# FIRM SIZE, CORPORATE LEVERAGE AND CORPORATE DIVIDEND: EVIDENCE FROM KOREAN BANKING INDUSTRY

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**Abstract**

This paper examines how the dividend policy of banks is associated with the level of safety of the banks. As the proxy for the safety of the bank, we employ the asset size and leverage measures. Considering that the explicit protection system of deposit insurance backing up the banking industry is prevailing and implicit forbearance policy practiced by the banking regulators generally would not allow the failure of especially large banks, the banks with larger asset size, other things being equal, would be considered safer than smaller banks. Also, following the implications of finance literature, higher leverage is believed to represent higher riskiness and the firms in higher leverage positions would have greater risk-taking incentives to maximize potential upward gains from high profit. From the panel data of Korean banks during 1994-2005, we find that the banks in a safer position significantly pay more dividends. That is, the banks with larger asset size and lower leverage tend to pay more dividends. In the tests employing partitioned samples and interaction variables for risk characteristics, we find more transparent and consistent results.

**Keywords:** Leverage, Asset size, Dividend policy, Banking industry, Bank risk

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## I. Introduction

Dividend policy determines the allocation of the firm's cash flows between the funds that are flown to investors as the reward for their investment and the funds that are retained by the firm for future investment. This decision affects firm value, and therefore, optimal dividend policy should be made to maximize the firm value. Dividend can also provide valuable information to the investors in capital market regarding the firm's past and future expected performance. This mechanism is referred to as a signaling effect of dividend policy. The signaling effect gives the managers the pressure that they are under the supervision of capital market, and therefore, they have to pay optimal amount of dividend to investors. The effectiveness of dividend policy on firm value has been examined by many researchers. Many of these were interested in identifying the factors affecting the dividend policy of firms. Rozeff (1981) finds that dividend payout ratio is negatively related to all the factors such as the growth rate of sales, insider ownership, and the beta of the firm. Crutchley and Hansen (1989) find that the dividend payout ratio is positively related to the size of the firm and the risk of the firm's operation, but negatively related to the cost of capital. Jensen, Solberg and Zorn (1992) find that the dividend payout ratio is positively related to the level of profit, but negatively related to the level of insider ownership, the growth rate of the firm, and the level of investment.

This paper continues the previous line of research by employing the data on a very special type of industry, and tries to add additional evidences and investment strategies regarding dividend policy to the previous researches that examined mostly non-financial firms. This paper employs the data on Korean banking industry, and examines how the dividend policy of Korean banks is associated with the banks' asset size and level of leverage. Considering that the explicit protection system of deposit insurance backing up the banking industry is prevailing and implicit forbearance policy practiced by the banking regulators generally would not allow the failure of especially large banks, the banks with larger asset size, other things being equal, would be considered safer than smaller banks. Also, following the implications of finance literature, higher leverage is believed to represent higher riskiness and the firms in higher leverage positions would have greater risk-taking incentives to maximize potential upward gains from high profit. From the panel data of Korean banks during 1994-2005, we find that the banks with larger asset size and lower leverage pay significantly more

dividends. In the tests employing partitioned samples and interaction variables for risk characteristics, we find more transparent and consistent results.

## II. Sample and Data

The sample for this paper consists of all the commercial banks in Korea from 1994 to 2005: 24 banks in 1994, 25 banks in 1995 and 1996, 26 banks in 1997, 20 banks in 1998, 17 banks in 1999 and 2000, 15 banks in 2001, and 14 banks from 2002 to 2005. Over the period 1994-2005, for each bank, we collect the data such as total asset, equity capital, fixed asset, dividend payout ratio, nonperforming loans and return on asset. These variables are obtained from the Statistics of Bank Management for each year published by the Korean Financial Supervisory Service.

## III. Testable Hypotheses and Testing Models

To examine how the dividend policy of the banks is related to the bank's level of leverage and asset size, we estimate the following pooled time-series/cross-sectional regression equation over the period 1994-2005.

$$(\text{Payout ratio})_{i,t} = \beta_0 + \beta_1(\text{Financial leverage})_{i,t} + \beta_2(\text{Operational leverage})_{i,t} + \beta_3(\text{Log of asset size})_{i,t} + \varepsilon_{i,t} \quad \text{-----(1)}$$

In the estimation equation for the bank's dividend policy, we employ two leverage measures; financial leverage and operational leverage, and asset size as the explanatory variables. Financial leverage is measured by the bank's ratio of equity capital to total asset. Operational leverage is measured by the ratio of fixed asset to total asset. As mentioned above, higher leverage is believed to represent higher riskiness and the firms in higher leverage positions would have greater risk-taking incentives to maximize potential upward gains from high profit t: The higher the financial leverage (or, the lower the ratio of the equity capital to total asset), the riskier the firm is and the greater risk-taking incentives the firm has, because of both leverage effect and the moral-hazard-incentives of stockholder associated with limited liability. The firm with a lower financial leverage or higher capital ratio has obviously a lower possibility of bankruptcy when the firm's asset value declines. Furthermore, limited liability gives the firm's stockholders more incentives to expropriate wealth from creditors by increasing risk to maximize the potential upward gains. Operational leverage is agreed to act in an analogous fashion to financial leverage in increasing firm risk. To better capture the above implication that higher leverage represents higher risk, financial leverage is measured by the negative value of the capital ratio. So, the higher the financial leverage, the lower the capital ratio, which represents higher risk. Also, the higher the operational leverage, the higher the ratio of fixed assets to total assets, which represents higher risk. Other things being equal, we could hypothesize that the safer banks in terms of financial, operational conditions and asset size would be able to pay more dividends. Then, the sign of the coefficient $\beta_1$ and $\beta_2$ would be negative, and $\beta_3$ would be positive in equation (1).

## IV. Empirical Results for Regression Analysis

### IV-1. Correlation Test

Table 1 presents the Pearson correlations among the variables of the banks. It is shown that the dividend payout ratio is negatively correlated with both financial leverage and operational leverage. Also, it is positively correlated with asset size. These results are consistent with our expectations that the banks with safer characteristics would pay more dividends. The two leverage measures are positively correlated. It is shown in the table that the multicollinearity problem does not appear to exist in the regression estimation that uses these variables as independent variables.

**-Insert Table 1 approximately here-**

### IV-2. Regression tests: Full Sample and Partitioned Sample

Table 2 shows the regression results for estimating the equation (1). It is shown that the coefficient on the financial leverage is significantly negative, and the coefficient on the asset size is significantly positive. Therefore, the safer banks such as with lower financial leverage and larger asset size tend to pay more dividends. The coefficient on the operational leverage is also negative, however, it is not statistically significant.

**-Insert Table 2 approximately here-**

To further examine the relationship between the level of leverage, asset size and dividend policy of the banks, we partition the full sample into two groups for each risk characteristic variable; higher financial leverage group vs lower financial leverage group, higher operational leverage group vs lower operational leverage group, and larger asset size group vs smaller asset size group. Firstly, in table 3, we partition the full sample into the two groups at the median value for financial leverage; higher financial leverage group and lower financial leverage group. Each year, the bank with lower financial leverage (those whose capital ratio is higher than the median for that year) takes the value of 1 and 0 otherwise.

Then, we multiply that dummy variable to each of the three independent variables, and estimate the following regression equation.

$(\text{Payout ratio})_{i,t} = \beta_0 + \beta_1(\text{Financial leverage})_{i,t} + \beta_2 D\times(\text{Financial leverage})_{i,t} + \beta_3 (\text{Operational leverage})_{i,t} + \beta_4 D\times(\text{Operational leverage})_{i,t} + \beta_5(\text{Log Asset size})_{i,t} + \beta_6 D\times(\text{Log Asset size})_{i,t} + \varepsilon_{i,t}$

Therefore, the coefficient on the dummy interaction variable ($\beta_2$, $\beta_4$, and $\beta_6$) indicates how the relationship between each independent variable and dividend payout ratio for the group of bans with lower financial leverage is different from the group of banks with higher financial leverage. The results are presented in table 3. It is shown that the coefficient on D×(Operational leverage) is significantly negative, indicating that the tendency of the banks with lower operational leverage to pay more dividends is more clearly observed in the group of the banks with lower financial leverage or higher capital ratio.

**-Insert Table 3 approximately here-**

Similar partition is made in table 4 with respect to operational leverage. The bank with lower operational leverage (lower ratio of fixed asset) is assigned the value of 1 and 0 otherwise. Then the dummy variable is multiplied to each of the three independent variables. The estimation results are presented in table 4. It is shown that the coefficient on D×(Operational leverage) is significantly negative, and that on D×(Log Asset size) is significantly positive, indicating that the tendency of the banks with lower operational leverage and larger asset size to pay more dividends is more clearly observed in the group of the banks with lower operational leverage.

**-Insert Table 4 approximately here-**

Table 5 presents the results for the test where the dummy variable for larger asset size is multiplied to each independent variable. The coefficient on D×(Financial leverage) and D×(Log Asset size) is negative and positive, respectively, at the significant level of about 15 percent.

**-Insert Table 5 approximately here-**

Overall, the above results in table 2-5 show that the lower the level of financial and operational leverage and the larger the asset size, the greater the dividend payout ratio the bank has. These results are more clearly confirmed in the partitioned sample tests.

### IV-3. Further Tests

We presume that one of the most convincing reasons for the banks with lower leverage and larger asset size to pay more dividends is that the banks with these characteristics are safer. To examine this hypothesis further, we run the regression for dividend payout ratio against the interaction variables between the three explanatory variables and the more transparent proxy variable for the safety of the bank. Firstly, the safety of the bank is measured by the ratio of nonperforming loans to total asset, and we estimate the following regression equation.

$(\text{Payout ratio})_{i,t} = \beta_0 + \beta_1(\text{Financial leverage} \times \text{Nonperforming loans})_{i,t} + \beta_2(\text{Operational leverage}\times \text{Nonperforming loans})_{i,t} + \beta_3 (\text{Log Asset size}\times \text{Nonperforming loans})_{i,t} + \varepsilon_{i,t}$

The results are shown in table 6. The coefficient on (Log Asset size× Nonperforming loans) is significantly negative. This result is believed to confirm our presumption. The significantly negative coefficient on the interaction variable indicates that the larger the asset size and the lower the nonperforming loans (and therefore, the lower the interaction variable of these two), the greater the dividend payout ratio the bank has.

**-Insert Table 6 approximately here-**

In table 7, we run one more regression employing another proxy for the safety of the bank, return on asset. It is shown that the coefficient on (Log Asset size× ROA) is significantly positive, indicating that the larger and the safer (greater ROA), the greater the dividend payout ratio the bank has. This result confirms our presumption, too. We find another consistent result from the coefficient of interaction variable between financial leverage and ROA. The coefficient is negative as expected, which is significant at the significant level of 10.6 percent.

## V. Concluding Comments

This paper examines how the dividend policy of banks is associated with the level of safety of the banks. As the proxy for the safety of the bank, we employ the asset size and leverage measures. Considering that the explicit protection system of deposit insurance backing up the banking industry is prevailing and implicit forbearance policy practiced by the banking regulators generally would not allow the failure of especially large banks, the banks with larger asset size, other things being equal, would be considered safer than smaller banks. Also, following the implications of finance literature, higher leverage is believed to represent higher riskiness and the firms in higher leverage positions would have greater risk-taking incentives to maximize potential upward gains from high profit. From the panel data of Korean banks during 1994-2005, we find that the banks in a safer position significantly pay more dividends. That is, the banks with larger asset size and lower leverage tend to

pay more dividends. In the tests employing partitioned samples and interaction variables for risk characteristics, we find more transparent and consistent results.

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**Table 1.** Correlations

This table shows the Pearson correlations among the risk-characteristic variables for the sample banks. The first number is the correlation for the pre-reform period (1994-1997); the second in the correlation for the post-reform period (1998-2005). One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively.

| | Payout ratio | Financial leverage | Operational leverage | Asset size |
|---|---|---|---|---|
| Payout ratio | 1 | -0.2512*** | -0.0939 | 0.0669* |
| Financial leverage | | 1 | 0.1986* | 0.0937 |
| Operational leverage | | | 1 | -0.0041 |
| Asset size | | | | 1 |

**Table 2.** Regression results

$$(\text{Payout ratio})_{i,t} = \beta_0 + \beta_1(\text{Financial leverage})_{i,t} + \beta_2(\text{Operational leverage})_{i,t} + \beta_3(\text{Log Asset size})_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively.

| | Coefficient | t-value | p-value |
|---|---|---|---|
| Constant | -5.5939** | -2.05 | 0.0413 |
| Financial leverage | -50.1436*** | -4.21 | $3.95\times10^{-5}$ |
| Operational leverage | -0.0009 | -0.68 | 0.4956 |
| Log Asset size | 1.1198** | 2.34 | 0.0203 |
| Adjusted $R^2$ | 0.08 | | |
| Number of observations | 225 | | |
| Standard error of regression | 3.6875 | | |
| F-statistic | 7.08*** | | |

**Table 3.** Regression results

$$(\text{Payout ratio})_{i,t} = \beta_0 + \beta_1(\text{Financial leverage})_{i,t} + \beta_2 D\times(\text{Financial leverage})_{i,t} + \beta_3(\text{Operational leverage})_{i,t} + \beta_4 D\times(\text{Operational leverage})_{i,t} + \beta_5(\text{Log Asset size})_{i,t} + \beta_6 D\times(\text{Log Asset size})_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively. D=1 if the bank belongs to lower financial leverage group, and 0 otherwise.

| | Coefficient | t-value | p-value |
|---|---|---|---|
| Constant | -2.1615 | -0.82 | 0.4096 |
| Financial leverage | -35.5535 | -1.55 | 0.1223 |
| D × Financial leverage | 3.5353 | 0.12 | 0.9045 |
| Operational leverage | -0.0007 | -0.51 | 0.6093 |
| D × Operational leverage | -0.0431*** | -2.62 | 0.0093 |
| Log Asset size | 2.6240 | 1.01 | 0.3151 |
| D × Log Asset size | 0.4237 | 1.39 | 0.1642 |
| Adjusted $R^2$ | 0.1 | | |
| Number of observations | 225 | | |
| Standard error of regression | 3.6477 | | |
| F-statistic | 4.92*** | | |

**Table 4.** Regression results

$$(\text{Payout ratio})_{i,t} = \beta_0 + \beta_1(\text{Financial leverage})_{i,t} + \beta_2 D\times(\text{Financial leverage})_{i,t} + \beta_3(\text{Operational leverage})_{i,t} + \beta_4 D\times(\text{Operational leverage})_{i,t} + \beta_5(\text{Log Asset size})_{i,t} + \beta_6 D\times(\text{Log Asset size})_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively. D=1 if the bank belongs to lower operational leverage group, and 0 otherwise.

| | Coefficient | t-value | p-value |
|---|---|---|---|
| Constant | -7.2653** | -2.35 | 0.0194 |
| Financial leverage | -77.5338*** | -4.12 | $5.2\times10^{-5}$ |
| D × Financial leverage | 33.0679 | 1.51 | 0.1303 |
| Operational leverage | 0.0001 | 0.07 | 0.9408 |
| D × Operational leverage | -0.0356** | -1.93 | 0.0544 |
| Log Asset size | 1.1660** | 2.06 | 0.0409 |
| D × Log Asset size | 0.4721** | 2.16 | 0.0319 |
| Adjusted $R^2$ | 0.09 | | |
| Number of observations | 225 | | |
| Standard error of regression | 3.6568 | | |
| F-statistic | 4.71*** | | |

**Table 5.** Regression results

$$(\text{Payout ratio})_{i,t} = \beta_0 + \beta_1(\text{Financial leverage})_{i,t} + \beta_2 D\times(\text{Financial leverage})_{i,t} + \beta_3(\text{Operational leverage})_{i,t} + \beta_4 D\times(\text{Operational leverage})_{i,t} + \beta_5(\text{Log Asset size})_{i,t} + \beta_6 D\times(\text{Log Asset size})_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively. D=1 if the bank belongs to larger asset size group, and 0 otherwise.

| | Coefficient | t-value | p-value |
|---|---|---|---|
| Constant | 10.0157*** | 2.65 | 0.0085 |
| Financial leverage | -37.9675*** | -3.14 | 0.0018 |
| D × Financial leverage | -41.8296 | -1.41 | 0.1592 |
| Operational leverage | -0.0087 | -0.87 | 0.3821 |
| D × Operational leverage | 0.0082 | 0.81 | 0.4141 |
| Log Asset size | -2.1114*** | -2.79 | 0.0057 |
| D × Log Asset size | 0.3857 | 1.36 | 0.1721 |
| Adjusted $R^2$ | 0.19 | | |
| Number of observations | 225 | | |
| Standard error of regression | 3.4551 | | |
| F-statistic | 9.65*** | | |

**Table 6.** Regression results

$$(\text{Payout ratio})_{i,t} = \beta_0 + \beta_1(\text{Financial leverage} \times \text{Nonperforming loans})_{i,t} + \beta_2(\text{Operational leverage} \times \text{Nonperforming loans})_{i,t} + \beta_3(\text{Log Asset size} \times \text{Nonperforming loans})_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively.

| | Coefficient | t-value | p-value |
|---|---|---|---|
| Constant | 3.7324*** | 9.21 | $2.46\times10^{-17}$ |
| Financial leverage × Nonperforming loans | -0.6428 | -0.52 | 0.5973 |
| Operational leverage × Nonperforming loans | $3.78\times10^{-5}$ | 0.48 | 0.6308 |
| Log Asset size × Nonperforming loans | -0.0554*** | -4.31 | $2.43\times10^{-5}$ |
| Adjusted $R^2$ | 0.07 | | |
| Number of observations | 225 | | |
| Standard error of regression | 3.6908 | | |
| F-statistic | 6.93*** | | |

**Table 7.** Regression results

$$(\text{Payout ratio})_{i,t} = \beta_0 + \beta_1(\text{Financial leverage} \times \text{ROA})_{i,t} + \beta_2(\text{Operational leverage} \times \text{ROA})_{i,t} + \beta_3(\text{Log Asset size} \times \text{ROA})_{i,t} + \varepsilon_{i,t}$$

This table shows the panel regression results. One, two, or three asterisks indicate statistical significance at the 10, 5, or 1% significance level, respectively.

| | Coefficient | t-value | p-value |
|---|---|---|---|
| Constant | 2.5781*** | 10.29 | $1.49\times10^{-20}$ |
| Financial leverage × ROA | -5.3720 | -1.62 | 0.1061 |
| Operational leverage × ROA | -0.0001 | -0.57 | 0.5640 |
| Log Asset size × ROA | 0.0983*** | 3.64 | 0.0003 |
| Adjusted $R^2$ | 0.09 | | |
| Number of observations | 225 | | |
| Standard error of regression | 3.6562 | | |
| F-statistic | 8.46*** | | |