1 percent level, “*” indicates statistical significance at the 5 percent level.

	Capital-Asset Ratio								
	All BHCs			Low Franchise Value BHCs			High Franchise Value BHCs		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Franchise Value	0.65 ** (0.16)	0.66 ** (0.16)	0.66 ** (0.17)	1.03 (0.57)	1.03 (0.58)	1.09 (0.58)	0.06 (0.15)	0.06 (0.15)	0.06 (0.15)
Insider Holdings	0.14 ** (0.05)			0.20 ** (0.08)			0.05 (0.05)		
Insider Holdings 0-5%		-0.54 (0.38)			-0.19 (0.63)			-0.22 (0.36)	
Insider Holdings 5-25%		0.16 (0.11)			0.15 (0.18)			0.08 (0.12)	
Insider Holdings >25%		0.19 ** (0.07)			0.28 * (0.12)			0.06 (0.08)	
Insider Indicator 0-5%			-0.01 (0.02)			0.01 (0.04)			-0.03 (0.02)
Insider Indicator 5-10%			-0.03 (0.02)			-0.02 (0.04)			-0.01 (0.02)
Insider Indicator 10-20%			-0.02 (0.02)			-0.01 (0.04)			-0.002 (0.02)
Insider Indicator 20-40%			-0.01 (0.02)			0.02 (0.04)			-0.02 (0.02)
Insider Indicator >40%			0.06 (0.03)			0.12 * (0.06)			0.03 (0.03)
Large Block Holdings	-0.08 * (0.03)	-0.08 * (0.03)	-0.07 (0.03)	-0.15 ** (0.06)	-0.15 ** (0.06)	-0.13 * (0.06)	-0.02 (0.03)	-0.02 (0.03)	-0.01 (0.03)
Firm Size	-0.04 ** (0.01)	-0.04 ** (0.01)	-0.04 ** (0.01)	-0.04 ** (0.01)	-0.04 ** (0.01)	-0.04 ** (0.01)	-0.06 ** (0.01)	-0.06 ** (0.01)	-0.05 ** (0.01)
Economic Growth	0.03 (0.40)	0.02 (0.40)	0.03 (0.40)	0.64 (0.69)	0.64 (0.69)	0.72 (0.69)	-0.36 (0.38)	-0.37 (0.38)	-0.38 (0.38)
N	1327	1327	1327	665	665	665	662	662	662
R ²	0.16	0.16	0.16	0.14	0.14	0.14	0.24	0.24	0.24

Table 5
 Regressions of the Log of All-In Risk on Franchise Value (Market-to-Book Asset Ratio), Insider Holdings, Large Block Holdings, Leverage (Log of Capital-Asset Ratio), Firm Size (Log of Total Assets) and Economic Growth (Growth in Personal Income). Regressions include Time Fixed Effects and BHC-Specific Random Effects. Pooled Data from 1991 to 1995.

	All-In Risk								
	All BHCs			Low Franchise Value BHCs			High Franchise Value BHCs		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Franchise Value	-1.85 ** (0.30)	-1.85 ** (0.30)	-1.86 ** (0.30)	-7.88 ** (0.92)	-7.86 ** (0.92)	-7.72 ** (0.91)	0.07 (0.35)	0.08 (0.35)	0.09 (0.35)
Insider Holdings	0.12 (0.09)			0.04 (0.12)			0.15 (0.11)		
Insider Holdings 0-5%		1.18 (0.71)			2.12 * (0.99)			-0.75 (0.88)	
Insider Holdings 5-25%		-0.10 (0.21)			-0.17 (0.28)			0.15 (0.27)	
Insider Holdings >25%		0.15 (0.14)			-0.01 (0.19)			0.26 (0.19)	
Insider Indicator 0-5%			0.11 ** (0.04)			0.25 ** (0.06)			-0.06 (0.05)
Insider Indicator 5-10%			0.10 * (0.04)			0.27 ** (0.06)			-0.10 * (0.05)
Insider Indicator 10-20%			0.09 * (0.04)			0.19 ** (0.06)			-0.04 (0.05)
Insider Indicator 20-40%			0.10 * (0.05)			0.21 ** (0.06)			-0.02 (0.06)
Insider Indicator >40%			0.07 (0.06)			0.11 (0.09)			0.01 (0.08)
Large Block Holdings	0.02 (0.07)	0.01 (0.07)	0.02 (0.06)	0.10 (0.09)	0.08 (0.09)	0.09 (0.09)	-0.16 * (0.08)	-0.15 (0.08)	-0.14 (0.08)
Ln(Capital-Asset ratio)	-0.71 ** (0.05)	-0.70 ** (0.05)	-0.70 ** (0.05)	-0.71 ** (0.06)	-0.71 ** (0.06)	-0.70 ** (0.06)	-0.49 ** (0.08)	-0.49 ** (0.08)	-0.49 ** (0.08)
Firm Size	-0.06 ** (0.01)	-0.06 ** (0.010)	-0.07 ** (0.01)	-0.04 ** (0.01)	-0.04 ** (0.01)	-0.06 ** (0.01)	-0.04 ** (0.01)	-0.05 ** (0.01)	-0.04 ** (0.01)
Economic Growth	-1.36 (0.77)	-1.33 (0.77)	-1.32 (0.77)	-1.99 (1.11)	-2.02 (1.10)	-1.93 (1.09)	0.03 (1.03)	-0.03 (1.03)	-0.13 (1.03)
N	1327	1327	1327	665	665	665	662	662	662
R ²	0.39	0.38	0.39	0.48	0.48	0.50	0.18	0.18	0.18

**FEDERAL RESERVE BANK OF NEW YORK
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