Changing Incentives and Opportunities for Risk-Taking in Recent U.S. Banking Industry

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We examine how the relationship between bank ownership structure and risk-taking may be differently affected by the different regulatory regimes in the U.S. banking industry. We find that higher insider-ownership banks had greater risk-taking incentives than lower insider-ownership banks between 1987-1990 (a period of relative deregulation and decline of the U.S. banking industry), when we represent risk-taking by systematic risk. However, this greater systematic risk-taking is unprofitable, indicating that banks pursued perverse risky strategies in the late 1980s as suggested by the moral-hazard hypothesis in banking literature. But we find that greater systematic risk-taking incentives of higher insider-ownership banks than lower insider-ownership banks disappeared, and that the association between risk-taking and profitability improved over the period of tightened regulation (1991-1995). These results may offer some supporting evidence for the effectiveness of regulatory reforms in the U.S. banking industry beginning around 1991.

In testing the partitioned sample between lower insider-ownership banks vs. higher ones, we find that the positive relationship between insider ownership and risk-taking, and the negative relationship between the risk-taking and profitability, is significantly more transparent for the set of banks with lower insider ownership over the period 1987-1990. Thus, at very low levels of stock ownership, banks greatly increase risk, but ultimately unprofitable risks, as the level of insider ownership rises over the period of deregulation and decline of the banking industry. This result is consistent with the corporate-control hypothesis. Over the period 1991-1995, we also find that at high levels of stock ownership, banks seemed to engage in profitable risk-taking as the level of insider ownership rose, as predicted by the corporate-control hypothesis.

Overall, in terms of only addressing the owner/manager agency problem, these results strongly suggest that in years of deregulation, the owner/manager agency problem of banks can be easily addressed by changing insider holdings or ownership structure to accommodate increased risk. But this policy suggestion should be taken with caution, since banks seem to take on more than enough risk in years of deregulation, which may ultimately increase the probability of bank failure. This might suggest that the increase in insider holdings to address the owner/manager agency problem should be associated with closer monitoring of the banks' risk-taking behavior. This policy suggestion should be encouraged more strongly, especially to banks with very low levels of stock ownership.

Keywords: agency problems, insider ownership, bank regulations, risk-taking, corporate control

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I. INTRODUCTION

Banking literature has emphasized a number of agency problems, or the conflict of interest between managers and outside stockholders. As in non-financial corporations, limited liability gives bank stockholders an incentive to expropriate wealth from debt holders (creditors) by increasing risk. But in banking, creditors have weak incentives to monitor and constrain such risk-taking because they are protected by deposit insurance. If creditors provide the major funding, so that only a negligible part of total funding comes from stockholders, incentives for risk-taking will be all the greater.

Many studies, however, suggest that the incentives of managers may differ from those of outside stockholders. If managers' wealth is largely in nondiversifiable human capital (firm-specific) form, and managers of failed firms have difficulty finding comparable jobs due to bad reputations regarding their management abilities, they may act in a risk-averse rather than a value-maximizing manner regarding stockholders to preserve jobs and perquisite consumption from control of the firm. In this case, their optimal degree of risk-taking would be less than that desired by outside stockholders. Denis (2001) provided simple examples of agency cost that includes managers engaging in activities that directly benefit themselves such as managerial shirking (golf games) and managerial consumption of perquisites (plush offices, expense account meals, corporate jets, etc.). These actions may also benefit shareholders. But if they do not, the cost is borne by shareholders. Shareholders, anticipating such problems, will discount the price of shares. In this manner, agency costs are borne by the original shareholders.

This owner/manager agency problem of the conflicts between stockholders and managers, however, can be mitigated if managers' interests (objects) are aligned with those of outside stockholders. One way in which alignment of interest may occur is through insider (managerial) ownership of the firm's stock. Several previous studies examined the relationship between risk-taking and the degree of insider ownership. Saunders, Strock, and Travlos (1990) found that stockholder-controlled banks (banks whose managers hold a relatively large proportion of the bank's stocks) have greater incentives to take risk than managerially-controlled banks (banks whose managers hold a relatively small proportion of the bank's stocks). Demsetz, Saldenberg, and Strahan (1997) find that the relationship between insider ownership and risk-taking is significantly positive only at low charter value banks – those whose moral hazard problems are most severe and where conflicts between owners and managers risk preferences, are therefore strongest. Cebenoyan, Cooperman & Register (1999) find that manager-owned thrifts exhibited unprofitable risk-taking in the mid-1980s, years of regulatory laxity and low charter values, but demonstrated profitable risk-taking in the mid-1990s, a period of regulatory stringency and high charter values.

Mork, Shleifer and Vishny (1988) found that Tobin's q increases as insider ownership increases up to 5%, then q falls as insider ownership grows up to 25%. Finally, q again increases at higher insider ownership levels. McConnell and Servaes (1990)

found a similar result. Researchers (including Gorton and Rosen, 1995) interpret these results in terms of the entrenchment power of managers, for small insider ownership managers do not have enough power to be entrenched. Thus, incentives of managers could easily be aligned with those of outside stockholders as insider ownership increases. As insider ownership continues to rise, managers would have enough power to be entrenched: managers would have enough ability to resist monitoring rather than aligning their interest with those of outside stockholders, but managers still do not have enough shares to have the same objectives as outside stockholders. A further increase in ownership could align management interest with outside stockholders: managers essentially become the sole owners.

More recently, reviews of the evidence on insider ownership are found in the works of Holderness (2001) and Denis (2001). The evidence on the relation between insider ownership and firm performance is mixed. Denis (2001) finds that there exists evidence that firm performance first increases and then decreases with percentage ownership, suggesting that the incentive alignment effect of increased ownership is more important at lower levels of managerial ownership while the entrenchment effect dominates at somewhat higher levels. Hughes et al. (2003) finds that the effects of an increase in insider ownership have two basic effects: (1) an alignment-of-interests effect; and (2) a contrasting entrenchment effect.

Cebenoyan, Cooperman and Register (1999), and Saunders, Strock and Travlos (1990) argue that ownership structure may have a more powerful effect on the risk-taking incentives of banks during periods of deregulation relative to periods of regulation. Unlike non-banking firms, the presence of regulators may either accentuate or mitigate bank risk-taking incentives. In periods of bank activity and interest-rate deregulation or closure-rule forbearance, bank stockholders, *ceteris paribus*, have greater incentives and ability to increase risk than when regulations are tight and strictly enforced. In other words, during periods of deregulation and regulator forbearance, the ability of stockholders to maximize the value of their call and put options by greater risk-taking is enhanced.

The period between the late 1980s and the early 1990s is widely acknowledged to have been a period of significant regulatory changes in the recent U.S. banking industry, as the transition from a deregulated period (pre-1990s) to a regulated period (post-1991). Researchers generally agree that the moral hazard associated with fixed-rate deposit insurance system and the Federal Deposit Insurance Corporation's (FDIC) "forbearance" practiced in the 1980s played major roles in the bank failure of the late 1980s. These problems motivated a major regulatory change in the banking industry beginning around 1991. The major reforms legislated with the FDICIA in 1991 include: the abandonment of forbearance, the introduction of risk-based deposit insurance premiums, the limitations on the use of "too-big-to-fail" bailouts, and extended federal regulation over foreign bank branches and agencies.

This study continues the above line of research and investigates those issues simultaneously, i.e. the effect of insider ownership in addressing agency problems, entrenchment

effects in ownership structure literature, and how these problems are related to the regulatory regimes surrounding the banking industry. This is done by examining how the relationship between bank ownership structure and risk-taking may be differently affected by different regulatory regimes. More importantly, we test these hypotheses by decomposing the risk measure into two parts: (1) the systematic (market-related); and (2) the unsystematic (non market-related) risk, believing that the systematic risk is more appropriate to the hypotheses being examined.

From the full sample tests, we find that the higher insider-ownership banks have greater risk-taking incentives than lower insider-ownership banks during the period of relative deregulation (1987-1990) when we represent risk-taking by systematic risk (beta of banks' stock returns, as estimated by the one-factor market model), but *not* when we represent risk-taking by unsystematic risk (standard deviation of errors from the market model). We believe that systematic risk is more appropriate to the fundamental ideas being examined since the risky assets in the sample banks' portfolios are loans to large businesses, and the risk of these loans largely depends on the economy at large, as reflected in the general course of the stock market. However, this greater systematic risk-taking is unprofitable (where profitability is measured by the return on assets). This indicates that the banks pursued perverse risky strategies in the late 1980s as suggested by the moral-hazard hypothesis in the banking literature. Under closure-rule forbearance and fixed-rate deposit insurance premiums, bank managers and stockholders do not need to deliberately pursue risk-taking strategies. They may rely on lucky outcomes, without being accurately informed about their investment projects and future prospects of their banks. Taking chances and hoping for good luck (taking on high variance projects and hoping for economic boom), of course, occasionally yield high earnings. However, the probability that the outcomes turn out to be bad will increase. These results may collectively provide robust evidence that support the premises of the previous studies associated with banking literature on moral hazard and ownership structure.

Also, we find that greater systematic risk-taking incentives of higher insider-ownership banks vs. lower insider-ownership banks disappeared over the period of tightened regulation (1991-1995). This result, of course, may deductively indicate that bankers believe that the FDIC and other regulators would increase the relative frequency of examination for higher insider-ownership banks during the period of tightened regulation. But more importantly, these results may offer some evidence for the effectiveness of the regulatory reforms beginning around 1991. Risk-based deposit insurance premiums are particularly interesting because under risk-based deposit insurance premiums, insurance premiums increase with the level of risk-taking and consequent deteriorating of asset quality. Thus, banks' risk-taking incentives are expected to decrease under risk-based deposit insurance premiums, if they are well chosen. Regarding the association of risk-taking with profitability, we find that the association has improved over the period 1991-1995, again supporting the effectiveness of the regulatory reforms. Compared to fixed-rate deposit insurance premiums, bankers will analyze their investment

project more accurately and deliberately and undertake it if they are pretty optimistic about its high earnings, which will result in a higher probability of good outcomes and profitability under risk-based deposit insurance premiums. That is, after regulatory reforms, current high levels of risk would be better associated with subsequent good performance compared to the pre-reform period.

Overall, in terms of only addressing the owner/manager agency problem, the above results from the full sample tests strongly suggest that in years of deregulation, the owner/manager agency problem of banks can be easily addressed by changing their insider holdings or ownership structure that accommodate increased risk. But this policy should be taken very cautiously, since banks seem to take on more than enough risk in years of deregulation. This may ultimately increase the probability of failure of banks. This might suggest that the increase in insider holdings that address the owner/manager agency problem should be associated with closer monitoring of the banks' risk-taking behavior.

In the test for the partitioned sample between lower insider-ownership banks vs. higher ones, we examine more explicitly the corporate-control hypothesis, which states that during periods of decline for banking industry, banks with entrenched managers at low levels of stock ownership will engage in greater, but unprofitable, risk-taking, and manager-owned banks will engage in profitable risk-taking. We find that the positive relationship between insider ownership and risk-taking, and the negative relationship between risk-taking and profitability, is significantly more transparent *for the set of banks with lower insider ownership* between 1987-1990, a period of deregulation and decline of the banking industry. Thus, *at very low levels of stock ownership*, the banks greatly increase risk, but to their detriment, as the level of insider ownership rises over the period of deregulation and decline of the banking industry. This result is consistent with the corporate-control hypothesis. Between 1991-1995, we also find that *at high levels of stock ownership*, the banks seem to engage in profitable risk-taking as the level of insider ownership rises, as predicted by the corporate-control hypothesis. The results from the partitioned samples provide stronger evidence than in the full sample tests for the hypotheses, especially for the banks at very low levels of stock ownership, and we may have to give stronger policy suggestions to these banks.

In the next section, we describe the sample of banks. Section 3 describes the testing model of the hypotheses. Section 4 presents the empirical results, and section 5 offers concluding comments.

II. SAMPLE AND DATA

The sample for this study consists of 62 bank holding companies for which data are available on Standard & Poor's Stock Report, the Center for Research in Security Prices (CRSP) data tapes, and Bank Proxy Statement data between 1987-1995.¹ From

the Standard & Poor's Stock Report, we obtain the capital-to-asset ratio, book value per share, asset portfolio shares, and asset size for each company. From the CRSP database, we obtain the daily stock return data (daily returns are adjusted to account for dividend payouts and stock splits). From the Bank Proxy Statement data, we obtain an insider ownership variable measuring the shares held by officers and directors of the banks as a fraction of shares outstanding.

III. SPECIFICATION OF THE TESTING MODEL

We use the following model to examine the relationship between insider ownership and risk-taking for banks:

$$\text{Risk} = f(\text{insider ownership, capital-to-asset ratio, charter value, asset size, economic growth})$$

where, risk for each individual bank is proxied by the systematic risk measured by the beta of banks' stock returns, and unsystematic risk is measured by the standard deviation of errors from the one-factor market model.

Insider ownership is the percentage of the equity held by officers and directors of a bank. We include capital-to-asset ratio, market-to-book equity ratio (*q* ratio), and asset size as control variables affecting the risk-taking behavior of banks. To control for leverage effect on risk, we include the banks' capital-to-asset ratio. We use the bank's book value of capital-to-asset ratio, since this is the leverage measure most commonly monitored by regulators. The market-to-book equity ratio of a bank is used as a measure of its charter value reflecting the economic value of future growth opportunity. A bank with a high charter value has an incentive to avoid risky strategies, since the owners of the bank cannot sell the charter if the bank is declared insolvent. We include the bank asset size as another control variable affecting the risk-taking behavior of banks. We include the GDP growth rate to control for the impact of economic conditions on the banks' risk-taking incentives. Following Saunders, Strock and Travlos (1990), we are assuming that ownership structure is exogenous and the level of risk-taking is endogenously determined. That is, the level of insider ownership is the driving variable, and risk is the result. But, a bank's risk may affect its ownership structure. We address this simultaneity problem by lagging the insider ownership variable in our regression equations.

Table 1 presents summary statistics of the sample banks. The banks in the sample range from \$235 million to \$250 billion in assets, averaging \$7.5 billion. The average capital-to-asset ratio is 7.2%. Our measure of charter value averages 1.03, ranging from 0.88 to 1.52. Insider ownership averages 13% of the outstanding shares of the sample banks, ranging from 0 to 71%.

Table 1. Summary Statistics

	Mean	Median	Maximum	Minimum	Standard-deviation
Assets (\$billion)	7.5	3.7	250	0.235	22.64
Capital-to-asset ratio	7.2	6.8	14.95	2	0.02
Market-to-book ratio	1.03	0.99	1.52	0.88	0.06
Insider ownership	0.13	0.11	0.71	0	0.14
Number of observations	558				

To summarize, we use the panel data to estimate the following equations over two different regulatory regimes in recent U.S. banking industry, 1987-1990 vs. 1991-1995. To examine whether the effect of insider ownership on reducing agency problems or on aligning the interests of managers with those of stockholders may be different depending on the degree of regulatory strength of the banking industry, we partitioned the whole sample into the two sub-samples: 1) 1987-1990, a period of deregulation; and 2) 1991-1995, a period of tightened regulation. We include time-fixed effects to control for changes in the average level of risk common to all banks in the sample, and estimate a random effects model to control for time-invariant bank-specific factors relating to risk.

$$\beta_{i,t+1} = a_0 + a_1 (\text{insider ownership})_{i,t} + a_2 (\text{capital-to-asset ratio})_{i,t} + a_3 (\text{market-to-book ratio})_{i,t} + a_4 (\log \text{ of asset size})_{i,t} + a_5 (\text{GDP growth})_t + \varepsilon_{i,t+1} \quad (1)$$

$$\sigma^2(\varepsilon_{i,t+1}) = a_0 + a_1 (\text{insider ownership})_{i,t} + a_2 (\text{capital-to-asset ratio})_{i,t} + a_3 (\text{market-to-book ratio})_{i,t} + a_4 (\log \text{ of asset size})_{i,t} + a_5 (\text{GDP growth})_t + \varepsilon_{i,t+1} \quad (2)$$

The time index takes the values $t=1987, \dots, 1990$, and $1991, \dots, 1995$. Following Galloway, Lee and Roden (1997), we estimate lagged regression equations between ex-post risk-taking behavior (dependent variable measured at time $t+1$) and the base periods' ex-ante explanatory variables (measured at time t). The time lag between left- and right-hand sides avoids the simultaneity problem mentioned above. $\beta_{i,t+1}$ represents the systematic (market-related) risk of the bank i at time $t+1$, and $\sigma^2(\varepsilon_{i,t+1})$ represents the unsystematic (non market-related) risk of the bank i at time $t+1$. Both of them are estimated from the one-factor market model using the daily stock returns of bank i with the market portfolio represented by S&P 500.

To examine the relationship between risk and bank profitability, or whether the banks have so-called moral hazard incentives in their risk-taking behavior, we estimate the following equations. First, we regress the return on assets on only with respect to the risk measures, β and $(\sigma^2(\varepsilon))$, and the return on S&P 500, controlling for the effect of the overall market conditions on each individual bank's performance. Then we regress the return on assets, including all the explanatory variables employed in the estimation of the risk-taking incentives.

$$(\text{Return on assets})_{i,t+1} = a_0 + a_1 (\beta_{i,t}) + a_2 (\text{return on S\&P500})_{i,t-1} + \varepsilon_{i,t+1} \quad (3)$$

$$(\text{Return on assets})_{i,t+1} = a_0 + a_1 (\sigma^2(\varepsilon_{i,t})) + a_2 (\text{return on S\&P500})_{i,t-1} + \varepsilon_{i,t+1} \quad (4)$$

$$(\text{Return on assets})_{i,t+1} = a_0 + a_1 (\beta_{i,t}) + a_2 (\text{capital-to-asset ratio})_{i,t} + a_3 (\text{market-to-book ratio})_{i,t} + a_4 (\log \text{ of asset size})_{i,t} + a_5 (\text{return on S\&P500})_{i,t-1} + \varepsilon_{i,t+1} \quad (5)$$

$$(\text{Return on assets})_{i,t+1} = a_0 + a_1 (\sigma^2(\varepsilon_{i,t})) + a_2 (\text{capital-to-asset ratio})_{i,t} + a_3 (\text{market-to-book ratio})_{i,t} + a_4 (\log \text{ of asset size})_{i,t} + a_5 (\text{return on S\&P500})_{i,t-1} + \varepsilon_{i,t+1} \quad (6)$$

IV. EMPIRICAL RESULTS

1. Results Based on the Full Sample

The results for estimating the relationship between insider ownership and risk-taking, equation 1 and 2, for the two different regulatory regimes are presented in Table 2. As shown in the second column of Table 2, no coefficients are statistically significant for both the 1987-1990 and 1991-1995 periods, when risk is interpreted as unsystematic risk. We henceforth ignore this interpretation and focus on systematic risk. Regarding the hypothesis of the study, the coefficient on insider ownership is significantly positive over the period 1987-1990, when risk is measured by the *systematic* one, indicating that the banks' systematic risk-taking incentives become significantly greater as the insider or managerial ownership rises, when regulations are loose. For control variables, the coefficient on charter value is significantly negative over the period 1987-1990, indicating that the banks with lower charter values have significantly greater risk-taking incentives when regulations are loose, consistent with the findings of Keeley (1990), Galloway, Lee and Roden (1997), and Cebenoyan, Cooperman and Register (1999). The coefficient on asset size is significantly positive over the period 1987-1990, indicating the existence of moral hazard incentives associated with the too-big-to-fail hypothesis during the period of deregulation. Contrary to expectation, the coefficient on capital-to-asset ratio is insignificantly positive.

Table 3 presents the results for the association of the degree of risk-taking with profitability of banks. We are interested in examining the coefficient on the systematic risk, β , since in the former test, we observed a significantly positive relationship between the degree of insider ownership and systematic risk. Indeed, Table 3 shows a significantly negative coefficient on β over the period 1987-1990 in both specifications with and without control variables, suggesting that the higher the systematic risk, the worse the profitability of banks. This result may suggest that the banks pursued perverse risky strategies over the period of deregulation.

Now, let's turn to the results for the period of tightened regulation (1991-1995). First, regarding the results for the banks' risk-taking incentives, Table 2 shows that the greater systematic risk-taking incentives for higher insider-ownership banks than

lower insider-ownership banks no longer appear over the period of tightened regulation. This result, of course, is expected to have resulted from the tightened regulation over the latter period. Particularly, risk-based deposit insurance premiums introduced in 1993 will deserve all, or at least part of the credit. This is because by making banks' cost of funds properly sensitive to the banks' asset risk (i.e. by charging higher insurance premiums for higher risk), risk-based deposit insurance premiums is expected to reduce banks' risk-taking incentives. For control variables, the significantly positive relationship between systematic risk and asset size over the periods of deregulation is no longer observed. These results again offer support for the effectiveness of regulatory reforms, because they reduce the previously found associations supporting the existence of moral hazard incentives among these variables in banking literature.

Regarding the relationship between systematic risk and profitability of the banks over the latter period, Table 3 shows that the perverse risk-taking incentives over the period 1987-1990, reflected by the significantly negative relation between the return on asset and β , become weaker and the association has improved after regulatory reforms, as indicated by a marginally significant (at around 15% significance levels) and positive coefficient on β . That is, after regulatory reforms, high current riskiness became better associated with the subsequent good performance compared to pre-reforms period.

TABLE 2. RANDOM EFFECTS REGRESSION RESULTS FOR BANKS' RISK-TAKING INCENTIVES

The table shows the coefficients and t-statistics. ***denotes statistical significance at 1% level, **denotes statistical significance at 5% level, *denotes statistical significance at 10% level.

$$\begin{aligned} \beta_{it+1} &= a_0 + a_1 (\text{insider ownership})_{it} + a_2 (\text{capital-to-asset ratio})_{it} + a_3 (\text{market-to-book ratio})_{it} \\ &\quad + a_4 (\log \text{ of asset size})_{it} + a_5 (\text{GDP growth})_{it} + \varepsilon_{it+1} \\ \sigma^2(\varepsilon_{it+1}) &= a_0 - a_1 (\text{insider ownership})_{it} + a_2 (\text{capital to asset ratio})_{it} + a_3 (\text{market-to-book ratio})_{it} \\ &\quad + a_4 (\log \text{ of asset size})_{it} + a_5 (\text{GDP growth})_{it} + \varepsilon_{it+1} \end{aligned}$$

Dependent variable	β_{it+1}		$\sigma^2(\varepsilon_{it+1})$	
	1987~1990	1991~1995	1987~1990	1991~1995
Intercept	0.2541 (0.36)	0.2590 (0.62)	0.0042 (0.13)	0.0050 (0.08)
Insider ownership	0.0927** (2.412)	0.0684 (0.92)	0.0283 (0.98)	0.0197 (0.76)
Capital-to-asset ratio	0.1814 (0.72)	0.5418 (1.16)	-0.0237 (-0.56)	0.0091 (0.04)
Market-to-book ratio	-0.9127* (-1.73)	0.0528 (0.47)	0.0036 (0.19)	0.0027 (0.46)
Log of asset size	0.3618*** (3.91)	0.0279 (0.71)	-0.0012 (-0.23)	-0.0910 (-0.41)
GDP growth	-1.2109 (-0.61)	-0.9143 (-0.56)	-0.0563 (-0.21)	0.0381 (0.19)
Adjusted R ²	0.23	0.24	0.17	0.25

TABLE 3. RANDOM EFFECTS REGRESSION RESULTS FOR BANKS' PROFITABILITY

The table shows the coefficients and t-statistics. ***denotes statistical significance at 1% level, **denotes statistical significance at 5% level, *denotes statistical significance at 10% level.

$$(\text{Return on assets})_{i,t-1} = a_0 + a_1 (\beta_{i,t-1}) + a_2 (\text{return on S\&P500})_t + \varepsilon_{i,t-1}$$

$$(\text{Return on assets})_{i,t-1} = a_0 + a_1 (\beta_{i,t-1}) + a_2 (\text{capital-to-asset ratio})_{i,t} + a_3 (\text{market-to-book ratio})_{i,t} + a_4 (\text{log of asset size})_{i,t} + a_5 (\text{return on S\&P500})_t + \varepsilon_{i,t-1}$$

	1987~1990	1987~1990	1991~1995	1991~1995
Intercept	0.9662*** (15.82)	0.8269*** (14.63)	1.1002*** (17.23)	0.9927*** (15.11)
β	-0.2761** (-2.16)	-0.3187** (-1.99)	0.1175 (1.52)	0.2108 (1.56)
Capital to asset ratio	-	0.1792 (0.36)	-	0.2210 (0.54)
Market-to-book ratio	-	0.5528* (1.65)	-	0.5228 (1.04)
Log of asset size	-	-1.0025* (1.67)	-	0.0463 (0.37)
Return on S&P500	0.0891 (0.66)	0.0727 (0.70)	0.0918 (1.02)	0.0725 (0.89)
Adjusted R ²	0.16	0.18	0.24	0.21

Taken together, in terms of only addressing the owner/manager agency problem, the results in Table 2 and 3 strongly suggest that in years of deregulation, the owner/manager agency problem of banks can be easily addressed by changing insider holdings or ownership structure that may be associated with increased risk. But this policy should be taken very cautiously, since the banks seem to take on more than enough risk in years of deregulation that may ultimately increase the probability of failure of the banks. This might suggest that the increase in insider holdings to address the owner/manager agency problem should be associated with closer monitoring of the banks' risk-taking behavior.

2. Results Based on the Partitioned Sample (Test for Corporate-Control Hypothesis)

To examine whether there are any differences in the relationships between ownership structure, risk-taking, and profitability among lower insider-ownership group vs. higher ones, we partition the full sample into these two groups and run the same regressions as in 4.1, including the dummy variable for the lower insider-ownership variable, D_L . Each year, the full sample is partitioned at the median for the insider-ownership variable. First, we estimate the following two equations over the period 1987-1990.

$$\begin{aligned} \beta_{i,t-1} = & a_0 + a_1 (\text{insider ownership})_{i,t} + a_2 D_{L,t} \times (\text{insider ownership})_{i,t} + a_3 (\text{capital-to-asset ratio})_{i,t} + a_4 (\text{market-to-book ratio})_{i,t} + a_5 (\text{log of asset size})_{i,t} \\ & + a_6 (\text{GDP growth})_t + \varepsilon_{i,t-1} \end{aligned} \quad (7)$$

$$\begin{aligned}
 (\text{Return on asset})_{i,t+1} = & a_0 + a_1 (\beta_{i,t}) + a_2 D_{i,t} \times (\beta_{i,t}) + a_3 (\text{capital-to-asset ratio})_{i,t} + \\
 & a_4 (\text{market-to-book ratio})_{i,t} + a_5 (\log \text{ of asset size})_{i,t} + a_6 (\text{return on} \\
 & \text{S\&P500})_{t-1} + \varepsilon_{i,t+1}
 \end{aligned}
 \quad (8)$$

Where $t = 1987, \dots, 1990$, and $D_{i,t} = 1$, if bank i is in the lower insider-ownership group at time t and 0 otherwise

TABLE 4. RANDOM EFFECTS REGRESSION RESULTS FOR BANKS' RISK-TAKING INCENTIVES AND PROFITABILITY

The table shows the coefficients and t-statistics. ***denotes statistical significance at 1% level, **denotes statistical significance at 5% level, *denotes statistical significance at 10% level.

$$\begin{aligned}
 \beta_{i,t+1} = & a_0 + a_1 (\text{insider ownership})_{i,t} + a_2 D_{i,t} \times (\text{insider ownership})_{i,t} + a_3 (\text{capital to-asset ratio})_{i,t} \\
 & + a_4 (\text{market to-book ratio})_{i,t} + a_5 (\log \text{ of asset size})_{i,t} + a_6 (\text{GDP growth})_{i,t} + \varepsilon_{i,t+1}
 \end{aligned}$$

$$\begin{aligned}
 (\text{Return on assets})_{i,t+1} = & a_0 + a_1 (\beta_{i,t}) + a_2 D_{i,t} \times (\beta_{i,t}) + a_3 (\text{capital-to-asset ratio})_{i,t} + a_4 (\text{market-to-book} \\
 & \text{ratio})_{i,t} + a_5 (\log \text{ of asset size})_{i,t} + a_6 (\text{return on S\&P500})_{t-1} + \varepsilon_{i,t+1}
 \end{aligned}$$

where $D_{i,t} = 1$, if bank i 's insider ownership is lower than the median for all banks at time t
 $t = 1987, \dots, 1990$

Dependent variable	$\beta_{i,t+1}$	(Return on asset) $_{i,t+1}$
Intercept	0.3627 (0.54)	0.9216*** (15.21)
Insider ownership	0.0826 (1.35)	-
$D_{i,t} \times (\text{insider ownership})$	0.0723*** (2.93)	-
β	-	-0.1652* (-1.70)
$D_{i,t} \times \beta$	-	-0.0721** (-1.88)
Capital-to-asset ratio	0.1627 (0.57)	0.1528 (0.49)
Market-to-book ratio	-0.8238* (-1.72)	0.4922 (1.62)
Log of asset size	0.4105*** (3.62)	-3.0019* (-1.64)
GDP growth	-1.1893 (-0.47)	-
Return on S&P500	-	0.0621 (0.71)
Adjust R ²	0.19	0.22

As shown in Table 4, the significantly positive coefficient on $D_{i,t} \times (\text{insider ownership})_{i,t}$ with respect to β , and the significantly negative coefficient on $D_{i,t} \times (\beta_{i,t})$ with respect to return on assets, indicate that the positive relationship between insider ownership and risk-taking and the negative relation between the risk-taking and profitability

are significantly more transparent for the set of banks with lower insider ownership over the period of deregulation. Thus, at very low levels of stock ownership, the banks greatly increase risk, though ultimately unprofitable risk, as the level of insider ownership rises over the period of deregulation.

TABLE 5. RANDOM EFFECTS REGRESSION RESULTS FOR THE BANKS' RISK-TAKING INCENTIVES AND PROFITABILITY

The table shows the coefficients and t-statistics. ***denotes statistical significance at 1% level, **denotes statistical significance at 5% level, *denotes statistical significance at 10% level.

$$\beta_{i,t-1} = a_0 + a_1 (\text{insider ownership})_{i,t-1} + a_2 D_{it} \times (\text{insider ownership})_{i,t-1} + a_3 (\text{capital-to-asset ratio})_{i,t-1} + a_4 (\text{market-to-book ratio})_{i,t-1} + a_5 (\log \text{ of asset size})_{i,t-1} + a_6 (\text{GDP growth})_t + \varepsilon_{i,t-1}$$

$$(\text{Return on assets})_{i,t-1} = a_0 + a_1 (\beta_{i,t-1}) + a_2 D_{it} \times (\beta_{i,t-1}) + a_3 (\text{capital-to-asset ratio})_{i,t-1} + a_4 (\text{market-to-book ratio})_{i,t-1} + a_5 (\log \text{ of asset size})_{i,t-1} + a_6 (\text{return on S\&P500})_{t-1} + \varepsilon_{i,t-1}$$

where $D_{it} = 1$, if bank i 's insider ownership is higher than the median for all banks at time t
 $t = 1991, \dots, 1995$

Dependent variable	$\beta_{i,t-1}$	(Return on assets) $_{i,t-1}$
Intercept	0.3124 (0.55)	0.9782*** (16.10)
Insider ownership	0.0525 (0.72)	-
$D_{it} \times (\text{insider ownership})$	0.0322 (1.02)	-
β	-	0.2328 (1.48)
$D_{it} \times \beta$	-	0.0738 (1.32)
Capital-to-asset ratio	0.3871 (1.08)	0.1878 (0.52)
Market-to-book ratio	0.0489 (0.50)	0.2871 (1.16)
Log of asset size	0.0230 (0.82)	-0.0627 (-0.41)
GDP growth	-0.7829 (-0.49)	-
Return on S&P500	-	0.0628 (1.01)
Adjust R^2	0.18	0.22

This result is consistent with the corporate-control hypothesis as suggested by Gorton and Rosen (1995). The corporate-control hypothesis states that during periods of decline for the banking industry, bad managers can become entrenched by holding low levels

of stock ownership. In such an environment, bad managers can take on excessive, but ultimately unprofitable, risks in an attempt to mislead outside stockholders into thinking that they are good managers. Here, we find some evidence for the corporate-control hypothesis in the sample period of the late 1980s, characterized by relative deregulation, increased competition, and declining profitability in the banking industry.

To complete the test for the corporate-control hypothesis, we estimate the above equations, including the dummy variable for the higher insider-ownership variable, $D_{H,t}$, over the period 1991-1995, during which the banking industry experienced tightened regulation, increasing profitability and charter value, and economic expansion. In the estimation for this period, we explicitly include the dummy variable for the higher insider-ownership group, $D_{H,t}$ for convenience. This is because the corporate-control hypothesis focuses on the behavior of managers with large stock holdings when the above conditions characterizing the decline of the banking industry, such as in the 1980s, disappear, and predicts that manager-owned banks will engage in profitable risk-taking. Table 5 presents somewhat consistent results with this premise, as indicated by a positive coefficient on $D_{H,t} \times (\text{insider ownership})_{i,t}$ and $D_{H,t} \times \beta_{i,t}$, even though the latter is insignificant. That is, *at high levels of stock ownership*, the banks seem to engage in profitable risk-taking as the level of insider ownership rises.

Overall, the results from the partitioned samples provide stronger evidence for the hypotheses for banks at very low levels of stock ownership, and we may have to give stronger policy suggestions to those banks than those made in Section 4.1.

V. CONCLUSION

We examine how the relationship between bank ownership structure and risk-taking may be differently affected by different regulatory regimes in the U.S. banking industry. We find that higher insider-ownership banks have greater risk-taking incentives than lower insider-ownership banks over 1987-1990 (a period of relative deregulation and decline of the U.S. banking industry), when we represent risk-taking by systematic risk. However, this greater systematic risk-taking is unprofitable, indicating that the banks pursued perverse risky strategies in the late 1980s, as suggested by the moral-hazard hypothesis in the banking literature. But we find that systematic risk-taking incentives of higher insider-ownership banks vs. lower insider-ownership banks disappeared, and that the association between risk-taking and profitability improved over the period of tightened regulation (1991-1995). These results may offer some evidence for the effectiveness of regulatory reforms in the U.S. banking industry beginning around 1991.

In the test for the partitioned sample between lower insider-ownership banks vs. higher ones, we find that the positive relation between the insider ownership and risk-taking, and the negative relation between the risk-taking and profitability, are significantly more transparent *for the set of banks with lower insider ownership* over the

period 1987-1990. Thus, *at very low levels of stock ownership*, the banks greatly increase risk, though ultimately unprofitable risk, as the level of insider ownership rises over the period of deregulation and decline of the banking industry. This result is consistent with the corporate-control hypothesis. Over the period 1991-1995, we also find that *at high levels of stock ownership*, the banks seem to engage in profitable risk-taking as the level of insider ownership rises, as predicted by the corporate-control hypothesis.

Overall, in terms of only addressing the owner/manager agency problem, these results strongly suggest that in years of deregulation, the owner/manager agency problem of banks can be easily addressed by changing insider holdings or ownership structure that may be associated with increased risk. But this policy should be taken very cautiously, since the banks seem to take on more-than-enough risk in years of deregulation, which may ultimately increase the probability of failure of the banks. This might suggest that the increase in insider holdings to address the owner/manager agency problem should be associated with closer monitoring of the banks' risk-taking behavior. This policy suggestion should be given greater emphasis on banks with very low levels of stock ownership.

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ENDNOTES

¹ We have chosen this very limited sample period to examine the interaction effect of the regulatory regimes on the effectiveness of insider ownership for banks. The 1987-1995 period in the U.S. banking industry may be a very good sample to examine this issue, considering that: 1) 1987-1990 is a period of deregulation and decline in the banking industry; and 2) 1991-1995 is a period of regulation. But it would be desirable to expand the sample to other relevant periods or countries for more robust empirical results for the issue.