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## Ownership structure, regulation, and bank risk-taking: evidence from Korean banking industry

### Abstract

From the panel data of Korean banks during 1999-2006, we find very strong and significant evidence that the banks with higher insider ownership pursue less risky activities than the banks with lower insider ownership. Or rather, they appear to make their financial, operational structures and the composition of their asset portfolios safer and more conservative. We presume that these results may be attributed to that the regulations of the Korean banking system became very tightened and strict after 1998 during the sample period of this paper. The intuition for these results may be clear. Inside owners, or owner-managers, may figure out that, under very tight and strict regulations, the costs associated with increasing risk (many forms of higher explicit, implicit costs and increased supervisory attention under the strict regulations, and higher probability of bankruptcy, etc.) would be greater than the possible benefits from risk-taking. Thus, the net effect of insider ownership between the costs and benefits appears to depend on how strict the surrounding regulations are. Furthermore, in the tests for the banks' ex-post evaluation of risk-taking and profitability, we find that the banks with higher insider ownership achieve higher profitability and have less non-performing loans. Combined with the results for the above risk-taking, this result indicates that, under strict regulations, higher insider-owner banks pursue very deliberate and careful strategies, not engaged in perverse or unprofitable moral-hazard activities.

**Keywords:** ownership structure, insider ownership, moral hazard, profitability, bank regulations.

**JEL Classification:** G29.

### Introduction

It is generally believed in the literature of corporate finance that the incentives of managers may differ from those of outside stockholders. Managers who put their priority in preserving their jobs and perquisite consumption from control of the firm generally may act in a risk-averse manner. In contrast, outside stockholders have strong incentives to pursue risky activities, mainly because limited liability allows them to capture most of the potential upside gains from the large cash flows when the risk-taking is profitable while sharing the losses from the bad consequences of risk-taking with debtholders. This conflict of interest between managers and outside stockholders is known as the principal-agent problem or agency problem in corporate finance literature. This agency problem, however, is expected to reduce through insider or managerial stock ownership. By giving stock ownership to the managers, the interests of managers and those of outside stockholders could be aligned. Morck, Shleifer and Vishny (1988) find that the firms' risk-taking increases as insider ownership increases up to 5%, then decreases up to the level of 25% insider ownership, and finally again increases at higher levels of insider ownership. Some other researchers examine the interaction effects between the effectiveness of insider ownership on managers' risk-taking and some other characteristics surrounding firms. Ceponyan, Cooperman and Register (1999) find that the

thrifts with higher insider ownership pursue unprofitable risky activities during the periods of deregulation and low charter values, but pursue profitable risky activities during the period of regulatory stringency and high charter values. Saunders, Strock and Travlos (1990) find a significantly positive relationship between the level of insider ownership and risk-taking from the sample of banking industry during the periods of deregulation.

This paper continues the above line of research by examining what effects insider ownership or managerial ownership have on the risk-taking behavior of banks when regulations are very tight and strict employing the sample of Korean banking industry over the period of 1999-2006. To overcome the financial crisis that took place in the late 1997 and to restructure the banking industry toward safer and sounder system, the regulations of the Korean banking industry became very tight and strict after 1997.

From the panel data of Korean banks during 1999-2006, we find very strong and significant evidences that the banks with higher insider ownership pursue less risky activities than those with lower insider ownership. Or rather, they appear to make their financial, operational structures and the composition of asset portfolios safer and more conservative. We presume that these results may be attributed to that the regulations of the Korean banking system became very tight and strict after the late 1997 during the sample period of this paper. The intuition for these results may be clear. Inside owners, or owner-managers, may figure out that, under very tight and strict regulations, the costs associated with increasing risk (many forms of higher explicit, implicit costs and increased supervi-

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This work was supported by Ewha Womans University Research grant of 2007.

sory attention under the strict regulations, and higher probability of bankruptcy, etc.) would be greater than the possible benefits from the risk-taking. Thus, the effectiveness of managerial-stock ownership on the risk-taking of banks is interrelated to both the costs-benefits associated with risk-taking and regulatory regimes. Furthermore, in the tests for the banks' ex-post evaluation of risk-taking and profitability, we find that the banks with higher insider ownership achieve higher profitability and have less non-performing loans. Combined with the results for the above risk-taking, this result indicates that, under strict regulations, higher insider-owner banks pursue very deliberate and careful strategies, not engaged in perverse or unprofitable moral-hazard activities.

In the next section, we describe the sample of banks. In section 2, we describe the hypotheses to be tested and the regression model used to test them. In section 3, we present the empirical results and in the last section offer concluding remarks.

$$(Risk-taking)_{i,t} = \beta_0 + \beta_1(Insider\ ownership)_{i,t} + \beta_2(Asset\ size)_{i,t} + \varepsilon_{i,t}. \quad (1)$$

Risk-taking for each individual bank, as for the dependent variable, is proxied by alternative balance sheet measures. We employ two leverage measures; capital-to-asset ratio as the measure for the bank's financial leverage, fixed asset-to-asset ratio as the measures for the bank's operational leverage; two measures for the composition of the bank's investment securities portfolio, the ratio of government bond-to-investment securities, the ratio of stock-to-investment securities; the other two are the ratio of non-performing loans-to-total loans as the measure for the bank's ex-post risk-taking and the return on asset as the measure for profitability, respectively

The two leverage measures and the two asset composition measures are included to capture the bank's ex-ante risk-taking incentives. Following the implications of the literature, higher financial leverage (i.e., lower capital-to-asset ratio) and higher operational leverage (i.e., higher fixed asset-to-asset ratio), lower ratio of government bond-to-investment securities, higher ratio of stock-to-investment securities are believed to represent greater risk-taking incentives. The fifth one, the ratio of non-performing loans-to-total loans is used to evaluate ex-post the bank's risk-taking. The last one, return on asset, measures ex-post the performance of the bank's risk-taking behavior. In addition to the main explanatory variable, insider ownership, we include the asset size as the control variable for the bank's risk-taking.

### 3. Empirical results for regression analysis

**3.1. Results for risk-taking incentives.** Tables 1 and 2 show the results for the change in the

## 1. Sample and data

The capital-to-asset ratio (financial leverage), fixed asset-to-asset ratio (operational leverage), the ratio of government bond-to-investment securities, the ratio of stock-to-investment securities, the ratio of non-performing loans-to-loans, return on asset, asset size, and insider ownership for each bank are obtained from the Statistics of Bank Management for each year, from 1999 to 2006, published by the Korean Financial Supervisory Service.

## 2. Testable hypotheses, testing models and correlation test

To examine how the risk-taking incentives of banks change when the ownership structures change, we estimate the following pooled time-series/cross-sectional regression equation over the period of 1999-2006.

banks' risk-taking behavior with respect to the change in the banks' ownership structure when leverage measures are used as the banks' risk-taking. As Table 1 shows, the coefficient on the insider ownership is significantly positive. Thus, as the insider ownership increases the banks increase equity capital ratio (decrease financial leverage), indicating that the banks change their financial structures toward safer and more conservative ones. This result is inconsistent with the findings by many previous researchers. We presume that this result may be attributed to that the Korean banking industry's regulations are very tight and strict during the sample period of this paper. The same result is shown in Table 2 in which the operational leverage measured by the ratio of fixed assets to total asset is used as the measure for risk-taking. As shown in the table, the coefficient on insider ownership is significantly negative. Thus, as the insider ownership increases the banks decrease the ratio of fixed assets (decrease operational leverage), indicating that the banks change their operational structures toward safer and more conservative ones. Thus, from the results in both Table 1 and 2, we find very strong results that the banks with higher insider ownership take on less risk. Regarding the control variable, asset size, Table 1 shows that the larger banks increase equity capital more than smaller banks. Thus, the hypothesis that larger banks would have greater risk-taking incentives is not found in this paper when risk-taking is measured by financial leverage. The coefficient on asset size in Table 2 is insignificant.

Table 1. Regression results for financial leverage  
 $(Financial\ leverage)_{i,t} = \beta_0 + \beta_1(Insider\ ownership)_{i,t} + \beta_2(Asset\ size)_{i,t} + \varepsilon_{i,t}$

	Coefficient	t-value	p-value
Constant	0.0120 **	1.95	0.0527
Insider ownership	0.0232 ***	3.76	0.0002
Asset size	9.56×10 <sup>-9</sup> ***	3.08	0.0025
Adjusted R2	0.16		
Number of observations	125		
Standard error of regression	0.0157		
F-statistic	11.9428 ***		

Note: This table shows the panel regression results for the dependent variable of loan-to-asset ratio. \*, \*\* and \*\*\* indicate statistical significance at the 10, 5, or 1% significance level, respectively.

Table 2. Regression results for operational leverage  
 $(Operational\ leverage)_{i,t} = \beta_0 + \beta_1(Insider\ ownership)_{i,t} + \beta_2(Asset\ size)_{i,t} + \varepsilon_{i,t}$

	Coefficient	t-value	p-value
Constant	0.8966 ***	19.2	7.36×10 <sup>-39</sup>
Insider ownership	-0.8630 ***	-18.48	3.45×10 <sup>-37</sup>
Asset size	-2.4×10 <sup>-5</sup>	-1.04	0.2983
Adjusted R2	0.73		
Number of observations	125		
Standard error of regression	0.1184		
F-statistic	171.73 ***		

Note: This table shows the panel regression results for the dependent variable of loan-to-asset ratio. \*, \*\* and \*\*\* indicate statistical significance at the 10, 5, or 1% significance level, respectively.

Tables 3 and 4 show the results for the change in the banks' risk-taking behavior with respect to the change in the banks' ownership structure when the banks' risk-taking is measured by the portfolio composition of investment securities. Table 3 measures the level of risk-taking by the ratio of the bank's government bond to its total investment securities. It is shown that the coefficient on insider ownership is significantly positive, indicating that the banks with higher insider ownership more invest in government bond.

Table 4 shows a negative coefficient between insider ownership and the ratio of stock to total investment securities, too, however, it is not significant. Table 4 shows that the larger banks significantly more invest in stock taking on more

risk. Thus, the results regarding larger banks risk-taking behavior are rather mixed up in this paper.

Table 3. Regression results for the ratio of government bond to investment securities  
 $(Government\ bond-to-investment\ securities)_{i,t} = \beta_0 + \beta_1(Insider\ ownership)_{i,t} + \beta_2(Asset\ size)_{i,t} + \varepsilon_{i,t}$

	Coefficient	t-value	p-value
Constant	0.2271 ***	4.09	7.76×10 <sup>-5</sup>
Insider ownership	0.1069 **	1.92	0.0573
Asset size	-4.5×10 <sup>-8</sup>	-1.61	0.1083
Adjusted R2	0.04		
Number of observations	125		
Standard error of regression	0.1415		
F-statistic	3.1149 ***		

Note: This table shows the panel regression results for the dependent variable of loan-to-asset ratio. \*, \*\* and \*\*\* indicate statistical significance at the 10, 5, or 1% significance level, respectively.

Table 4. Regression results for the ratio of stock to investment securities  
 $(Stock-to-investment\ securities)_{i,t} = \beta_0 + \beta_1(Insider\ ownership)_{i,t} + \beta_2(Asset\ size)_{i,t} + \varepsilon_{i,t}$

	Coefficient	t-value	p-value
Constant	0.0670 *	1.83	0.0703
Insider ownership	-0.0133	-0.36	0.7179
Asset size	3.8×10 <sup>-8</sup> **	2.05	0.0421
Adjusted R2	0.28		
Number of observations	225		
Standard error of regression	0.0661		
F-statistic	23.2532 ***		

Note: This table shows the panel regression results for the dependent variable of loan-to-asset ratio. \*, \*\* and \*\*\* indicate statistical significance at the 10, 5, or 1% significance level, respectively.

Overall, the above results show very strong and significant evidences that the banks with higher insider ownership pursue less risky activities than the banks with lower insider ownership. Or rather, they appear to make their financial, operational structures and the composition of their asset portfolios safer and more conservative. We presume that these results may be attributed to that the regulations of the Korean banking system became very tightened and strict after 1998 during the sample period of this paper. The intuition for these results may be clear. Inside owners, or owner-managers, may figure out that, under very

tight and strict regulations, the costs associated with increasing risk (many forms of higher explicit, implicit costs and increased supervisory attention under the strict regulations, and higher probability of bankruptcy, etc) would be greater than the possible benefits from risk-taking. Thus, the effectiveness of managerial-stock ownership on the risk-taking of banks is interrelated to both the costs-benefits associated with risk-taking and regulatory regimes.

**3.2. Results for profitability.** Tables 5 and 6 examine the change in the banks' risk-taking behavior with respect to the change in ownership structure focusing on the measures for ex-post risk-taking and profitability. Tables 5 and 6 show a significantly negative coefficient on insider ownership with respect to the non-performing loan ratio and a significantly positive coefficient with respect to the return on asset, respectively. Combined with the findings in the previous sections, these results represent that the strategies of the banks with higher insider ownership turn out to be very healthier and profitable. That is, under strict regulations, higher insider-owner banks pursue very deliberate and careful strategies, not engaged in perverse or unprofitable moral-hazard activities.

Table 5. Regression results for the ratio of nonperforming loans to total loans

$$(Nonperforming\ loans-to-loans)_{i,t} = \beta_0 + \beta_1(Insider\ ownership)_{i,t} + \beta_2(Asset\ size)_{i,t} + \varepsilon_{i,t}$$

	Coefficient	t-value	p-value
Constant	10.7682 ***	5.85	4.22×10 <sup>-8</sup>
Insider ownership	-4.9832 ***	-2.69	0.0080
Asset size	-2.7×10 <sup>-16</sup> ***	-2.94	0.0038
Adjusted R <sup>2</sup>	0.11		
Number of observations	125		
Standard error of regression	4.6917		
F-statistic	8.0728 ***		

Note: This table shows the panel regression results for the dependent variable of loan-to-asset ratio. \*, \*\* and \*\*\* indicate statistical significance at the 10, 5, or 1% significance level, respectively.

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Table 6. Regression results for return on asset  
 $(ROA)_{i,t} = \beta_0 + \beta_1(Insider\ ownership)_{i,t} + \beta_2(Asset\ size)_{i,t} + \varepsilon_{i,t}$

	Coefficient	t-value	p-value
Constant	-4.3782 ***	-4.58	1.1×10 <sup>-5</sup>
Insider ownership	3.3392 ***	3.48	0.0006
Asset size	1.38×10 <sup>-6</sup> ***	2.88	0.0046
Adjusted R <sup>2</sup>	0.13		
Number of observations	125		
Standard error of regression	2.4333		
F-statistic	10.3381 ***		

Note: This table shows the panel regression results for the dependent variable of loan-to-asset ratio. \*, \*\* and \*\*\* indicate statistical significance at the 10, 5, or 1% significance level, respectively.

## Conclusion

From the panel data of Korean banks during 1999-2006, we find very strong and significant evidences that the banks with higher insider ownership pursue less risky activities than the banks with lower insider ownership. Or rather, they appear to make their financial, operational structures and the composition of their asset portfolios safer and more conservative. We presume that these results may be attributed to that the regulations of the Korean banking system became very tightened and strict after 1998 during the sample period of this paper. The intuition for these results may be clear. Inside owners, or owner-managers, may figure out that, under very tight and strict regulations, the costs associated with increasing risk (many forms of higher explicit, implicit costs and increased supervisory attention under the strict regulations, and higher probability of bankruptcy, etc) would be greater than the possible benefits from risk-taking. Thus, the net effect of insider ownership between the costs and benefits appears to depend on how strict the surrounding regulations are. Furthermore, in the tests for the banks' ex-post evaluation of risk-taking and profitability, we find that the banks with higher insider ownership achieve higher profitability and have less non-performing loans. Combined with the results for the above risk-taking, this result indicates that, under strict regulations, higher insider-owner banks pursue very deliberate and careful strategies, not engaged in perverse or unprofitable moral-hazard activities.

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