"Comparison of risk-taking and performance between regional banks and national banks: Korean banking industry"

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Seok Weon Lee (Korea)

Comparison of risk-taking and performance between regional banks and national banks: Korean banking industry

Abstract

In this paper, we examine whether Korean regional banks, taking the advantage of their regulatory flexibility over national banks, pursued riskier strategies to maximize their profit than national banks. From the panel analysis over the period of 1994-2005, we found that Korean regional banks tended to pursue riskier strategies than national banks. Their risk-taking incentives, measured by the association between the measures of risk-taking employed in this paper and the driving variable for risk-taking, were greater and more significant than those of national banks. However, this greater risk-taking of regional banks turned out to generate higher profits than national banks. Thus, in terms of ex-post evaluation of risk-taking incentives, we could conclude that the risk-taking of regional banks was not perverse or excessive moral hazard one.

Introduction

Over the last decades, Korean banking industry underwent many drastic changes: financial deregulation and liberalization, financial crisis, and recently, regulatory reforms and strengthening of the financial industry. One of the important and noteworthy deregulations until the early 1990s was the easiness of the regional banks establishment. There are two types of commercial banks in Korea: national banks and regional banks. National banks can open branch nationwide and there is no geographical restriction in their operation. However, regional banks are allowed to operate only within their specific regions. The number of regional banks increased much through the late 1980s and the early 1990s with the liberalization of the financial industry. To give more motivations for the contributions for the development of regional economy and accounting for the disadvantageous financial and market conditions surrounding regional banks, many regulatory advantages and incentives were given to regional banks such as more flexibility in setting the margin between loan and deposit interest rates, etc.

The purpose of this paper is to compare the risk-taking behavior and profitability between regional banks and national banks in Korea. Specifically, we are interested in examining whether regional banks, taking the advantage of their regulatory flexibility over national banks, pursued riskier strategies to maximize their profits than national banks. Whether the degree of their risk-taking was appropriate or excessive could be partly answered by examining both their risk-taking and ex-post performance. There are some studies on the comparison of the characteristics such as efficiency and competition between national banks and regional banks for Asian countries. However, as far as we know, there has not been any study that directly compares the risk-taking and performance between national banks and regional banks. Using a cross-section sample, and data envelopment analysis, Drake and Hall (2003) compared the efficiency level between larger (city) banks and smaller (regional) banks. They found that larger banks are generally found to be operating above the minimum efficient scale and to have limited opportunity to gain from eliminating *X*-inefficiencies. The opposite result is found for the smaller banks. Uchida and Tsutsui (2005) compared the level of competition and found that competition among city banks was stronger than that among regional banks.

From the panel analysis over the period of 1994-2005, we found that regional banks tended to pursue riskier strategies than national banks. Their risk-taking incentives, measured by the association between the measures of risk-taking employed in this paper and the driving variable for risk-taking, were greater and more significant than those of national banks. However, this greater risk-taking of regional banks turned out to generate higher profits than national banks. Thus, in terms of ex-post evaluation of risk-taking incentives, we could conclude that the risk-taking of regional banks was not perverse or excessive moral hazard one.

The next section 1 describes the sample of banks, testing models and hypotheses. In section 2, we present the empirical results and in the last section offer concluding remarks.

1. Data, testing models and hypotheses

The data in this study are based on the Statistics of Bank Management by the Korean Financial Supervisory Service. We use panel data including

all the national commercial banks and regional commercial banks from 1994 to 2005. The number of national banks and regional banks from 1995 to 1997 remained stable at 15 and 10, respectively, on average. However, the number continuously declined since the financial crisis of 1997-1998 due to the restructuring of the banking industry through mergers and acquisitions. The number became 12 and 8 in 1998, 11 and 6 in 1999 and 2000. It remained at 8 and 6 since 2002. The average asset size of the national banks and regional banks is 49,329,300 million Korean won and 7,439,700 million Korean won, respectively. The average capital ratio is 3.96% and 5.29%. The average loan-to-asset ratio is 45.01% and 46.81%.

How the risk-taking behavior between national banks and regional banks is different is estimated by regressing the following panel regression equation over the sample period of 1994-2005.

$$(\text{Measure of risk and profitability})_{i,t} = \gamma_0 + \gamma_1(\text{ASST})_{i,t} + \gamma_2\text{DUM}\times(\text{ASST})_{i,t} + \gamma_3(\text{LEVR})_{i,t} + \gamma_4\text{DUM}\times(\text{LEVR})_{i,t} + \gamma_5(\text{FIXED})_{i,t} + \varepsilon_{i,t\ldots} \quad (1)$$

To examine the risk-taking behavior of the banks, we employ both measures of risk and profitability as the dependent variable. The four measures of risk-taking are the ratio of total loans to total asset (LOAN), the ratio of investment securities to total asset (INVEST), the ratio of government bond to investment securities (GOVBND), and the ratio of stock to investment securities (STOCK). As the two measures for the bank's profitability and performance, we employ the return on assets (ROA) and the ratio of nonperforming loans to total loans (NPL). The intuition for the choice of these variables for risk-taking and performance is pretty clear. Of the asset categories, loans are generally considered the riskiest category, and the highest risk weight is assigned in the calculation of risk adjusted asset value. Thus, we expect the banks with greater risk-taking incentives to have a large portion of loans in their asset portfolio. On the other hand, investment securities are generally considered relatively safer, especially compared to loans. Thus, we expect the banks with greater risk-taking incentives to have a small portion of investment in investment securities in their asset portfolio. More specifically, in the calculation of risk adjusted assets, loans and common stock are assigned the highest 100% risk weight. The average ratio of common stock to total investment securities is only 8% in our sample. Thus, the investment securities in our sample mainly consist of the safer securities than the risky common stock. Thus, we believe that, in this paper, the group of investment securities can be considered very safe asset category. As the two

additional measures for risk, we employ the ratio of both government bond and common stock to total investment securities. To complete our analysis for the bank's risk-taking behavior, we examine whether the risk-taking, if any, turned out to be profitable or not. If their risk-taking was taken deliberately or at an optimal level, the risk-taking would have turned out profitable. As the measure for the profitability, we use the return on assets and the ratio of nonperforming loans to total loans. As the explanatory variable for risk taking and profitability, we employ the most widely used and agreed two variables in banking literature, asset size and leverage. The implication of the very well-known too-big-to-fail hypothesis and the moral hazard incentives of stockholders associated with limited liability expect the level of risk-taking to be positively related to the asset size and leverage (or negatively related to the equity capital ratio) of the firm. As one control variable for risk-taking, we add the ratio of fixed asset to total asset (FIXED).

To examine the difference in the risk-taking incentives between national banks and regional banks with respect to the main two independent variables (asset size and leverage), the dummy variable is assigned the value of one to the regional banks and zero to the national banks for each year. So, the coefficient γ_2 indicates how the risk-taking incentive of the regional banks with respect to the change in asset size is different from the national banks. Similarly, the coefficient γ_4 indicates how the risk-taking incentive of the regional banks with respect to the change in leverage is different from the national banks.

2. Empirical results

Table 1 shows the panel regression results using the loan-to-asset ratio as the measure for the bank's risk-taking. It is shown that the coefficient on the loan ratio is significantly positive. Thus, the hypothesized positive relationship between firm size and risk-taking is observed in this study. Regarding the issue of the analysis of this paper, the coefficient on DUM × AST is significantly positive, indicating that regional banks have significantly greater incentive to increase risk (loan) with respect to the increase in asset size than national banks. The coefficient on DUM × LEVR is insignificant.

Table 1. Panel regression results

$$(\text{LOAN})_{i,t} = \gamma_0 + \gamma_1(\text{ASST})_{i,t} + \gamma_2\text{DUM}\times(\text{ASST})_{i,t} + \gamma_3(\text{LEVR})_{i,t} + \gamma_4\text{DUM}\times(\text{LEVR})_{i,t} + \gamma_5(\text{FIXED})_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results for the dependent variable of loan-to-asset. One, two, or three asterisks indicate statistical significance at the

10, 5, or 1% significance level, respectively. DUM=1 if the sample period belongs to regional banks for each year, and 0 otherwise.

	Coefficient	t-value	p-value
INTERCEPT	0.385132***	26.71378	7.66×10^{-71}
AST	9.99×10^{-8}***	6.850943	7.32×10^{-11}
DUM × AST	5.26×10^{-7}***	4.250045	3.16×10^{-5}
LEVR	0.509949	1.394912	0.164456
DUM × LEVR	0.039282	0.126834	0.899188
FIXED	4.96E-06	0.179427	0.857768
R^2	0.25		
N	225		
F	12.44***		

Notes: LOAN: ratio of total loans to total assets (in %). ASST: total assets (in 100 million Korean won). LEVR: ratio of equity capital to total assets (in %). FIXED: ratio of fixed assets to total assets (in %)

Table 2 shows the regression results using the investment securities-to-asset ratio as the measure for the bank's risk-taking. It is shown that investment securities ratio is significantly negatively related to the asset size. Thus, the results in Tables 1 and 2 combined show that large banks have greater risk-taking incentives by increasing loans and decreasing their investment in relatively safer assets such as investment securities. However, no coefficient on the dummy interaction variable is significant. Thus, we do not find any difference in the risk-taking behavior between regional and national banks when using the investment securities ratio as the dependent variable.

Table 2. Panel regression results

$$(INVEST)_{i,t} = \gamma_0 + \gamma_1(ASST)_{i,t} + \gamma_2 DUM \times (ASST)_{i,t} + \\ + \gamma_3(LEVR)_{i,t} + \gamma_4 DUM \times (LEVR)_{i,t} + \\ + \gamma_5(FIXED)_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results for the dependent variable of investment securities-to-asset. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively. DUM=1 if the sample period belongs to regional banks for each year, and 0 otherwise.

	Coefficient	t-value	p-value
INTERCEPT	0.385132***	26.71378	7.66×10^{-71}
AST	9.99×10^{-8}***	6.850943	7.32×10^{-11}
DUM × AST	5.26×10^{-7}***	4.250045	3.16×10^{-5}
LEVR	0.509949	1.394912	0.164456
DUM × LEVR	0.039282	0.126834	0.899188
FIXED	4.96E-06	0.179427	0.857768
R^2	0.25		
N	225		
F	12.44***		

Notes: INVEST: ratio of investment securities to total assets (in %). ASST: total assets (in 100 million Korean won). LEVR: ratio of equity capital to total assets (in %). FIXED: ratio of fixed assets to total assets (in %)

Table 3 shows the regression results using the government bond-to-investment securities as the measure for the bank's risk-taking. It is shown that the coefficient on DUM × LEVR is significantly positive, indicating that the higher the leverage ratio (the lower the capital ratio), the lower the investment in government bond for the group of regional banks than national banks, indicating that regional banks have significantly less incentive to decrease risk with respect to the increase in the leverage than national banks. This result also represents that regional banks have greater risk-taking incentives than national banks. The coefficient on DUM × AST is insignificant.

Table 3. Panel regression results

$$(GOVBND)_{i,t} = \gamma_0 + \gamma_1(ASST)_{i,t} + \gamma_2 DUM \times (ASST)_{i,t} + \\ + \gamma_3(LEVR)_{i,t} + \gamma_4 DUM \times (LEVR)_{i,t} + \\ + \gamma_5(FIXED)_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results for the dependent variable of government bond-to-investment securities. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively. DUM=1 if the sample period belongs to regional banks for each year, and 0 otherwise.

	Coefficient	t-value	p-value
INTERCEPT	0.073712***	8.204303	1.97×10^{-14}
AST	1.15×10^{-8}	1.268994	0.20579
DUM × AST	6.04×10^{-8}	0.783244	0.43433
LEVR	-0.454**	-1.99274	0.047531
DUM × LEVR	0.338795*	1.755318	0.080603
FIXED	-1.5×10^{-6}	-0.08643	0.931204
R^2	0.04		
N	225		
F	1.69*		

Notes: GOVBND: ratio of government bond to total investment securities (in %). ASST: total assets (in 100 million Korean won). LEVR: ratio of equity capital to total assets (in %). FIXED: ratio of fixed assets to total assets (in %)

Table 4 shows the regression results using the stock-to-investment securities as the measure for the bank's risk-taking. It is shown that the coefficient on DUM × LEVR is significantly negative, indicating that the higher the leverage ratio (the lower the capital ratio), the greater the investment in stock for the group of regional banks than national banks. This result also shows that regional banks have significantly greater risk-taking incentives than national banks. The coefficient on DUM × AST is insignificant.

Table 4. Panel regression results

$$(STOCK)_{i,t} = \gamma_0 + \gamma_1(ASST)_{i,t} + \gamma_2 DUM \times (ASST)_{i,t} + \\ + \gamma_3(LEVR)_{i,t} + \gamma_4 DUM \times (LEVR)_{i,t} + \\ + \gamma_5(FIXED)_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results for the dependent variable of stock-to-investment securities. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively. DUM=1 if the sample period belongs to regional banks for each year, and 0 otherwise.

	Coefficient	t-value	p-value
INTERCEPT	0.008475**	2.047383	0.041814
AST	-8.5×10^{-9}***	-2.03137	0.043426
DUM × AST	3.95×10^{-8}	1.112652	0.267078
LEVR	0.524168***	4.993878	1.21×10^{-6}
DUM × LEVR	-0.32773***	-3.68559	0.000288
FIXED	1.31×10^{-5}*	1.646678	0.101058
R^2	0.13		
N	225		
F	5.75***		

Notes: STOCK: ratio of common stock to total investment securities (in %) ASST: total assets (in 100 million Korean won). LEVR: ratio of equity capital to total assets (in %). FIXED: ratio of fixed assets to total assets (in %).

Tables 5 and 6 show the results for the difference in performance and profitability among regional banks and national banks with respect to risk-taking. Table 5 using the ROA as the dependent variable shows that the coefficient on DUM × AST is significantly positive and the coefficient on DUM × LEVR is significantly negative. Table 6 using the nonperforming loan ratio as the dependent variable shows that the coefficient on DUM × AST is significantly negative and the coefficient on DUM × LEVR is significantly positive. All of these results, combined with the results in Tables 1-4, indicate that the profitability and performance with respect to risk-taking are significantly better for the regional banks than national banks. Thus, based on the overall results in Tables 1-6, we conclude that regional banks tend to pursue riskier strategies than national banks at least for the sample period of this study, and these riskier strategies turn out to be successful and more profitable than national banks, not perverse or excessive moral hazard ones.

Table 5. Panel regression results

$$(ROA)_{i,t} = \gamma_0 + \gamma_1(ASST)_{i,t} + \gamma_2 DUM\times(ASST)_{i,t} + \gamma_3(LEVR)_{i,t} + \gamma_4 DUM\times(LEVR)_{i,t} + \gamma_5(FIXED)_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results for the dependent variable of return on assets. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively. DUM=1 if the sample period belongs to regional banks for each year, and 0 otherwise.

	Coefficient	t-value	p-value
INTERCEPT	-3.68408***	-10.9581	1.46×10^{-22}
AST	4.97×10^{-7}	1.459738	0.145795
DUM × AST	1.39×10^{-5}***	4.801444	2.92×10^{-6}
LEVR	81.12105***	9.515486	3.45×10^{-18}
DUM × LEVR	-37.5107***	-5.19367	4.71×10^{-7}
FIXED	-0.00207***	-3.22008	0.001476
R^2	0.43		
N	225		
F	27.55***		

Notes: ROA: return on assets (in %). ASST: total assets (in 100 million Korean won). LEVR: ratio of equity capital to total assets (in %). FIXED: ratio of fixed assets to total assets (in %).

Table 6. Panel regression results

$$(NPL)_{i,t} = \gamma_0 + \gamma_1(ASST)_{i,t} + \gamma_2 DUM\times(ASST)_{i,t} + \gamma_3(LEVR)_{i,t} + \gamma_4 DUM\times(LEVR)_{i,t} + \gamma_5(FIXED)_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results for the dependent variable of nonperforming loan-to-asset. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively. DUM=1 if the sample period belongs to regional banks for each year, and 0 otherwise.

	Coefficient	t-value	p-value
INTERCEPT	10.62232***	13.40606	2.55×10^{-30}
AST	-1.7E-06**	-2.17096	0.031009
DUM × AST	-3.1×10^{-5}***	-4.49429	1.13×10^{-5}
LEVR	-128.877***	-6.41431	8.6×10^{-10}
DUM × LEVR	66.7487***	3.921392	0.000118
FIXED	0.003589**	2.363939	0.018956
R^2	0.28		
N	225		
F	14.49***		

Notes: NPL: ratio of nonperforming loans to total loans (in %). ASST: total assets (in 100 million Korean won). LEVR: ratio of equity capital to total assets (in %). FIXED: ratio of fixed assets to total assets (in %).

Conclusion

In this paper, we examine whether Korean regional banks, taking the advantage of their regulatory flexibility over national banks, pursued riskier strategies to maximize their profit than national banks. From the panel analysis over the period of 1994-2005, we found that Korean regional banks tended to pursue riskier strategies than national banks. Their risk-taking incentives, measured by the association between the measures of risk-taking employed in this paper and the driving variable for risk-taking, were greater and more significant than national banks. However, this greater risk-taking of regional banks turned out to generate higher profits than national banks. Thus, in terms of ex-post evaluation of risk-taking incentives, we could conclude that the risk-taking of regional banks was not perverse or excessive moral hazard one.

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