

Do Managers Affect Firm Value in an Emerging Market?

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2008. 6.11

ABSTRACT

This paper examines whether managers affect firm performance in an emerging market. Using information on managers in publicly traded firms in Korea, we find that managers with better academic credentials improve Tobin's Q. The impact of manager ability is more evident when management decision making becomes more critical. Manager ability becomes more important as government interventions become weaker after the economic crisis. Management effects are stronger in firms with higher growth opportunities, higher risks, or under financial distress. Stand-alone firms and firms with better corporate governance scores show stronger impacts of managers on firm value. A positive impact of manager ability on firm performance is robust when endogeneity issues are controlled. These findings still hold regardless of choices of managers; executive directors, outside directors, and CEOs. Taken together, these results suggest that managerial ability matters more to firms when the firms face challenges and managers have more decision scope and power.

Keywords: manager ability, educational credentials, firm value, economic crisis, growth opportunity, financial distress, corporate governance

I. Introduction

After some controversy in earlier studies over the role of managers in firm performance, literature on management turnovers such as Warner, Watt and Wruck (1988) has established that top management matters in firm values. Moreover, Hayes and Schaefer (1999) argue that managers with better ability contribute to stock values, by showing that their departure lowers firm value.

This study examines whether managers' ability affects firm value under different conditions in an emerging market. We test if an increase in managers with high ability improves firm performance. We also explore whether managers' ability yield different impacts when economic conditions and firm characteristics change. Specifically, we analyze whether managerial ability improves firm performance more in changing economic environments or in more volatile situations. Under such conditions, managers' ability might become more critical. As an emerging economy experiences a structural change from one regulated by governments to one governed by market forces, managers' decision making may become more important and would yield a greater impact on firm value. Moreover, corporate financial conditions and corporate governance structure might amplify management ability's link to firm value. For example, scopes and impacts of management decision would be larger and more critical in firms with higher growth opportunities, higher risks, better corporate governance systems or under financial distress. In addition, managers in stand-alone firms will have more discretion and scopes of decision-making compared to their counterparts in business groups.

While there can be many dimensions in managerial ability, we focus on managers' educational credentials for a couple of reasons. Despite an argument that education does not seem to improve individual productive capacity, education can be interpreted as an information device signaling manager's inborn ability and a screening device from a firm's perspective (Becker 1964, Arrow 1973, Spence 1974, Stiglitz 1975). A manager from a highly competitive school is apt at accumulating useful knowledge and skills in management even if education and academic training itself might not be directly related to the managerial ability. Moreover, graduates from top universities earn more than their counterparts after controlling for education years and careers (Taubman and Wales 1973). When a manager's pay is correlated with her ability, this study implies that (perceived) ability of managers from top educational institutions is higher. In addition, managers graduating from elite universities may exhibit certain managerial ability. D'Aveni (1990) has reported that firms with more top managers graduating from elite universities were less likely to face corporate bankruptcy.

In this paper, we test whether firms have higher values if they have proportionately more managers with elite school credentials. When managers with better credentials might not contribute to firm value, we may infer that educational credentials are not correlated with managerial ability. On the other hand, firms have higher values if they have proportionately more managers with elite school credentials, suggesting that academic credentials are likely correlated with ability.

In this study, we test whether managers' ability affects firm value using educational

information on top managers of Korean firms for the following reasons. First, academic rankings of colleges in Korea are directly correlated with students' ability. A very strong academic ranking system has been established among universities. For a long time, universities are required to select students based on academic merits only by the law. Top ranking schools had successfully recruited the highest scoring students, with a few exceptions. Consequently, academic rankings of colleges reflect students' ability with a great precision. Second, the Korean economy provides a unique opportunity to examine how effects of management on firm performance vary across different corporate organizations. Many of Korean firms are subsidiaries of business groups called "chaebol" in which controlling families exercise their controlling power on firm management (Joh 2003). In chaebols, as affiliated firms are controlled by group headquarters or controlling shareholders, managerial ability might not be an important factor. Third, the Korean economy also provides an interesting opportunity to examine the management effects over structural changes in business environments. Before the crisis in 1997, the Korean economy was intervened and controlled by government. Along with the conditionality attached to the IMF bailout money during the financial crisis in 1997, the Korean economy has observed a series of deregulation that eventually weakened government intervention and introduced more market oriented reform measures (Kim and Kim 2008). In addition, after the crisis, the Korean government reinforced directors' liabilities and responsibility; enhanced disclosure policies; introduced outside directors and internal audit committees; and strengthened minority shareholders protection (Chang and Shin, 2006). With less government intervention in an increasingly transparent economy, manager ability can be more important.

We use the ratio of directors who graduated from universities with a top 5th percentile academic ranking. In Korea, the ratio of directors from top schools with a 5th percentile ranking is about 40% of board of directors and more than two-thirds of the ministers for several decades. Building up an elite group by specific school graduates occurs frequently in many developed countries such as France, UK, and USA, not only South Korea.¹

The purpose of this paper is to carefully examine whether the school credentials of managers are linked to their firms' performances, and whether it affects firm value and cross-sectional variations of the effects, using a sample of 7,104 firm-year observations from the college quality data of boards provided by Korea Listed Companies Association and KISLINE over the period 1990-2006, encompassing a wide range of economic conditions. The role and scope of managerial decision-making has become more important and transparent in some economic conditions as discussed earlier.

We find that managers with better academic backgrounds improve firms' Tobin Q. The importance of managers to firm value is more evident after the economic crisis, for the firms with higher growth opportunities or higher risks, or firms under financial distress. In addition, non-chaebol affiliated and firms with better corporate governance scores show stronger impact of managers. Managers' ability plays a more important role when controlling shareholders' intervention and government's regulation becomes weak. These results are robust to our attempts to address endogeneity concerns and regardless of choices

¹ Graduates from elite schools may benefit from larger and better social network as many of those would hold important positions in the society. We also examine this issues as part of robustness tests.

of managers; executive managers, outside directors, and CEOs. Also the positive impacts on firm value are stronger when managers are from universities belonging to the top one percentile.

Our findings add to the literature on firm value and management in at least three ways. First, the study shows compelling evidence of manager impact on firm performance. Specifically, we identify a new factor affecting firm value: academic excellence of board members as a predictor of their managerial ability. Third, our evidence suggests that managers play a more important role in specific environments: firms with good governance system, firms facing financial difficulties or growth options or stand-alone firms.

This paper is organized as follows. Section II reviews the research on manager ability and firm value. Section III describes the data. We discuss empirical specifications and results in Section IV. In Section V, we discuss the robustness of the results. Section VI contains a summary and conclusions.

II. Manager's ability and firm value

A. Manager ability and Prestigious schooling

There was some controversy in early studies² over whether top executives matter in firm performance. Such controversy has been weakened as many event studies on firm performance and turnovers of top management suggest that top management matters in firm value. For example, Warner, Watt and Wruck (1988) show that management turnover occurs after poor stock market returns. Their study shows that managers matter in firm performance. Furthermore, Hayes and Schaefer(1999) show that a firm's stock return falls when an able manager departs the firm, while it increases when an average manager departs. Hence, manager ability matters to firm performance.

Manager's ability is a complicate multi-dimensional concept and not easily observable. For example, Aron (1988) asserts that the managerial abilities involve organizational skills, business intuition, and knowledge of economy wide trends. Sah and Stiglitz (1991) define the managerial ability in selecting projects and future managers and argue that it affects the performance and survival of the organization.

Whether a person's education is linked to managerial ability remains an open question. Firms appreciate managers and workers' education, possibly perceiving education as a proxy for managerial ability. Education sends signal the workers' ability to employers, either through queuing (Thurow 1975, Moen 1990) or through filtering (Arrow, 1973). According to queuing theory, education enhances trainability of the managers, while proponents of filtering theory argue that education can screen individual differences in

² Early studies on organization literature such as Lieberson and O'Connor (1972) Finkelstein and Hambrick(1996) and Pfeffer, (1997) argue top management do not have much explanatory power on firm performance. On the other hand, Child (1972), Hambrick and Mason (1984), and Tushman and Romanelli (1985) argue that executives do matter in firm performance.

ability even though education may not seem to improve individual productive capacity.³

Consequently, workers with more education are paid higher wages. Return to education is very high as reflected in high wage differentials (Taubman and Wales 1973, Layard and Psacharopoulos, 1974) despite that education does not seem to improve immediate individual productive capacity. These findings are consistent with the argument that education can sort workers (Weiss, 1995) as workers use it as signaling device and firms use it as screening device (Becker 1964, Arrow 1973, Spence 1973).

Not only levels (or years) of education, education and diploma from prestigious universities can signal the managerial ability to the market and members of the firm. Some studies report that the quality of educational institutions is correlated with wages and earnings. According to Wales (1972), graduates from undergraduate or graduate schools with better school quality earn significantly and substantially higher earnings than other graduates. When a manager's pay is correlated with her ability, this study implies that managerial ability of managers from top educational institutions is perceived to be higher.

Moreover, some studies argue that the quality of educational institutions is correlated with job performance of their graduates. Bawman and Mehay (2002) analyze the effects of college quality and individual academic background on selected job performance measures for U.S. Navy officers. They find that graduates of top-rated private schools were more likely than other officers to be promoted at the up-or-out point. Baltzell (1958), Domhoff (1967), and Clement (1975) describe that educations at Ivy League universities are indicators of superior individual performance as a manager in the future. D'Aveni (1990) has reported that firms with proportionately more top managers from ivy-league undergraduate schools or selective prestige research institutions are less likely to file for bankruptcy.

In short, as prestige of schools does not change much over time because schools try to recruit students comparable to the current school reputation, the prestige level of schools signals the graduates' ability. A manager from a highly competitive school is apt at accumulating useful knowledge and skills in management even if education and academic training itself might not be directly related to the managerial ability.

B. Managerial ability and higher education in Korea

There is a very strong academic ranking system has been established among universities. For a long time, universities are required to select students based on academic merits only by the law. As top-ranking schools had successfully recruited the highest scoring students with a few exceptions, academic rankings of colleges are directly correlated with students' ability. As prestige of schools does not change much over time because schools try to recruit students comparable to the current school reputation, the prestige level of schools signals the graduates' ability. Kim and Lee (2005) argue that the most competitive

³ Contrary to this view, proponents of credentialism can argue that education does not change a manager's productivity and skills, nor signal his ability. According to credentialism, education is a way monopolizing an access to high rewarding jobs and leading to "training robbery". See Berg (1971), Collins (1971, 1974)

university in students' academic ability is the largest and oldest national university which is mostly run by the central government budget,⁴ followed by two very well endowed science and engineering schools, and more established private universities in Seoul.

A positive relationship between managerial ability and educational credentials can be observed in Korea. Several studies show graduates from top ranking universities earn more than their counterparts after controlling for education years and careers (Chang, 2004, Kim 2007).

Educational credentials would predict managerial ability with more precision in Korea, when aforementioned theories hold. As Korean universities are required to select students based on academic merits only by the law, academic rankings of colleges are directly correlated with students' ability. In addition, Kim (2004) shows the evidence that the average SAT score of students admitted to each university are much correlated with its own past scores and the academic ranks of schools based on students' SAT scores have not changed over the past 10 years.

[Insert Table I around here]

In Table I, we present the characteristics of the universities with a top 5th percentile academic ranking in Lee et al. (2003) based on Korean government administered Scholastic Aptitude Test Scores of students in 124 universities in 2000. The table also shows that graduates from these schools amount a large number of leaders in their fields, judiciary court members, high level government officials. These schools also show the highest research outputs, and highest expenditure on students.

In our work, we use it as a proxy for manager ability that a manager graduated from elite school graduation. More specifically, as a measure of top managers' ability, we use the proportion of the directors who graduated from universities with the 5th percentile or the 1st percentile academic rankings.

III. Data

Our sample consists of the non-financial, publicly traded firms in the Korea Stock Exchange from 1990 to 2006. To investigate the relationship between managers' ability (measured through school's academic ranking) and firm value, we have collected information on each director on boards from Korea Listed Companies Association and KISLINE, a database maintained by Korea Investors Service, Inc. The top management team files of Korea Listed Companies Association and KISLINE supply quarterly updated information on the name, title, intra-company rank, birth date, education background, and career of the top managers of listed companies. In addition, accounting data for the firms in our sample were taken from FnDataguide. There are 7,104 firms with a complete set of

⁴ According to Kim and Lee (2005), "From the beginning, SNU naturally became the most highly regarded university." They also report that "In general, the current pecking order is that SNU shares the top positions with two new-but very-well-endowed science and engineering universities; below them are more established private universities in Seoul."

board of director data and a complete financial data.

[insert Table II around here]

Table II contains summary statistics for the study. Following earlier studies of corporate governance and performance issues since Morck et al. (1988), we use Tobin's Q – the ratio of the firm's market value to the replacement cost of its assets – as a measure of corporate value. Firm's market-to-book value is used as a proxy for Q, while market value is measured through the market value of common equity plus the book value of preferred stock and long-term debt. As Table II shows, average and median Tobin's Q during the overall period are 0.545 and 0.651, respectively. Additionally, we use operating profitability – the ratio of operating income before depreciation to total assets at the beginning of the year, as a measure of current profitability.

Table II also shows the portion of directors graduated from elite schools. On average, 39.8% and 17.6% of board members graduated from schools with the 5th percentile ranking or the 1st percentile ranking, respectively. Board composition is the fraction of directors who are outsiders. Outside director system was introduced in 1998 and all listed firms are legally required include outside directors on boards.

[insert Table III around here]

Results of correlation analysis among the variables used in this study are presented in the Table III. In addition, Table III provides the difference of the correlation between elite schools graduated directors' ratio and firm value before and after crisis. Elite schools graduated directors' ratio is highly correlated with firm value after the crisis, while it is not significantly correlated before the crisis.

IV. Analyses and Results

We examine how managers' ability affects firm performance when we control for factors determining firm performance. As discussed earlier, we use the portion of managers from top colleges as a proxy for managers' ability. For firm performance, we use Tobin's Q.

$$\begin{aligned} \text{Tobin's Q} = & \alpha + \beta_1 (\text{Manager ability}) + \beta_2 (\text{Board size}) + \beta_3 (\text{Board's average age}) \\ & + \beta_4 (\text{Largest ownership}) + \beta_5 (\text{CAPEX/Assets}) + \beta_6 (\text{Leverage}) + \\ & \beta_7 (\text{firm size}) + \beta_8 (\text{Operating profitability}) + \beta_9 (\text{Distress dummy}) + \\ & \beta_{10} (\text{Market risk}) + \beta_{11} (\text{Industry dummy}) + \beta_{12} (\text{year dummy}) \quad (1) \end{aligned}$$

We control for firm size, capital expenditure, leverage, operating profitability and firm risk. Firm size is measured by log value of total asset. We also control for leverage as the ratio of total debt to total assets, because debt can enhance or hinder a firm's ability to create value by, for example, changing its contracting environment through constraints imposed by debt covenants. Following Yermack (1996) and Faleye (2006), we include operating profitability, defined as the ratio of operating income before depreciation to total

assets at the beginning of the year, as a measure of current profitability. Compared to traditional equations on firm value, the firm performance equation includes information on boards, such as average age of managers, and board size following Yermack (1996). Board size is a log value of total number of directors on board. Also, we include two-digit primary SIC code dummies to control for industry differences.

A. Basic Results

Table IV summarizes the basic results when all the samples in the data are used. It shows that manager's ability has a significant positive effect on market value. The results are also consistent when random effect and fixed effect are considered. When management ability is measured by the ratio of managers from the schools with the 1st percentile rankings, the effect of managerial ability is larger compared to those with the 5th percentile rankings? Leverage increases firm value (possibly due to tax shields associated with a use of debt) and firm profitability also increases Tobin's Q. Firm size, and experience of financial distress have negative impacts on firm value. Board Size, and average age of board members have negative impacts on Tobin's Q. These results still hold even when we control for firm fixed effects.

[insert Table IV around here]

B. Time-series variations before and after the crisis

We test whether the effect of the manager's ability on firm value changes when structural environmental changes occur. Since the economic crisis in 1997, the Korean economy has experienced many changes including corporate restructuring and financial restructuring. Moreover, as the government regulation becomes weaker, there is more scope for managerial ability.

Table V reports the changes of the effect of managers' ability before and after an economic crisis. The regression includes an interaction term between the proportion of managers who graduated from the 5th percentile schools or the 1st percentile schools and the after crisis dummy variable. The interaction term is positive and significant at a 1% level. Hence, it indicates that after the economic crisis, the Tobin's Q ratio has a stronger positive impact manager's ability. This result is consistent when we regress the model before and after the crisis, respectively.

[insert Table V around here]

C. Cross-sectional variations

We also examine whether the effect of the manager's ability on firm value changes over firm's specific situations.

C.1. Volatility

We examine whether the effects of manager ability would change over firm's volatile or risky economic situations. In addition to explanatory variable in the basic model, we

include interaction terms between firm's volatile conditions with manager's ability indicator variable. We examine the effects of financial distress, market risk, return volatility, and growth options. If managers' ability matters more in such volatile conditions, the effects of manager ability will be greater. Growth options are measured through sales growth rates and R&D expenses, market risk is measured through beta (systematic risk), and return volatility is measured through standard deviation of stock return. As Dittmar and Thakor (2007) insist R&D expenses are a measure of firms' growth opportunities, we include Research and development (R&D) expenses as a control variable. We assume that any firm that reports total assets but not R&D expenses had no R&D expenses in that year. R&D is measured as Research and development (R&D) expenses divided by assets.⁵

[insert Table VI around here]

Table VI summarizes the results on interaction terms between the manager's ability and firm's characteristics of Variation, Distress, sales growth rate and R&D activity. Coefficients on interaction terms are positive, indicating that Tobin's Q has a stronger positive relation with the manager's ability when the firm is more risky, highly growing, or financially distressed. These results suggest that management ability becomes more important when firms experience some volatile situations.

C.2. Governance and business organizations

We also examine whether the effect of the manager's ability on firm value changes over firm's governance system or chaebol affiliation. Adams et al. (2005) suggest that a manager's impact on firm performance depends on organizational variables. The role and scope of managerial decision-making may become more important and transparent in firms with higher governance scores. On the other hand, some economic conditions as discussed earlier. As business-group affiliated firms are controlled by group headquarters or controlling shareholders, managerial ability in chaebol-affiliated firms might not be an important factor.

We include interaction terms between the manager's ability and chaebol dummy or governance index in regression equations. As a governance measure, we use the Korean corporate governance index (KCGI), which is based primarily on responses to a survey of governance practices by the Korea Stock Exchange (KSE). The index includes 39 governance elements in equally weighted five sub-indices: Shareholder Rights; Board Structure and Procedure; Disclosure; Audit Committees; and Ownership Parity. We construct the governance measure by taking a log value of KCGI.

The regression results in Table VII generally support our hypotheses. The interaction term between the manager's ability and chaebol is negative and the interaction term between the manager's ability and governance index is positive, significant at the 5% level respectively. The results indicate that Tobin's Q has a stronger positive association with the manager's ability for stand alone firms or firms with a good governance practice. The evidence is consistent with the recent literature on the nature of chaebols and governance system in

⁵ The result is consistent when we use the R&D variable as Research and development expenses divided by sales.

Korea. Kato et al. (2007) show a significant executive pay-performance link in non chaebol-affiliated firms while no such link exists for chaebol firms. Black et al (2006) report the evidence that the greater board independence causally predicts higher market value in Korea.

[insert Table VII around here]

D. How manager ability affects firm value

We explore mechanisms by which manager ability affects firm value. We examine the effects on firm's volatility, sales growth, credit rating, cost of capital and governance scores. Return Volatility is measured as the annualized standard deviation of daily returns during the year. Sales growth is the growth rate of sales in the recent 3 years. Credit rating is a conversion of KIS's corporate credit rating into a number from 1 to 10 (lowest to highest). Cost of capital is the interest expenses divided by the interest bearing debts. Governance is the natural logarithm of total Korean corporate governance index (KCGI) from 2002 to 2006.

Table VIII reports the results. Firms with high proportion of managers from top schools seem to enjoy lower volatility of stock returns, more sales growth, higher credit ratings and higher governance scores.

[insert Table VIII around here]

V. Analyses of robustness tests and results

In this section, we examine whether the previous results are robust in several ways. One, we study endogeneity issues by asking whether better performing firms hire better able managers, or vice versa. Two, we explore which manager's ability is important, executive managers, outside directors, or CEOs. Three, we test whether the results reflect the social/political network of managers rather than their managerial skills and abilities. Finally, we analyze how our previous results change when we use the proportion of managers from university with 1st percentile of academic ranking.

A. Endogeneity and causality issues

In this section, we address the potential endogeneity and causality problems. Hermalin and Weisbach (2003) argue that both endogeneity and the equilibrium nature of the results should be considered when evaluating studies of boards or corporate governance.

Accordingly, an important issue in studying the correlation between management and firm performance is the direction of causation. Managers can affect firm performance, but firm performance can also cause the firm to change its managers. Prior researchers have found limited evidences of an endogenous relationship between firm performance and board composition, in which performance affects board composition. They insist that board composition could affect future firm performance, but a firm's need for a particular board structure, the firm's past performance, and other factors could also affect the firm's future

board composition.

If managers' ability is endogenous, ordinary least squares (OLS) coefficient estimates can be biased. Furthermore, treating board's ability as exogenous can confuse the direction of causality. For example, if corporate value affects elite school-trained managers, then regressing a measure of corporate value against a measure of the ratio of elite school-trained managers is problematic. This false attribution of causality can lead to a misinterpretation of the relation between managers' ability and corporate value.

To address the potential endogeneity problems, we estimate a simultaneous equations system of ratio of top school graduated directors and corporate value using the two-stage least squares (2SLS) method. Because two-stage least squares regression and three-stage least squares provide qualitatively similar results, we only report the results from the 2SLS model. Specifically, we estimate the following simultaneous equations system:

$$\text{Tobin's } Q = f(\text{manager ability, Board size, Board composition, Director age, Largest ownership, CAPEX/Assets, Leverage, Firm size, Operating profitability, Distressed, Chaebol, Market risk, Industry, year}), \quad (2)$$

$$\text{Manager ability} = g(\text{Board size, Director age, Largest ownership, CAPEX/Assets, Firm size, Tobin's } Q, \text{ Operating profitability, Distressed, Chaebol, Industry, year}). \quad (3)$$

The use of Board's ability graduated directors as an endogeneous variable captures the possibility that corporate value affects the Ratio of elite school graduated directors. Other things being equal, a firm may prefer elite school graduated directors as board of directors when the firm value is higher and, consequently, there could be relation between the ratio of top school graduated directors and firm value. A greater level of corporate value may lead to a higher rate of elite school graduated directors.

The Tobin's Q equation, Eq. (2), is similar to the one used in the OLS corporate value regression. We use the lag variable of the proportion of managers who graduate from the 5th percentile school, as an instrument to control for the possibility that board's ability is endogenously determined, because the lag variable of the proportion of managers who graduate from the 5th percentile school is very highly correlated with the rate of the current elite school graduated directors, while less highly correlated with the current firm value compared to the current elite school graduated director variable.

In the managers' ability equation, Eq. (3), we use the lag variable of Tobin's Q as instrument variable because it is very highly correlated with firm value and operating performance, while less highly correlated with the current elite school graduated director variable.

In all of these three equations, industry dummy variables based on SIC codes and year dummy variables are included. The inclusion of industry dummy variables helps control for industry effect on corporate value and the ratio of top school graduated directors, and the inclusion of year dummy variables helps control for macroeconomic effects on each year

using the panel data.

[insert Table IX around here]

Table IX reports the two-stage least squares estimation results of the simultaneous regression. The primary result is that endogeneity doesn't affect the results of OLS regressions. The firm value regression appears in the second column of Table IX. It shows that the ratio of elite school graduated managers is important determinant of corporate value, confirming earlier findings. However, the regression results on managers' ability do not show any evidence that the corporate value affects the ratio of elite school graduated directors.

The managers' ability regression reported in the third column shows that the ratio of elite school trained directors is a function of firm size and chaebol dummy. Taken together, this finding and the corporate value regression result suggest that the significant positive correlation between board's ability and firm value is not only robust, but is also consistent with causation running from the manager's ability to firm value.

B. Firm fixed effects and endogeneity problems.

We also consider the following first-order difference specification as another method of solving endogeneity problem. Through this equation, unobserved firm fixed effects are removed.

$$\begin{aligned} \Delta \text{Tobin's } Q_{i,t} = & \beta_1 \Delta \text{Managers from elite school}_{it} + \beta_2 \Delta \text{Board size}_{it} + \beta_4 \Delta \text{Director age}_{it} \\ & + \beta_5 \Delta \text{Largest ownership}_{it} + \beta_6 \Delta \text{CAPEX/Assets}_{it} + \beta_7 \Delta \text{Leverage}_{it} \\ & + \beta_8 \Delta \text{Firm size}_{it} + \beta_9 \Delta \text{Operating profitability}_{it} + \beta_{11} \Delta \text{Market risk}_{it} \\ & + \Delta \varepsilon_{it}, \end{aligned} \quad (4)$$

In the equation above, Δ means the difference between t and $t-1$ (for example, Δ elite school graduated managers_{it} = elite school graduated managers_t - elite school graduated managers_{t-1}). Executive managers are mostly determined on early in a year at the shareholder's meeting and Tobin's Q presents the market value of the common stock at the end of a year. Thus, this regression shows the 1-year lag effect of director's ability on firm performance.

[insert Table X around here]

Table X presents a significant relation between the first-order difference of elite school graduated directors and the first-order difference of Tobin's Q, suggesting that the increase in the board's ability causes the increase in the firm value, which is consistent with the results of our aforementioned works.

[insert Table XI around here]

We also examine the difference in the effect of manager ability on firm value between the

highly changed manager ability group and the lowly changed manager ability group. Table XI presents the result of test. Means of change in Tobin's Q is significantly larger for the group of highest change in manager ability than for the group of lowest change in manager ability. And the coefficient of manager ability in the simple OLS regression model is significantly positive in the group of highest change in manager ability.

C. Executive managers, outside directors, and CEOs

We measured the effect of elite school graduated directors on firm value dividing directors into three groups such as insider, outsider, and CEOs.

Table XII shows that the effect of managers graduating from schools with the 5th percentile academic ranking on firm value is significant. Panel A, B, C shows the results when we restrict executive managers (or insiders) only, CEOs only and outside directors only, respectively. While insiders and CEOs generate positive impacts on firms' Tobin Q, the effects of outsiders are not significant.

[insert Table XII around here]

D. High academic credentials and managerial ability

We analyze how the effect changes when academic credentials become stronger. We include the portion of managers from top 1 percentile academic rankings to measure manager ability. As Table I shows, the average SAT scores of graduates from this school is very high, reaching top 0.5%.

Table XIII shows that the effect of top school graduated managers on firm value is significantly positive at the 1%. The earlier effects still hold. In addition, Table XIII exhibits that manager ability affects Tobin's Q in all three groups of managers; insiders, CEOs and outsiders as well. These results suggest that the positive impacts of manager's ability on firm value are robust regardless of choices of managers; inside managers, outside directors, and CEO.

[insert Table XIII around here]

E. Social network or Managerial ability

As graduates from elite schools also have large social network or outside contacts, an improvement in firm value might results from benefits associated with large social network. Because the Korean economy has shown strong influences and effects of governments and politics, Siegel (2007) and Johnson et al (2007)⁶ argue that building political connection with governments is very important for firm managers. Given the fact that prestigious schools produce many government officials and officials, graduates from elite universities might benefit from political connections.

⁶ Unlike education from elite colleges, Johnson et al. (2007) use the basis of political networks as regional connections, and Siegel (2007) uses affiliations from elite high schools in the five regions of the country.

This section examines whether the effect of managers with academic credentials results from their social/political network rather than their management ability. Some studies also use the variable of elite university graduation as a proxy of management network density (D'Aveni (1990), Kim (2005)).

Figure I shows the historical trends of managers and ministers from 1990 to 2006. It shows the ratios of managers and ministers who graduated from elite schools. Before the crisis, in government the percentage of ministers from elite schools was high. During Kim Young Sam (YS regime) presidency, two-thirds of the cabinet members graduated from the 1st percentile school consisted of more than in the regime. Since the onset of economic crisis in 1997 however, there was a large drop in the ratio of the 1st percentile school graduated cabinet members. Despite such drop, there is a slight increase in the ratio of the elite school graduated managers. If the prestigious schooling reflects graduates' large social network rather than ability, there has to be a positive relation between the school's network power in governments and the ratio of the elite school graduated directors.

[insert Figure I around here]

Table XIV provides further evidence that the impact of managers' educational credentials on the firm value is not caused by the school's social network benefit. As seen earlier, social capital of managers from the 1st percentile school was stronger in the YS regime than in the other regimes. We used an interaction term between the ratio of managers from top school diploma and YS regime dummy variable in the regression model. If social network effects are right, we expect a positive, significant coefficient on the interaction term. However, Table XIV shows that the impact of the 1st percentile school graduates on the firm value decreased, suggesting the impact of elite school graduated boards on the firm value is not caused by the school's social network benefit.

[insert Table XIV around here]

VI. Summary and conclusion

This study examines whether managers' ability affects firm value under different conditions in an emerging economy. Using managers' educational credentials in Korea where universities recruit students based on academic merits only, we test how managers' ability improves firm performance more in changing economic environments or in more volatile situations. Scopes and impacts of management decision would be larger and more critical in firms with higher growth opportunities, higher risks, better corporate governance systems or under financial distress. In addition, managers in stand-alone firms may have more impacts compared to their counterparts in business groups.

We find that managers with better academic backgrounds improve firms' Tobin Q and the effects are more evident after the economic crisis, for the firms with higher growth opportunities or higher risks, or firms under financial distress. In addition, non-chaebol affiliated and firms with better corporate governance scores show stronger impact of

managers. Managers' ability plays a more important role when controlling shareholders' intervention and government's regulation becomes weak. These results are robust to our attempts to address endogeneity concerns and regardless of choices of managers; executive managers, outside directors, and CEOs. Also the positive impacts on firm value are stronger when managers are from universities belonging to the top one percentile.

In summary, this study shows that firms have higher values if they have proportionately more managers with elite school credentials, suggesting that academic credentials are likely correlated with ability. Therefore, this study helps identify a new factor affecting firm value: academic excellence of board members as a predictor of their managerial ability. Moreover, our evidence suggests that managers play a more important role in specific environments.

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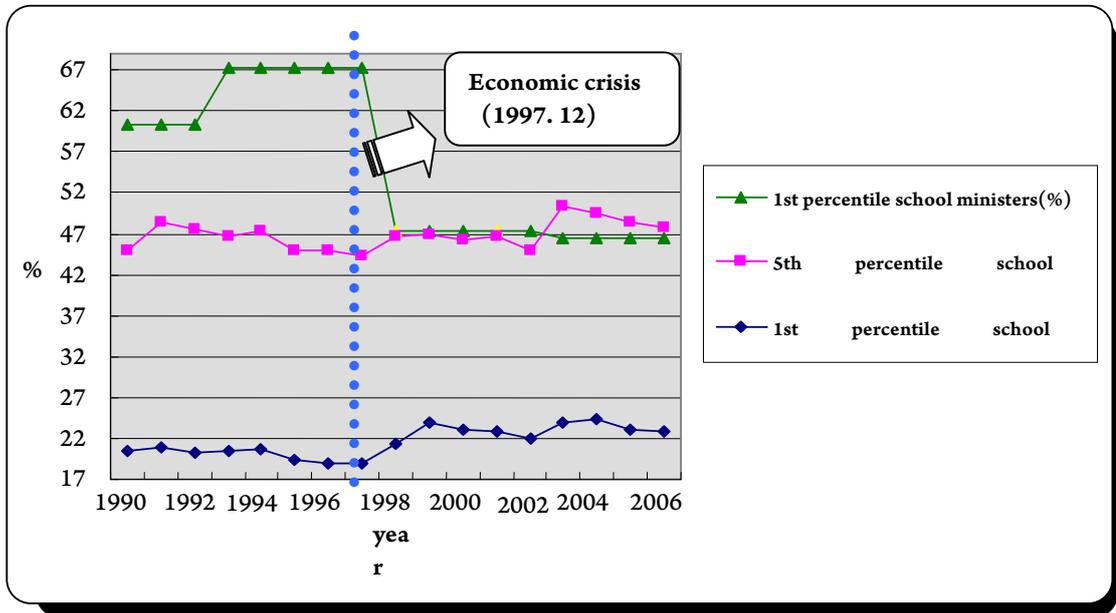


Figure I. The changes in the ratio of boards and cabinet members who graduated from elite schools. Figure I shows the change in the ratio of boards and the change in the ratio of cabinet members who graduated from elite schools between 1990 and 2006.

Table I
The characteristics of elite schools

This table reports the characteristics of elite schools. The sample consists of 124 universities. We divided universities by deciles of Korean government administered SAT percentile scores of year 2000 and the numbers of each variable were adjusted by the total number of students. *SAT Score* is the Average SAT percentile score of each university; *Number of elites* is the number of persons who registered in the Database of people of the four newspapers such as Jhosunilbo, Dongailbo, JoongAngilbo, and Munhwaillbo as of August, 2001; *Success in national exams* is the number of persons who succeeded in the National Examination of a state law examination and a state administration examination in 2000; *SCI* is the number of articles per one professor which were published in Science Citation Index in 1997; *School spendings* are expenses for personnel, administration, operation, research, and students

(unit; %, persons, number, 1,000 won)

	SAT Score	Number of elites	Success in national exams	SCI	School spendings
1 st percentile	99.5	102,934	419.0	0.92	6,453
5 th percentile	98.7	39,343	173.6	0.52	4,628
1 th decile	97.8	40,914	177.1	0.64	7,404
2 nd decile	92.5	11,551	19.8	0.22	4,572
3 rd decile	87.7	5,733	7.0	0.18	4,567
4 th decile	82.1	2,366	1.4	0.18	4,267
5 th decile	78.2	3,775	1.3	0.16	4,452
6 th decile	74.3	2,899	1.3	0.11	4,190
7 th decile	68.6	755	0.0	0.09	4,171
8 th decile	62.3	486	0.0	0.09	3,587
9 th decile	55.4	861	0.1	0.07	3,306
10 th decile	41.2	115	0.0	0.06	2,704
Average of overall Univ.	73.9	5,777	16.4	0.22	4,289

(Lee et al, 2003)

Table II
Descriptive statistics for sample firms

This table presents descriptive statistics for sample firms over 1990-2006. The sample is drawn from FnDataguide. Data related to board of director characteristics are taken from Korea Listed Companies Association and KISLINE. Tobin's Q is the ratio of the sum of the market value of common equity, the book value of preferred equity, and the book value of long-term debt to the book value of assets. The Manager ability_5th or Manager ability_1st is the proportion of directors who graduated from the 5th percentile universities or the 1st percentile universities on the boards. Ability of Executive manager or Outside directors is the ratio of directors who graduated from the 5th percentile universities among the executive managers or outside directors. CEO ability is a dummy variable which takes 1 when the first rank of the company is a graduate of 5th percentile school. Board size is the natural logarithm of total number of directors. Board composition is the fraction of directors who are outsiders. Board composition is the fraction of directors who are outsiders. Director age is as of the end of year and the natural logarithm of the age. Largest ownership is the percentage shareholding of the largest shareholder. CAPEX/Assets is the ratio of capital expenditures to total assets. Leverage is the ratio of total debt to total assets. Firm size is the natural logarithm of (total assets/1,000,000). Operating profitability is the ratio of earnings before interest and taxes (EBIT) to beginning total assets. Distressed is a dummy that takes 1 when a firm experienced ordinary income losses in recent 3 years, or an equity loss in the year. Chaebol dummy is a dummy variable to indicate whether a firm belongs to one of the 50 largest chaebols. The Korea Fair Trade Commission updates the list of the 50 largest chaebols annually. Market risk (beta) is the estimate from market model in which the firm's monthly returns over the last year are regressed on the KOSPI monthly returns. Return Volatility is measured as the annualized standard deviation of daily returns during the year. 3yr Sales growth(%) is the growth rate of sales in the recent 3 years.

Panel A : the overall period (1990~2006)						
Variable	First quartile	Mean	Median	Third quartile	Standard deviation	Sample size
Tobin's Q	0.380	0.651	0.545	0.775	0.503	7,104
Manager ability_5 th	0.273	0.470	0.500	0.667	0.268	7,104
Manager ability_1 st	0.000	0.217	0.176	0.333	0.219	7,104
Executive manager ability	0.250	0.463	0.480	0.667	0.285	7,104
CEO ability	0.000	0.414	0.000	1.000	0.493	7,104
Outside director ability	0.000	0.516	0.500	1.000	0.413	7,104
Board size	1.792	2.102	2.079	2.398	0.578	7,104
Director age	3.916	3.965	3.971	4.025	0.102	7,104
Largest ownership	0.171	0.303	0.281	0.406	0.173	7,104
CAPEX/Assets	0.012	0.060	0.037	0.089	0.263	7,104
Leverage	0.450	0.625	0.612	0.748	0.495	7,104
Firm size	4.109	5.236	5.010	6.098	1.584	7,104
Operating profitability	0.007	0.021	0.024	0.055	0.117	7,104
Distressed dummy	0.000	0.277	0.000	1.000	0.447	7,104
Chaebol dummy	0.000	0.190	0.000	0.000	0.393	7,104
Market risk(beta)	0.476	0.756	0.766	1.044	0.437	7,104
Return Volatility	0.377	0.561	0.497	0.692	0.259	7,104
3yr Sales growth	0.017	0.104	0.093	0.170	0.244	7,104
Panel B : Before the crisis (1990~1997)						
Variable	First	Mean	Median	Third	Standard	Sample

	quartile		quartile		deviation	size
Tobin's Q	0.468	0.681	0.607	0.810	0.389	2,796
Manager ability_5 th	0.273	0.461	0.467	0.660	0.268	2,796
Manager ability_1 st	0.000	0.199	0.158	0.333	0.203	2,796
Board size	1.946	2.295	2.197	2.639	0.563	2,796
Director age	3.901	3.942	3.944	3.990	0.073	2,796
Largest ownership	0.159	0.271	0.256	0.350	0.150	2,796
CAPEX/Assets	0.022	0.080	0.054	0.110	0.104	2,796
Leverage	0.574	0.701	0.693	0.794	0.291	2,796
Firm size	3.801	4.959	4.718	5.854	1.580	2,796
Operating profitability	0.007	0.020	0.019	0.039	0.058	2,796
Distressed dummy	0.000	0.205	0.000	0.000	0.403	2,796
Chaebol dummy	0.000	0.195	0.000	0.000	0.396	2,796
Market risk(beta)	0.568	0.844	0.880	1.164	0.476	2,796
Return Volatility	0.365	0.501	0.451	0.574	0.202	2,796
3yr Sales growth	0.073	0.146	0.133	0.201	0.186	2,796
Panel C : After the crisis (1999~2006)						
Variable	First quartile	Mean	Median	Third quartile	Standard deviation	Sample size
Tobin's Q	0.323	0.629	0.480	0.733	0.590	3,875
Manager ability_5 th	0.275	0.477	0.500	0.667	0.270	3,875
Manager ability_1 st	0.000	0.233	0.200	0.375	0.231	3,875
Board size	1.609	1.935	1.946	2.197	0.489	3,875
Board composition	0.200	0.262	0.222	0.286	0.125	3,875
Director age	3.946	3.988	4.004	4.055	0.120	3,875
Largest ownership	0.180	0.328	0.305	0.452	0.187	3,875
CAPEX/Assets	0.005	0.037	0.024	0.058	0.358	3,875
Leverage	0.348	0.538	0.496	0.648	0.626	3,875
Firm size	4.402	5.477	5.247	6.282	1.539	3,875
Operating profitability	0.008	0.027	0.034	0.069	0.138	3,875
Distressed dum	0.000	0.328	0.000	1.000	0.470	3,875
Chaebol dummy	0.000	0.190	0.000	0.000	0.392	3,875
Market risk(beta)	0.412	0.678	0.668	0.942	0.400	3,875
Return Volatility	0.375	0.563	0.517	0.700	0.259	3,875
3yr Sales growth	-0.013	0.747	0.618	0.137	0.270	3,875
Governance (2002~2006)	4.575	4.704	4.691	4.804	0.209	2,164

Table IV
Manager ability and firm performance

This table presents linear ordinary least-squares regressions analysis of firm performance on manager ability and other firm characteristics between 1990 and 2006. The dependent variable is Tobin's Q_t which is the market value to book value. Manager ability is the proportion of directors who graduated from the 5th percentile universities. Regression (1) shows the results of basic regression and Regression (2) shows fixed effect regression of firm performance and manager ability. Industry dummies are employed to control for industry compensation practices, and year dummies are employed to account for economy-wide shocks. Standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	(1)	(2)
Manager ability	0.084*** (0.020)	0.058*** (0.024)
Board size	-0.029** (0.013)	-0.069*** (0.014)
Director age	-0.548*** (0.055)	-0.321*** (0.061)
Largest ownership	0.053* (0.032)	0.056* (0.039)
CAPEX/Assets	0.006 (0.020)	0.026 (0.020)
Leverage	0.232*** (0.022)	0.321*** (0.061)
Firm size	-0.012** (0.005)	-0.106*** (0.013)
Operating profitability	0.177*** (0.047)	0.199*** (0.043)
Distressed dummy	-0.066*** (0.012)	-0.055*** (0.012)
Chaebol dummy	0.010 (0.015)	
Market risk(beta)	0.018 (0.014)	-0.012 (0.013)
Industry dummy	Yes	
Year dummy	Yes	Yes
Firm fixed effect		Yes
Number of firms	7,104	7,104
Adj. R ²	0.219	0.490

Table V

Manager ability and firm value: An Intertemporal Perspective

This table presents linear ordinary least-squares regressions analysis of firm value on manager ability and other firm characteristics before and after the economic crisis. Manager ability in the Regression (1) and (2) is the proportion of directors who graduated from the 5th percentile universities and the 1st percentile universities on the boards, respectively. Regressions include interaction terms between the manager ability and Post-Crisis dummy variable equal to one if the period is from 1999 to 2006. The sample consists of 7,104 firm-year observations between 1990 and 2006. We report standard errors in parentheses below each coefficient estimate. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	(1)	(2)
Manager ability	0.007 (0.029)	0.011 (0.037)
Manager ability * Post-Crisis	0.140*** (0.038)	0.222*** (0.046)
Board size	-0.022* (0.013)	-0.020 (0.013)
Director age	-0.544*** (0.055)	-0.553* (0.055)
Largest ownership	0.048 (0.033)	0.045 (0.033)
CAPEX/Assets	0.007 (0.020)	0.005 (0.020)
Leverage	0.234*** (0.022)	0.232*** (0.022)
Firm size	-0.014*** (0.005)	-0.016*** (0.005)
Operating profitability	0.176*** (0.047)	0.172*** (0.047)
Distressed dummy	-0.066*** (0.012)	-0.067*** (0.012)
Chaebol dummy	0.010 (0.015)	0.007 (0.015)
Market risk(beta)	0.017 (0.014)	0.016 (0.014)
Industry dummy	Yes	Yes
Year dummy	Yes	Yes
Number of firms	7,104	7,104
Adj. R ²	0.220	0.223

Table VI

Volatility, distress and growth options on effects of manager ability

This table reports the cross sectional differences in the effect of manager ability on firm value between 1990 and 2006. The dependent variable is Tobin's Q, which is the market value to book value. Manager ability is the proportion of directors who graduated from the 5th percentile universities. Distressed is a dummy that takes 1 when a firm experienced ordinary income losses in recent 3 years, or an equity loss in the year. Market risk (beta) is the estimate from market model in which the firm's monthly returns over the last year are regressed on the KOSPI monthly returns. Return Volatility is measured as the annualized standard deviation of daily returns during the year. 3yr Sales growth is the growth rate of sales in the recent 3 years. R&D is R&D expenses over total assets. We assume that any firm that reports total assets but not R&D expenses had no R&D expenses in that year. Standard errors are shown in parentheses. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	(1)	(2)	(3)	(4)	(5)
Manager ability	0.080***	0.035	0.036	0.065***	0.022
	(0.025)	(0.038)	(0.043)	(0.022)	(0.028)
Board size	-0.029**	-0.029**	-0.010	-0.029**	-0.040**
	(0.013)	(0.013)	(0.013)	(0.013)	(0.016)
Director age	-0.548***	-0.547***	-0.449***	-0.539***	-0.484***
	(0.055)	(0.055)	(0.055)	(0.056)	(0.069)
Largest ownership	0.053*	0.055*	0.069**	0.048	0.044
	(0.033)	(0.033)	(0.032)	(0.033)	(0.041)
CAPEX/Assets	0.006	0.006	0.018	0.026	0.064
	(0.020)	(0.020)	(0.020)	(0.024)	(0.042)
Leverage	0.232***	0.231***	0.189***	0.221***	0.265***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.027)
Firm size	-0.012**	-0.013**	-0.003	-0.015***	-0.018***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Operating profitability	0.177***	0.177***	0.195***	0.153***	0.429***
	(0.047)	(0.047)	(0.046)	(0.048)	(0.062)
Distressed dummy	-0.072***	-0.066***	-0.112***	-0.064***	-0.072***
	(0.022)	(0.012)	(0.012)	(0.012)	(0.015)
Chaebol Dummy	0.011	0.010	0.006	0.012	0.011
	(0.015)	(0.015)	(0.015)	(0.015)	(0.018)
Market risk(beta)	0.018	-0.014		0.015	-0.002
	(0.014)	(0.026)		(0.014)	(0.018)
Return Volatility			0.366***		
			(0.041)		
3yr Sales growth				-0.001	
				(0.001)	
R&D					1.136
					(0.846)
Manager ability	0.060*				
*Distressed dummy	(0.038)				
Manager ability		0.072*			
* Market risk(beta)		(0.044)			

Manager ability			0.110*		
* Return Volatility			(0.067)		
Manager ability				0.002***	
*3yr Sales growth				(0.001)	
Manager ability					7.209***
* R&D					(1.391)
Number of firms	7,104	7,104	7,104	7,104	4,909
Adj. R ²	0.219	0.219	0.241	0.222	0.258

Table VII

Manager ability and firm value by Governance and Business organizations

This table presents the regressions of firm value and manager ability using an interaction term between manager ability and governance score or Chaebol dummy. In the regression (1), Governance is the natural logarithm of total Korean corporate governance index (KCGI) which consists of five sub-indices: Shareholder Rights, Board Structure and Procedure, Disclosure, Audit Committees, and Ownership Parity. The regression (2) uses Governance variable as a natural logarithm of total Korean corporate governance index less Board structure and Procedure index. The regressions (3) and (4) examine whether the effect of the manager's ability on firm value changes over Chaebol affiliation using an interaction term between the manager's ability and Chaebol dummy. The regression (3) examines the overall period between 1990 and 2006 and the regression (4) examines the post-crisis period from 1999 to 2006. The sample in the regressions (1) and (2) consists of 2,164 firm-years between 2002 and 2006, when Korean corporate governance index are announced. All regressions use Tobin's Q as the dependent variable. Manager ability is the proportion of directors who graduated from the 5th percentile universities. Standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	(1)	(2)	(3)	(4)
Manager ability	-1.254 (0.939)	-1.530 (0.923)	0.090*** (0.022)	0.087*** (0.033)
CAPEX/Assets	-0.024 (0.027)	-0.026 (0.027)	0.006 (0.020)	0.001 (0.023)
Leverage	-0.383*** (0.061)	-0.385*** (0.062)	0.232*** (0.022)	-0.040 (0.038)
Firm size	0.027*** (0.010)	0.041*** (0.010)	-0.012** (0.005)	0.020** (0.008)
Operating profitability(%)	-0.525*** (0.089)	-0.514*** (0.089)	0.177*** (0.047)	0.015 (0.059)
Distressed dum	0.031 (0.025)	0.028 (0.025)	-0.066*** (0.012)	-0.007 (0.018)
Market risk(beta)	0.151*** (0.033)	0.155*** (0.033)	0.018 (0.014)	0.075*** (0.023)
Governance	0.133 (0.121)	-0.053 (0.121)		
Manager ability * Governance	0.300* (0.189)	0.386** (0.198)		
Chaebol Dummy			0.032 (0.034)	0.105** (0.053)
Largest ownership			0.052* (0.033)	-0.022 (0.045)
Board size			-0.029** (0.013)	-0.005 (0.022)
Director age			-0.548*** (0.055)	-0.715*** (0.072)
Manager ability * Chaebol dum			-0.040 (0.053)	-0.124* (0.076)

Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Number of firms	2,164	2,164	7,104	3,875
Adj. R ²	0.260	0.256	0.219	0.229

Table VIII
How manager ability affects firm value

This table reports how manager ability affects firm performance related values such as Return volatility, Sales growth, Corporate Credit rating, Cost of capital, and Governance. Manager ability is the proportion of directors who graduated from the 5th percentile universities. Return Volatility is measured as the annualized standard deviation of daily returns during the year. Sales growth is the growth rate of sales in the recent 3 years. Credit rating is a conversion of KIS's corporate credit rating into a number from 1 to 10 (lowest to highest). Cost of capital is the interest expenses divided by the interest bearing debts. Governance is the natural logarithm of total Korean corporate governance index (KCGI) which consists of five sub-indices: Shareholder Rights, Board Structure and Procedure, Disclosure, Audit Committees, and Ownership Parity. The sample in the regressions from (1) to (4) includes the period from 1990 to 2006 and the sample firms in the regression (5) are from 2002 to 2006. Standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	(1)	(2)	(3)	(4)	(5)
	Return Volatility	Sales growth	Credit rating	Cost of capital	Governance
Manager ability	-0.015* (0.008)	2.648* (1.427)	0.343*** (0.100)	-1.356 (1.297)	0.042*** (0.015)
Board size	-0.050*** (0.006)	-1.677** (0.765)	0.116** (0.056)	-1.206 (0.857)	0.004 (0.012)
Director age	-0.244*** (0.023)	-14.491*** (3.182)	-0.056 (0.249)	-8.350*** (3.580)	-0.108** (0.042)
Largest ownership	-0.052*** (0.014)	0.524 (1.879)	0.074 (0.140)	-8.239*** (2.113)	-0.107*** (0.020)
CAPEX/Assets	-0.032*** (0.008)	4.697*** (1.349)	0.055 (0.074)	0.294 (1.327)	-0.001 (0.009)
Leverage	0.105*** (0.009)	-0.332 (1.262)	-1.913*** (0.158)	4.139*** (1.442)	-0.057*** (0.020)
Firm size	-0.019*** (0.002)	1.523*** (0.303)	0.289*** (0.023)	-0.068 (0.339)	0.077*** (0.004)
Operating profitability(%)	-0.050** (0.020)	16.302*** (2.718)	0.518* (.279)	19.497*** (3.137)	0.120*** (0.030)
Distressed dummy	0.115*** (0.005)	-4.924*** (0.702)	-0.634*** (0.056)	2.085*** (0.779)	-0.038*** (0.008)
Chaebol dummy	0.015** (0.006)	0.220 (0.850)	0.191*** (0.056)	-0.422 (0.944)	0.010 (0.010)
Market risk(beta)		0.942 (0.828)	-0.258*** (0.071)	-1.841** (0.922)	0.002 (0.011)
Industry dummy	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes
Number of firms	7,104	7,104	1,751	6,625	2,164
Adj. R ²	0.560	0.068	0.494	0.020	0.457

Table IX
Two Stage Regression Coefficients Explaining the Endogeneity problem
during the Post Crisis

Simultaneous equation analysis of corporate value and the rate of top school trained board of directors for nonfinancial firms, using the two-stage least squares method to estimate the following equations:

Tobin's $Q = f$ (Manager ability, Board size, Director age, Largest ownership, CAPEX/Assets, Leverage, Firm size, Operating profitability, Distressed, Chaebol, Market risk, Industry, year),

Manager ability = h (Board size, Director age, Largest ownership, CAPEX/Assets, Firm size, Tobin's Q , Operating profitability, Distressed, Chaebol, Market risk, Industry, year).

Instruments include lagged manager ability variable in the Regression (1) and lagged Tobin's Q variable in the Regression (2). Additionally we used all contemporaneous firm-specific control variables used in Table IV as instruments, including industry and year dummies. See Table II for exact definitions of the variables. Manager ability is the proportion of directors who graduated from the 5th percentile universities. All data are from 1999 to 2006 and standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	Tobin's Q (1)	Manager ability (2)
Manager ability	0.092** (0.044)	
Board size	0.003 (0.022)	-0.026** (0.013)
Director age	-0.685*** (0.074)	-0.099** (0.044)
Largest ownership	-0.015 (0.045)	0.056** (0.025)
Board composition		0.156*** (0.045)
CAPEX/Assets	0.026 (0.027)	-0.021 (0.014)
Leverage	-0.037 (0.038)	-0.040* (0.023)
Firm size	0.017** (0.008)	0.051*** (0.005)
Tobin's Q		0.001 (0.017)
Operating profitability(%)	0.002 (0.059)	-0.046 (0.035)
Distressed dummy	-0.009 (0.018)	-0.008 (0.010)
Chaebol Dummy	0.034 (0.023)	0.101*** (0.013)
Market risk(beta)	0.081*** (0.024)	-0.002 (0.014)
Industry dummy	Yes	Yes

Year dummy	Yes	Yes
Number of firms	3,201	3,201
Adj. R ²	0.223	0.177

Table X
Change in manager ability and change in firm value

This table provides the result of first-order difference specification between manager ability and firm value. Change in variables means the difference between t and t-1. The dependent variable is Tobin's Q, which is the market value to book value. Manager ability is the proportion of directors who graduated from the 5th percentile universities. See Table II for exact definitions of the variables. All data are from 1990 to 2006 and standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	
Change in manager ability	0.057** (0.025)
Change in Board size	0.033** (0.016)
Change in Director age	0.035 (0.062)
Change in Largest ownership	-0.004 (0.047)
Change in CAPEX/Assets	0.010 (0.015)
Change in Leverage	0.068*** (0.026)
Change in Firm size	-0.136*** (0.024)
Change in Operating profitability(%)	0.001 (0.001)
Change in Market risk(beta)	-0.038*** (0.011)
Industry dummy	Yes
Year dummy	Yes
Number of firms	6,396
Adj. R ²	0.138

Table XI
Comparison of Changes in Tobin's Q over two groups

The sample comprises 6,396 nonfinancial firms listed on the KSE between 1990 and 2006. We classified the sample firms into two groups; highest changes in manager ability and lowest changes in manager ability. Highest group is the top one-third of changes in manager ability and Lowest group is the bottom one-third of changes in manager ability. Standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

	Highest change in manager ability (A)	Lowest change in manager ability (B)	t-Statistic (Mean Differences) (A-B)
Mean of change in Tobin's Q	0.169 (0.428)	-0.006 (0.388)	1.857**
Coefficient of manager ability (dependent variable: Tobin's Q)	0.116** (0.052)	0.033 (0.061)	
N	2,132	2,132	

Table XII
Executive managers, outside directors, and CEOs

This table presents linear ordinary least-squares regressions analysis of firm value on manager ability and other firm characteristics dividing managers into three groups such as Executive manager, CEO, and Outsider director. The dependent variable is Tobin's Q_t which is the market value to book value. Manager ability is the proportion of directors who graduated from the 5th percentile universities. All data are from 1999 to 2006 and standard errors are shown in parentheses under parameter estimates. Regressions include interaction terms between the manager ability and firm characteristics. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Panel A: Executive managers				
Variable	(1)	(2)	(3)	(4)
Executive manager ability	0.085**	0.106***	0.003	-0.064
	(0.037)	(0.032)	(0.059)	(0.068)
Board size	0.050**	0.049**	0.050**	0.062***
	(0.026)	(0.025)	(0.026)	(0.024)
Director age	-0.694***	-0.691***	-0.695***	-0.555***
	(0.080)	(0.080)	(0.080)	(0.078)
Largest ownership	0.001	-0.002	0.002	0.015
	(0.049)	(0.049)	(0.049)	(0.048)
Board Composition	0.368***	0.384***	0.361***	0.342***
	(0.085)	(0.086)	(0.085)	(0.083)
CAPEX/Assets	-0.002	-0.003	-0.002	0.007
	(0.024)	(0.024)	(0.024)	(0.023)
Leverage	-0.204***	-0.200***	-0.205***	-0.299***
	(0.044)	(0.044)	(0.044)	(0.044)
Firm size	0.010	0.010	0.009	0.031***
	(0.009)	(0.009)	(0.009)	(0.009)
Operating profitability(%)	-0.097	-0.096	-0.095	-0.092
	(0.068)	(0.068)	(0.068)	(0.066)
Distressed dummy	0.001	-0.006	-0.005	-0.072***
	(0.033)	(0.020)	(0.020)	(0.020)
Chaebol Dummy	0.043*	0.149***	0.043*	0.041*
	(0.025)	(0.053)	(0.025)	(0.024)
Market risk(beta)	0.102***	0.101***	0.045	
	(0.026)	(0.026)	(0.044)	
Return Volatility				0.464***
				(0.060)
Executive manager ability	0.014			
* Distressed dummy	(0.056)			
Executive manager ability		-0.179**		
* Chaebol dummy		(0.080)		
Executive manager ability			0.116*	
* Market risk(beta)			(0.072)	
Executive manager ability				0.274***
* Return Volatility				(0.102)
Industry dummy	Yes	Yes	Yes	Yes

Year dummy	Yes	Yes	Yes	Yes
Number of firms	3,875	3,875	3,875	3,875
Adj. R ²	0.246	0.248	0.247	0.288
Panel B: CEOs				
Variable	(1)	(2)	(3)	(4)
CEO ability	0.007	0.015	0.024	0.064*
	(0.016)	(0.017)	(0.035)	(0.038)
Board size	0.047*	0.046*	0.046*	0.061***
	(0.025)	(0.026)	(0.026)	(0.024)
Director age	-0.702***	-0.702***	-0.703***	-0.565***
	(0.080)	(0.080)	(0.080)	(0.079)
Largest ownership	0.001	0.005	0.005	0.027
	(0.049)	(0.049)	(0.049)	(0.048)
Board Composition	0.374***	0.381***	0.382***	0.353***
	(0.085)	(0.085)	(0.085)	(0.083)
CAPEX/Assets	-0.004	-0.004	-0.004	0.004
	(0.024)	(0.024)	(0.024)	(0.023)
Leverage	-0.251***	-0.207***	-0.207***	-0.303***
	(0.046)	(0.044)	(0.044)	(0.044)
Firm size	0.014*	0.014	0.014	0.035***
	(0.008)	(0.009)	(0.009)	(0.009)
Operating profitability(%)	-0.079	-0.102	-0.102	-0.106
	(0.068)	(0.068)	(0.068)	(0.066)
Distressed dummy	-0.001	-0.006	-0.005	-0.071***
	(0.020)	(0.020)	(0.020)	(0.020)
Chaebol Dummy	0.053**	0.049	0.052**	0.047**
	(0.025)	(0.035)	(0.025)	(0.024)
Market risk(beta)	0.106***	0.102***	0.111***	
	(0.026)	(0.026)	(0.033)	
Return Volatility				0.615***
				(0.049)
CEO ability	0.408***			
* Distressed dummy	(0.126)			
CEO ability		-0.004		
* Chaebol dummy		(0.043)		
CEO ability			0.019	
* Market risk(beta)			(0.045)	
CEO ability				0.053
* Return Volatility				(0.068)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Number of firms	3,875	3,875	3,875	3,875
Adj. R ²	0.247	0.245	0.245	0.285
Panel C: Outside directors				
Variable	(1)	(2)	(3)	(4)
Outside director ability	-0.018	-0.011	0.028	-0.039

	(0.026)	(0.022)	(0.041)	(0.046)
Board size	0.079***	0.081***	0.079***	0.087***
	(0.026)	(0.026)	(0.026)	(0.025)
Director age	-0.683***	-0.688***	-0.684***	-0.552***
	(0.079)	(0.079)	(0.079)	(0.077)
Largest ownership	0.010	0.015	0.012	0.025
	(0.048)	(0.048)	(0.048)	(0.047)
Board Composition	0.528***	0.526***	0.531***	0.462***
	(0.088)	(0.088)	(0.088)	(0.086)
CAPEX/Assets	-0.001	-0.003	-0.001	0.007
	(0.023)	(0.023)	(0.023)	(0.023)
Leverage	-0.207***	-0.212***	-0.206***	-0.306***
	(0.044)	(0.044)	(0.044)	(0.043)
Firm size	0.005	0.005	0.005	0.029***
	(0.009)	(0.009)	(0.009)	(0.009)
Operating profitability(%)	-0.106	-0.104	-0.104	-0.106
	(0.067)	(0.067)	(0.067)	(0.065)
Distressed dummy	-0.034	-0.008	-0.010	-0.073***
	(0.029)	(0.020)	(0.020)	(0.020)
Chaebol Dummy	0.037	-0.012	0.036	0.032
	(0.025)	(0.042)	(0.025)	(0.024)
Market risk(beta)	0.106***	0.107***	0.128***	
	(0.026)	(0.026)	(0.038)	
Return Volatility				0.543***
				(0.055)
Outside director ability	0.048			
* Distressed dummy	(0.041)			
Outside director ability		0.080		
* Chaebol dummy		(0.058)		
Outside director ability			-0.040	
* Market risk(beta)			(0.053)	
Outside director ability				0.078
* Return Volatility				(0.075)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Number of firms	3,875	3,875	3,875	3,875
Adj. R ²	0.253	0.253	0.252	0.291

Table XIII
Manager ability as 1st percentile school ratio

This table presents linear ordinary least-squares regressions analysis of firm performance on manager ability and other firm characteristics. The regressions use Tobin's Q as the dependent variable, which is the market value to book value. We classify manager ability as the proportion of directors who graduated from the 1st percentile universities as a robustness check; all other variables are described in Table II. Industry dummies are employed to control for industry compensation practices, and year dummies are employed to account for economy-wide shocks. Regression (1) shows the results of basic regression and Regressions from (2) to (4) show the effect of firm performance and manager ability, dividing managers into three groups such as Executive manager, Outsider director, and CEO. All data in the regression (1) are from 1990 to 2006 and regressions from (2) to (4) include firms between 1999 and 2006. Standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	(1)	(2)	(3)	(4)
Manager ability	0.142*** (0.024)			
Executive manager ability		0.107*** (0.037)	0.100*** (0.038)	
Outside director ability			0.063*** (0.023)	0.075*** (0.023)
CEO ability				0.061*** (0.019)
Board size	-0.028** (0.013)	0.047** (0.024)	0.081*** (0.025)	0.097*** (0.026)
Board Composition		0.309*** (0.082)	0.449*** (0.085)	0.402*** (0.088)
Director age	-0.667*** (0.055)	-0.605*** (0.076)	-0.584*** (0.077)	-0.665*** (0.082)
Largest ownership	0.050 (0.033)	-0.008 (0.048)	-0.002 (0.047)	0.012 (0.049)
CAPEX/Assets	0.005 (0.020)	0.034 (0.028)	0.032 (0.027)	0.034 (0.027)
Leverage	0.230*** (0.022)	-0.286*** (0.042)	-0.290*** (0.043)	-0.203*** (0.017)
Firm size	-0.014*** (0.005)	0.026*** (0.009)	0.016* (0.009)	0.001 (0.009)
Operating profitability	0.174*** (0.047)	0.008*** (0.001)	0.008*** (0.001)	0.007*** (0.001)
Distressed dummy	-0.067*** (0.012)	-0.024 (0.021)	-0.020 (0.021)	-0.094*** (0.021)
Chaebol dummy	0.008 (0.015)	0.047* (0.025)	0.022 (0.024)	0.025 (0.025)
Market risk(beta)	0.017 (0.014)	-0.050* (0.027)	-0.038 (0.027)	-0.011 (0.027)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes

Number of firms	7,104	3,260	3,260	3,260
Adj. R ²	0.220	0.282	0.296	0.313

Table XIV

Manager ability, social network benefit, and firm value

This table tests whether the effect of manager ability on firm value is different by social network benefit. The dependent variable is Tobin's Q. We classify manager ability as the proportion of directors who graduated from the 1st percentile universities. *Manager ability * YS regime* is an interaction term between Kim, Y.S. regime and the ratio of 1st percentile school graduated directors. See Table II for exact definitions of the variables. All data are from 1990 to 2006 and standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	
Manager ability	0.183*** (0.028)
Manager ability * YS regime	-0.181*** (0.055)
Board size	-0.025** (0.013)
Director age	-0.557*** (0.055)
Largest ownership	0.047 (0.033)
CAPEX/Assets	0.005 (0.020)
Leverage	0.230*** (0.022)
Firm size	-0.015*** (0.005)
Operating profitability(%)	0.172*** (0.047)
Distressed dummy	-0.067*** (0.012)
Chaebol dummy	0.007 (0.015)
Market risk(beta)	0.017 (0.014)
Industry dummy	Yes
Year dummy	Yes
Number of firms	7,104
Adj. R ²	0.222