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Corporate Performance and CEO Turnover in Korea: A Comparative Analysis of Accounting and Market-based Performance Measures

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A B S T R A C T

This study empirically examines the influence of firm performance on CEO turnover using data of all listed companies on the Korea Stock Exchange, except those in the financial industry, over the period 2000-2012. We control for endogeneity of firm performance by employing the Two-Stage Residuals Inclusion (2SRI) methodology in estimating the random effect (RE) panel probit model and then compare the marginal effects of the two performance measures on the CEO turnover.

The empirical results show that both the accounting- and the market-based performance measures are negatively associated with the CEO turnover probability. In non-Chaebol companies, both the performance measures are found to have a significantly negative impact on the CEO turnover, while the accounting-based performance measures have a larger effect than the market-based performance measures do. However, we found that neither of them has any significant impact on the CEO turnover in conglomerate Chaebol companies or their subsidiaries. These findings suggest that board of directors in Chaebol affiliations are relatively ineffective disciplinarians of the management turnover.

Keywords: CEO Turnover; 2SRI; Random Effect Panel Probit Model; Marginal Effect; Accounting Performance; Market Performance

Ⅰ. Introduction

Many studies suggest that the poor firm performance should be one of the important sources for the CEO turnover, using different measures of corporate performance. Using as a proxy for the accounting performance the ratio of operating income to total assets, the return on assets, and the ratio of net income to sales, Lausten (2002), Shin and Chang (2005), Pyon and Choe (2011), and Part et al. (2010) argued that the accounting-based performance measures have a significantly negative impact on the CEO turnover. On the other hand, using the market performance indexes such as the ratio of return on stocks and the market-to-book (MB) Ratio, Denis et al. (1997) and Lee et al. (2015) found that the poor corporate performance can increase the probability of the CEO turnover. In addition, Kaplan (1994), Denis and Denis (1995), Huson et al. (2001), and Brunello et al. (2003), using the ratio of return on Stocks as a proxy for the market performance and the ratio of operating income to total assets and the ratio of income before tax to sales as a the accounting-based performance measures, found that both the measures have a significantly negative effect on the CEO turnover. Despite

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many studies to address the effects of the accounting and the market-based performance measures on the CEO turnover, few studies examined which of the two firm performance measures can have a greater impact on the CEO turnover than the others.

Meanwhile, it has been discussed whether firm characteristics can affect the management turnover. In particular, it has been debated on whether and how conglomerate Chaebol companies and their subsidiaries may be different in the decision of the CEO turnover. Cho (2013), Part et al. (2010), and Cin et al. (2015) found that whether a company is Chaebol or not could not influence on the CEO turnover. Kim et al. (2012) found, on the other hand, that Chaebol companies can be subject to the CEO turnover when the corporate performance goes down.

This study empirically examines the influence of the accounting performance and the market performance on the management turnover, by using the panel data covering all listed companies on the Korea Stock Exchange except those in the financial industry over the period 2000-2012. We control for endogeneity of firm performance by employing the Two-Stage Residuals Inclusion (2SRI) methodology in estimating the random effect panel probit model and then compare the marginal effects of the two performances on the CEO turnover.

This paper would be meaningful and different from prior studies in the following ways. First, it used the unbalanced panel data over the period 2000-2012 to analyze the effect of the corporate performance on the CEO turnover. Based on the panel data and the panel probit model, we tried to remove biases which arise from the use of the simple probit model.

Second, in order to take into consideration the potential endogeneity of the corporate performance, this study employs the two stage residuals inclusion estimation method. In the first stage, we use the corporate performance variable as the dependent variable in the framework of the random effect model, and we regress it against the instrument variables (that is, lagged variables such as company size and debt) to get the residuals. In the second stage, including as an independent variable the calculated residuals obtained from the first stage, we estimate the CEO turnover model. The endogeneity problem of the accounting performance or the market performance can arise when the bi-causality between the corporate performance variables and the CEO turnover is ignored. That is, while the corporate performance can have an impact upon the CEO turnover probability, the CEO turnover can also have an impact on the corporate performance improvement. Disregarding this reverse causality can cause endogeneity bias.

Third, this study comparatively analyzes which of corporate performance variables, either the accounting performance or the market performance, has a greater impact on the CEO turnover by estimating the marginal effect or partial effect in the panel probit model.

The remainder of this paper is structured as follows; Section Ⅱ discusses the previous studies about how the corporate performance affects the management turnover and whether a Chaebol company can affect the turnover. Section Ⅲ describes the selection methods of the research models and the sample corporations, and the definition of variables. Section Ⅳ presents the outcome of the empirical analysis of this study. Finally, Section Ⅴ deals with the main findings of this study and its limits.

Ⅱ. Literature Reviews

The prior studies that analyzed the influential factors on the CEO turnover are mainly divided into two categories; one is to consider the poor corporate performance its primary factor, while the other is to think factors other than the corporate performance, for example, the board of directors, the characteristics of the management, the company size, and the corporate governance as its main factors. Of these, the most research found, the poor corporate performance is the key factor of the CEO turnover. In other words, when the corporate performances are in a slump, the corporations seek to recruit new CEOs who seem to be capable of achieving their aims or fulfilling their business tasks, thus resulting in the CEO turnover, and this has been one of the important research topics for many studies and empirical analyses. In these cases, the corporate performances were measured by using the accounting performance indexes such as the return on assets ratio or the ratio of operating income to total assets, or by using the corporate performance indexes in the stock market such as the ratio of return on stocks or MB ratio.

Kaplan (1904) asserted that, in the American and

Japanese corporations, the lower the ratio of return on stocks, the growth rate of sales, and the ratio of earnings before tax to total assets are, the higher the CEO turnover probability increases. Denis and Denis (1995) measured the corporate performance by using the ratio of operating income to total assets and proved through an event study that the lower ratio of operating income to total assets could bring the higher possibility of the forced CEO turnover and that after the CEO replacement the performance improvement is more probable. Also, he proved that, before the forced CEO turnover, the ratio of return on stocks had a significantly negative value, but it increased after the CEO turnover. Huson et al. (2001) presented the return on assets ratio (ROA), the rate of change in ROA, and holding period rate of return on stock (ROR) as the corporate performance measurement variables, and proved that the lower these corporate performances are, the higher the CEO turnover probability increases. Brunello et al. (2003), using both the accounting performance and the market performance in the Italian corporations, maintained that the lower the rate of change in earnings before interest, taxes, depreciation and amortization (△EBITDA) and the return on stocks decrease, the higher the CEO turnover probability increases. Lausten (2002) proved that the lower the return on assets ratio and the ratio of income before tax to sales are, the higher the CEO turnover probability increases. Denis et al. (1997) also confirmed that the lower ratio of return on stocks in the previous year could result in the higher possibility of the CEO turnover.

Shin and Chang (2005) analyzed the domestic KOSPI and KOSDAQ listed companies and found that the lower the corporate performance is, the more the CEO turnout probability increases. The corporate performance was measured by the income before interest and tax divided by the beginning-of-term total assets. Pyon and Choe (2011) measured the corporate performance from the standpoint of the financial performance, and classified it into the three categories of the profitability ratios, the stability ratios and the activity ratios. Especially, the profitability ratios were measured by the ratio of net income to sales, the ratio of operating income to sales, and the return on equity ratio, and the result showed that the lower profitability ratios lead to the significantly higher probability of the CEO turnover. Part et al. (2010) measured the corporate performance by the industry-adjusted return on assets ratio, which is calculated by deducting the median value of the same-industry return on total assets ratio of the pertinent year from the return on total assets ratio of the corporation. The lower corporate performance led to the higher probability of the CEO turnover. And, Lee et al. (2015) analyzed the listed companies on the Korea Stock Exchange except those in the financial industry, using the market performance indexes such as MB ratio and the ratio of return on stocks, and confirmed that the lower the MB ratio and the ratio of return on stocks are, the significantly higher the CEO turnover probability increases.

Meanwhile, Cho (2013) asserted that, as Chaebol itself is a management unit and so there exists an inducement factor to adjust profits between the affiliate companies for the purpose of maximizing the personal profits of the dominant shareholders rather than the profit of the individual affiliate company, or for the purpose of maintaining and developing the business group system, it can be hard to blame the CEOs for each affiliate company's poor business performance, and under this condition, whether the company is Chaebol or not can make a difference in the influence of the low corporate performance on the CEO turnover. According to his study results, the poor accounting performance of an affiliate of Chaebol group does not significantly affect the CEO turnover, regardless of whether it is by the personnel transfer within the group or by the external kick-out from the group. Kim et al. (2012) proved through the comparison between the Chaebol groups and the non-Chaebol groups that the corporate performance and the CEO's external kick-out in Chaebol groups have a significantly negative correlation, thus showing that the Chaebol groups also replace the CEOs when the corporate performance is poor. Cin et al. (2015) maintained that, in terms of the correlation between the equity of the largest shareholders ratio or the equity ratio of the foreign investors and the CEO turnover, the corporate performance of Chaebol groups does not significantly impact the CEO turnover, but in case of non-Chaebol groups, the corporate performance, especially the low accounting performance, had a significantly positive impact on the CEO turnover probability.

However, Shin and Chang (2005) proved in their study that the poor corporate performance in both the Chaebol and non-Chaebol corporations did not significantly impact the CEO turnover probability. Also, Part et al. (2010) analyzed that whether the company is Chaebol or not

does not exert a significantly moderating effect in regard to the corporate performance and the CEO turnover. Therefore, the influence of whether the company is Chaebol or not on the CEO turnover caused by the poor corporate performance does not produce consistent results.

Ⅲ. Data and Model Specification

A. Data Collection and Definition of Variables

This study has as its analysis object range all the listed companies on the KOSPI (Korea Composite Stock Price Index) and KOSDAQ (Korea Securities Dealers Automated Quotations) market from January 2000 till December 2012 except those in the financial industry, and collected the accounting and market information needed for the analysis through TS2000 (Total Solution 2000) and KisValue (Korea information service Value). The term CEO in this study is defined as a full-time executive with the job title of 'president' who has the company's business report compiled and takes its legal responsibility. The information about the CEO turnover was collected from the ‘CEO change’ section of the Korea Investor’s Network for Disclosure System (KIND). Using a dummy variable of the CEO turnover, when there occurred a CEO change, it was regarded as a CEO turnover and given the number one as a measurement value, and the number zero otherwise.

During the analysis period, the total number of 11,071 year-firm samples (6,069 from KOSPI, and 5,002 from KOSDAQ) was collected, of which 21.4% or 2,197 samples were those of the CEO turnover. And, in order to analyze the influence of the corporate performance on the CEO turnover, it divided the corporate performance variable which is an independent variable into the accounting performance and the market performance, and measured the corporate performance thereby.

The accounting performance has been used as a performance variable in many preceding researches such as those by Denis and Denis (1995), Lausten (2002), and Shin and Chang (2005). The ratio of operating income to total assets (*ROT*), which is the representative measurement ratio of a corporation's asset profitability, was used as its proxy variable in this study. As a proxy variable of the market performance, it employed the rate of return on stocks (*ROR*) which was used in many studies such as those by Kaplan (1994), Denis et al. (1997), and Brunello et al. (2003), and it was measured by the annualized holding period return rate.

Besides independent variables, variables that could affect the CEO turnover were set as control variables. It took the growth rate of sales (*RSG*) and the debt ratio (*LEV*) as the corporate characteristics variables, and the equity ratio of the largest shareholders (*LSI*) and the equity of the foreign investors (*FSI*) as the corporate governance related variables. Virny and Tushman (1986), and Baek and Kim (2014) maintained that, in the industry which is fast growing and unstable, the CEO turnover is important in order to improve corporate performance or to keep it good, so that the lower the corporate performance is, the higher the CEO turnover probability is. Therefore, in this study, the corporate growth level was measured by the growth rate of sales and this was used as a control variable. Debt ratio was defined as the value of the total debt divided by the total assets. The higher the debt ratio is, the higher the financial risk of a corporation is, and therefore the need for the surveillance of the top management grows. According to the researches by Shin and Chang (2005) and Kim et al. (2012), the Debt Ratio had a significantly positive correlation with the CEO turnover.

Meanwhile, the researches by Denis et al. (1997) showed that the higher equity ratio of the largest shareholders led to the significantly lower probability of the CEO turnover. According to the researches by Shin and Chang (2005) and Lee et al. (2015), the equity ratio of the foreign investors had a significantly negative impact on the CEO turnover. Therefore, this study used the equity ratio of the largest shareholders (*LSI*) and the equity ratio of the foreign investors (*FSI*) as the control variables. LSI was measured as the sum of the equity shares by year possessed by the largest shareholder, his/her relatives and affiliate persons. FSI was measured as the shares of foreign investors among other shareholders from TS2006.

In addition to these, based upon the studies by Kim et al. (2012), Part et al. (2010) and Cho (2013), it tried to control the influence of whether the company is Chaebol or non-Chaebol on the CEO turnover, using the dummy variable Chaebol (*dChaebol*). Chaebol was defined as a large business conglomerate stipulated by the Fair Trade Commission(FTC), and in case a corporation belonged

to the conglomerate, the value number one was given, and otherwise the number zero, to ascertain whether the corporation is Chaebol or not. Lausten (2002) and Cho (2013) said that bigger corporations are subject to the higher probability of the CEO turnover in case the management performance is poor. Therefore, in order to control the influence of the company size on the CEO turnover, it employed the dummy variable Large Company. The dummy variable Large Company (*dLarge*) was measured as number one in case of a large company and otherwise number zero. And, the dummy variable Year (*dYear*) was employed as a control variable to control the environmental effect caused by the economic conditions by year.

B. Model Specification and Estimation Method

To examine the effect of firm performance on the CEO turnover, the following panel probit model will be used in this study.

$$y_{1it}^{*} = \alpha_1 y_{2it} + X_{1it}\beta_1 + \eta_i + \mu_{it} \qquad (1)$$
$$y_{1it} = 1(y_{1it}^{*} > 0)$$

where y_{1it} is a dummy variable for CEO turnover at the time t, y_{2it} is firm performance vector, X_{1it} is independent variable vector to explain the CEO turn-over, 1(•) stand for an indicator function. The determinant variable vector of the CEO turnover model, X_{1it} =*[RSG, LEV, LSI, FSI, dLarge, dChaebol, dYear]* where *RSG* is sales growth rate, *LEV* leverage ratio, *LSI* the largest shareholder's stake, *FSI* foreigner share, *dLarge* is a dummy variable for large firms, *dChaebol* is a dummy for Chaebol, *dYear* is a dummy variable for each year. The firm performance vector y_{2it} stands for the ratio of operating income to total asset as a proxy for accounting performance and the ratio of return on stocks as a proxy for market performance.

In estimating the CEO turnover model, use of panel data can be more efficient than use of only cross-sectional data by mitigating identification and measurement error. We can estimate the turnover model by using the RE (random effect) probit methodology.[1] However, the firm performance variable y_{2it} is not independent from the structural errors, simple use of the probit estimation can produce biased results due to the endogeneity of firm performance. This can happen if there were a bidirectional causality between firm performance y_{2it} and the CEO turnover probability y_{1it}. That is, when the firm performance can affect the CEO turnover probability, it can be affected by the CEO turnover at the same time.

In order to alleviate the endogeneity problem, the two-stage estimation method is generally used. There are two forms of two-stage estimation method: traditional Two-Stage Predictor Substitution (2SPS) method and Two-Stage Residual Inclusion (2SRI) method which was proposed by Rivers and Vuong (1988) and Terza et al.(2008). Two methods are similar in that the first stage involves a regression of a potentially endogenous variable against the instrumental variables. However, the two methods differ in that while the traditional 2SPS includes the predicted value of the endogenous variable obtained from the first stage as an independent variable in the second stage, the 2SRI includes the residuals ($\widehat{v}_{it}$) from the first stage as an independent variable (see Cin et al. 2015). We employ the 2SRI RE probit estimation methodology; in the first stage, we get the residuals from the estimation of the RE panel model of the firm performance; in the second stage we estimate the following reduced-form of the CEO turnover model including residual variables:

$$y_{1it}^{*} = \alpha_1 y_{2it} + X_{it}\beta + \theta\widehat{v}_{it} + \mu_{it} \qquad (2)$$

where X_{it} is a vector of exogenous variables including X_{1it} and an instrumental variable vector.

In the linear model, the estimation methods for 2SPS and 2SRI are identical. But in the non-linear model, the 2SRI estimators are inconsistent while the 2SPS estimators are not. Terza et al. (2008) show that the use of 2SPS in non-linear model when the endogeneity problem is considered can produce biased results. In particular, the

1) Using either the probit or the logit model, we may not have very different results since the cumulative normal distribution and the logistic distribution are very close to each other (See Maddala (1983), p.23). Besides, from a computational perspective, the RE logistic model is not much desirable than the RE probit model (Wooldrige, 2010, p.619). Under the assumption that the response probability follows the logistic function and the unobserved firm's heterogeneity is independent from structural errors, the RE logit estimation should be more complicated, which might not be desirable.

2SPS estimators from the simultaneous probit models and count data model where the data are non-negative integers are biased, while the 2SRI estimators are not biased. Since this paper uses the probit models, they are subject to potential non-linearity bias in removing the endogeneity of firm performance. For this reason, this paper chooses the 2SRI estimation method.

This paper does not only explore whether the firm performance could affect the CEO turnover probability but also of which performance, market or accounting, would have larger effect on the probability. To compare these effects, we need to estimate marginal effects or partial effects of firm performance on the CEO turnover probability. However, since the partial effects depend on the independent variable, we need to decide which effect we have to use. To avoid these problems, we will estimate average partial effects based on the following equation (see Wooldrige, 2010, p.576).

$$\frac{\partial p(y_{2it}, X_{it}, \hat{v}_{it}, \eta_i)}{\partial y_{2it}} y_{1it}^{*}$$

$$= \hat{\alpha}_1 \times \frac{1}{NT} \sum_{i=1}^{N} \sum_{t=1}^{T} (\alpha_1 y_{2it} + X_{it}\beta + \theta \hat{v}_{it} + \eta_i) \quad (3)$$

Ⅳ. Empirical Results

Table 1 presents the mean, the standard deviation and the correlation coefficient of the independent variables and the control variables used in this empirical analysis. The accounting performance measured by the ratio of operating income to total assets (*ROT*) represents the mean of 0.050 and the standard deviation of 0.102, while the market performance measured by the rate of return on stocks (*ROR*) represents the mean of 0.218 and the standard deviation of 1.1014.

The table shows that all except one correlation coefficients between the ratio of operating income to total assets (*ROT*) and other independent variables are statistically significant and positive. Those coefficients between independent variables except the equity ratio of the foreign share investors (*FSI*) are not statistically significant, which implies no indication for multicollinearity between the variables such as the growth rate of sales (*RSG*), the debt ratio (*LEV*), and the largest shareholders (*LSI*). Those of the equity ratio of the foreign share investors (*FSI*) with others are significant but small and thus its multicollinearity problem might not be serious.

Table 2 shows results for the influence of the company size on the CEO turnover estimated by the panel probit model without considering the endogeneity of the ratio of operating income to total assets (*ROT*) and the rate of return on stocks (*ROR*). The lower the *ROT*, an accounting-based performance measure, is, the significantly higher the probability of the CEO turnover increases. But the coefficient estimate of *ROR*, a market-based performance measure, does not appear statistically significant. This seems to be a biased result which is caused because it does not take into consideration the potential endogeneity of the accounting performance and the market performance. Second, estimated coefficients for the year dummy variable are significant in all cases, implying that the panel model could be more relevant.

Finally, it shows that the null hypothesis, that ρ (intergroup correlation) reaches zero, is rejected in all the models. This result implies that, if the corporate

Table 1. Descriptive Statistics

Variable	Mean	Standard Deviation	*ROT*	*ROR*	*RSG*	*LEV*	*LSI*	*FSI*
ROT	0.050	0.102	1					
ROR	0.218	1.014	0.112**	1				
RSG	0.285	12.898	0.006	0.011	1			
LEV	1.376	6.300	-0.089**	-0.023*	0.000	1		
LSI	0.407	0.171	0.129**	-0.003	0.017	-0.011	1	
FSI	0.080	0.133	0.204**	0.035**	-0.051**	-0.035**	-0.069**	1

Notes: ** and * indicate statistical significance at the 1% and 5% level.

Table 2. Panel Probit Model for the Effect of Corporate Performance on CEO Turnover

Variables	Model 1 (Accounting Performance)	Model 2 (Market Performance)	Model 3 (Accounting Performance & Market Performance)
ROT	-1.796** (0.170)		-1.646** (0.175)
ROR		-0.011 (0.016)	0.004 (0.016)
RSG	0.030 (0.016)	0.018 (0.012)	0.029 (0.016)
LEV	0.001 (0.002)	0.003 (0.002)	0.001 (0.002)
LSI	-0.132 (0.108)	-0.182 (0.111)	-0.063 (0.111)
FSI	0.044 (0.152)	-0.309* (0.154)	-0.043 (0.155)
dLarge	0.240* (0.100)	0.221* (0.102)	0.232* (0.102)
dChaebol	0.189 (0.100)	0.195 (0.102)	0.189 (0.102)
dYear	Y**	Y**	Y**
σ_η^2	-1.814** (0.123)	-1.677** (0.117)	-1.749** (0.122)
Wald χ^2	261.525	132.846	218.276
ρ	0.140	0.158	0.148
χ^2 under $\rho = 0$	164.907**	197.085**	172.402**
Number of observations	9,494	9,113	9,113

Notes: The numbers in parentheses denote the standard error. ** and * indicate significance level at the 1% and 5% level respectively. All models include dummy variables for the year (*dYear*).

dissimilarity in the CEO turnover model is ignored by use of the simple pooled OLS or the simple pooled probit, it can produce a biased result. This is confirmed by the result that the null hypothesis ($\sigma_\eta^2 = 0$) can be rejected statistically in all cases.

Table 3 shows the result estimated by the 2SRI method of Terza et al. (2008), considering the endogeneity problem of the corporate performance variables. First of all, the coefficient estimate of the residual, when estimated including both the accounting performance variables and the market performance variables at the same time, show statistical significance in all cases, meaning that the corporate performance variables should have the endogeneity nature. Thus, ignoring the endogeneity can cause a biased result, which suggests that the CEO turnover probability should have the bi-causality with the market performance.

However, when both the accounting and the market -based performance measures are estimated separately, the coefficient estimate of the former is statistically significant while the latter is not. This result suggests that when the two corporate performance measures are not used at the same time, the model specification errors are followed due to the omission of the important variables, which can create a biased result.

Therefore, this study employs the model 3, which uses both the accounting performance and the market performance, in analyzing the influence of the corporate performance on the CEO turnover. According to the estimated results, the lower the ratio of operating income to total assets (*ROT*) which is the accounting performance measures and the rate of return on stocks (*ROR*) which is the market performance measures are, the higher the CEO turnover probability increases. This is consistent with the other preceding studies, such as those done by Huson et al. (2001), Brunello et al. (2003), Shin and Chang (2005), and Part et al. (2013).

Besides, the growth rate of sales (*RSG*) has a significantly positive impact on the CEO turnover, which is consistent with the results done by Virany and Tushman

Table 3. 2SRI Panel Probit Model for the Effect of Corporate Performance on CEO Turnover (Full Samples)

Variable	Model 1 (Accounting Performance)	Model 2 (Market Performance)	Model 3 (Accounting Performance & Market Performance)
ROT	-7.263** (2.159)		-9.234** (2.209)
v_{ROT}	5.529* (2.172)		7.460** (2.213)
ROR		-0.376 (0.335)	-1.009** (0.359)
v_{ROR}		0.340 (0.336)	1.000** (0.361)
RSG	0.108** (0.029)	0.058* (0.025)	0.130** (0.030)
LEV	-0.005 (0.014)	0.017 (0.012)	-0.010 (0.014)
LSI	0.147 (0.138)	0.070 (0.137)	0.131 (0.138)
FSI	0.768** (0.282)	-0.032 (0.166)	0.976** (0.285)
dLarge	0.098 (0.125)	0.164 (0.127)	0.166 (0.127)
dChaebol	0.285* (0.126)	0.282* (0.127)	0.226 (0.128)
dYear	Y**	Y**	Y**
σ_{η}^{2}	-1.959** (0.176)	-1.957** (0.177)	-1.998** (0.181)
Wald χ^2	163.221	129.075	171.697
ρ	0.124	0.124	0.119
χ^2 under $\rho = 0$	64.184**	64.240**	59.652**
Number of observations	6,256	6,256	6,256

Notes: The numbers in parentheses denote the standard error. ** and * indicate significance level at the 1% and 5% level respectively. All models include dummy variables for the year (*dYear*).

(1986), and Back and Kim (2014). Meanwhile, the equity ratio of the largest shareholders (*LSI*) cannot influence on the CEO turnover significantly, but the equity ratio of the foreign investors (*FSI*) can have a significantly positive influence, as opposed to the results of Shin and Chang (2005) and others.

Table 4 presents the estimated result of the marginal effect of each coefficient by the formula (6) in order to analyze which of the two, the accounting performance or the market performance, has a greater impact on the CEO turnover. When both variables are included, it produces a statistical significance and confirms the result of Table 3 which says the corporate performance variables have a significantly negative impact on the CEO turnover.

The comparison of the two corporate performance variables shows that the accounting performance variables (*ROT*) have a higher impact on the CEO turnover than the market performance variables (*ROR*). This implies that the CEO turnover is more influenced by the low accounting performance (*ROT*) than by the low market performance (*ROR*). That is, the domestically listed companies are more susceptible to the low accounting performance than to the low market performance.

According to Table 4 which shows estimated results for the marginal effects, the dummy variable Chaebol significantly influence the CEO turnover by the value of 0.065. And, according to the research results by Kim et al. (2012), Cho (2013), and Cin et al. (2015), whether the company is Chaebol or not made a difference in the influence of the corporate performance slump on the CEO turnover. Therefore, this study employs the model 3 in which the whole samples are divided into Chaebol

Table 4. Average Marginal Effects of Corporate Performance Variables by 2SRI Panel Probit Model (Full Samples)

Variables	Model 1 (Accounting Performance)	Model 2 (Market Performance)	Model 3 (Accounting Performance & Market Performance)
ROT	-1.992** (0.594)		-2.503** (0.364)
v_{ROT}	1.516** (0.597)		2.022** (0.365)
ROR		-0.376 (0.335)	-0.273** (0.059)
v_{ROR}		0.340 (0.336)	0.271** (0.060)
RSG	0.030** (0.008)	0.058* (0.025)	0.035** (0.005)
lev	-0.001 (0.004)	0.017 (0.012)	-0.003 (0.002)
LSI	0.040 (0.038)	0.070 (0.137)	0.035 (0.023)
FSI	0.211** (0.078)	-0.032 (0.166)	0.265** (0.047)
dLarge	0.027 (0.036)	0.164 (0.127)	0.047* (0.023)
dChaebol	0.084** (0.040)	0.282* (0.127)	0.065** (0.024)

Notes: The numbers in parentheses denote the standard error. ** and * indicate significance level at the 1% and 5% level respectively.

Table 5. 2SRI Panel Probit Model for the Effect of Corporate Performance on CEO Turnover (Chaebol vs. Non-Chaebol)

Variables	Chaebol	Non-Chaebol
ROT	-4.076 (4.705)	-8.092* (3.184)
v_{ROT}	2.906 (4.817)	6.245* (3.181)
ROR	-0.773 (0.657)	-0.819 (0.438)
v_{ROR}	0.780 (0.661)	0.815 (0.440)
RSG	0.265 (0.176)	0.220** (0.068)
LEV	0.033 (0.046)	-0.011 (0.017)
LSI	0.275 (0.315)	0.105 (0.163)
FSI	0.942 (0.644)	0.738* (0.368)
dLarge	-0.376 (0.486)	0.175 (0.162)
dYear	Y**	Y**
σ_η^2	-2.957** (0.686)	-1.729** (0.184)
Wald χ^2	37.953	77.403
ρ	0.049	0.151
χ^2 under $\rho = 0$	3.009	63.993**
Number of observations	1,088	5,026

Notes: The numbers in parentheses denote the standard error. ** and * indicate that the estimated parameter is significant at the 1% and 5% level. All models include dummy variables for the year (*dYear*).

and non-Chaebol, in order to analyze the influence of the corporate performance on the CEO turnover, and the result is presented in Table 5. According to Table 5, the corporate performance slump rarely influences on the CEO turnover of the Chaebol companies. However, in cases of the non-Chaebol companies, the accounting performance (*ROT*) has a significant impact on the CEO turnover, while the market performance (*ROR*) does not. This result is consistent with the research result by Cin et al. (2015), which implies that, as is stated in the paper by Cho (2013), in Chaebol companies, the CEOs are not fired due to the poor corporate performances. For non-Chaebol companies, the higher the growth rate of sales (*RSG*) and the equity ratio of the foreign investors (*FSI*) are, the higher the CEO turnover probability increases.

Table 6 presents results of the average marginal effect of the accounting performance and the market performance on the CEO turnover in Chaebol and non-Chaebol corporations. According to the results, in case of the non-Chaebol corporations, the accounting performance (*ROT*) has a relatively greater impact on the CEO turnover probability than the market performance (*ROR*) does.

Table 6. Average Marginal Effects of Corporate Performance Variables by 2SRI Panel Probit Model (Chaebol vs. Non-Chaebol)

Variables	Chaebol	Non-Chaebol
ROT	-1.397 (1.106)	-2.019** (0.461)
v_{ROT}	0.996 (1.133)	1.558** (0.460)
ROR	-0.265 (0.154)	-0.204** (0.063)
v_{ROR}	0.267 (0.155)	0.203** (0.064)
RSG	0.091* (0.041)	0.055** (0.010)
lev	0.011 (0.011)	-0.003 (0.002)
LSI	0.094 (0.074)	0.026 (0.024)
FSI	0.323* (0.151)	0.184** (0.053)
dLarge	-0.137 (0.114)	0.04 (0.027)

Notes: The numbers in parentheses denote the standard error. ** and * indicate significance level at the 1% and 5% level respectively.

Ⅴ. Conclusions

This study empirically examines the effect of firm performance measures on the CEO turnover by employing the 2SRI method in the random effect panel probit model, with use of the data covering all the listed companies on the Korea Stock Exchange except those in the financial industry during the period from January 2000 till December 2012. In particular, it breaks down the corporate performance measures into the accounting and the market-based performance measure, and estimates their marginal effects on the CEO turnover, thereby analyzing which of the two performance measures has a greater impact on the CEO turnover. The main findings of this paper are as follows:

First, the empirical results show that the ratio of operating income to total assets (*ROT*) as a proxy for the accounting performance and the rate of return on stocks (*ROR*) as a proxy for the market performance, have a significantly negative effect on the CEO turnover. This implies that the lower the accounting performance and the market performance are, the higher the CEO turnover probability.

Second, the estimated result of the marginal effects shows that the accounting performance has a larger effect on the CEO turnover than the market performance does. This implies that a worsening of the market performance and the accounting performance should increase the CEO turnover probability in Korea, meaning that management turnover in the listed Korean companies can be more vulnerable to the accounting performance than to market performance, and thus an aggravation of the accounting performance affect the CEO turnover more significantly. On the other hand, the results show that an increase in growth rate of sales can cause a statistically significant increase in the CEO turnover probability. In addition, while the equity ratio of the largest shareholders does not affect the CEO turnover significantly, that of the foreign investors has a significantly positive impact.

Finally, for the sub-samples of Chaebol or non-Chaebol corporations, the estimated results show that a worsening of the firm performance does not significantly influence the Chaebol corporations' CEO turnover, but in non-Chaebol corporations, the lower in the *ROT* or the *ROR* can lead to an increase CEO turnover probability significantly. In the non-Chaebol corporations, a

worsening of the accounting performance has a larger impact on the CEO turnover than that of the market performance.

This study could be more meaningful in that it comparatively analyzes effects of firm performance on the management turnover by breaking down firm performance into the accounting and the market performance, while the other preceding studies examine simple correlation between the accounting performance or the market performance and the CEO turnover. Moreover, this study is meaningful by examining empirically how the corporate performance differently affects the CEO turnover for Chaebol companies and the non-Chaebol companies. However, we have to mention one caveat on our paper. Depending on whether the CEO turnover is voluntary or forcible, the effect of the accounting performance and the market performance on the management turnover could be different. In the future, more researches on how the types of the CEO turnover may affect the results should be needed.

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