CEO Compensation and Concurrent Executive Employment of Outside Directors: A Panel Data Analysis of S&P 1500 firms

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In many advanced countries, most outside directors are executives, active or retired, at other firms; in other words, executives from other companies make executive compensation decisions. This situation may hinder the board of directors (BOD) in their efforts to optimize executive compensation levels objectively. Using a panel data analysis of the S&P 1500 companies, we provide supplemental evidence of whether, and to what extent, the concurrent executive employment of outside directors distorts the executive pay decisions at a given company. An unbiased fixed-effect estimation confirms that a $1.00 increase in CEO pay at outside directors' primary companies results in an approximate increase of $0.22 in CEO pay at the given company. From a policy perspective, this added agency problem — caused by the BOD and not by management — is noted as difficult to control; although a firm may establish board independence, the inherent concurrent employment of directors on a board continues to exist.

Key Word: CEO Compensation, Director-Agency Problem,
　　　　　 Outside Directors, Board of Directors,
　　　　　 Corporate Governance
JEL Code: M12, G34, G38

I. Introduction

Executive compensation has attracted significant attention from economists and business experts since the early 1990s. News stories have questioned the fairness of executive pay practices and articles have been published about inappropriate pay practices, spurring pressure for oversight and regulation

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(e.g., Boyd 1994; Hall and Murphy 2003; Jensen *et al.* 2004). As delegates of shareholders, board members are entitled to monitor and control managers to minimize agency costs. However, boards of directors (BOD) have not been very effective, partly because they have been captured by chief executive officers (CEO) and because of the directors' own agency problem; just as no reason exists to presume that managers automatically seek to maximize shareholder value, no reason exists to expect *a priori* that directors will also do so. Bebchuk and Fried (2003) refer to this phenomenon as the *director–agency problem*.

For instance, most outside directors have no significant vested interest in the firm and, therefore, need not be very careful when deciding on company expenditure amounts, including executive pay (Baker *et al.* 1988; Cyert *et al.* 2002; and Brenner and Schwalbach 2009). Furthermore, they may not want to hurt their personal or business relationships over stingy decisions about compensation. If outside directors are appointed owing to personal ties, they may even fear losing their board seats.

Additionally, it is noteworthy that most outside directors are executives, active or retired, at other firms in the United States and in many other advanced countries, including the United Kingdom, Australia and the Netherlands. In other words, executives from other companies make executive compensation decisions in those countries. This situation may significantly affect the executive compensation decision-making process. That is, directors' status as executives at other firms can be another source of the director–agency problem.

Numerous governance experts describe their concerns about this additional agency problem. For example, Jensen *et al.* (2004) recommend that boards limit the number of CEO-directors who are outside directors but serve as CEOs for other firms, as such outside directors tend to "subconsciously (if not consciously) view the board through the eyes of a CEO."[1] However, solid empirical support of their concerns is relatively rare, except for much of the "social network" literature that examines the influence of connections between board members and executives on the level of CEO compensation (e.g., Hwang and Kim 2009; Bizjak *et al.* 2009; Larcker *et al.* 2005; and Hallock 1997).

In contrast, business practitioners often claim that this concern could be imaginary and that their policy suggestions would cause over-regulation of BOD operations. Instead, they emphasize that having other top executives as directors on the board provides the BOD with numerous advantages related to its evaluation of business strategies, voting on major operational proposals, and the scrutinizing of financial and accounting reports. Their claims are partly supported by positive stock price reactions to director appointments when the appointee is an active CEO (Fich 2005).

The empirical work in this paper provides supplemental evidence of whether, and to what extent, the concurrent executive employment of outside directors distorts pay decisions at a given company. We collected a consecutive two-year compensation dataset of the S&P 1500 firms from Compustat Execomp. Using the Board Analyst database, each company listed in the S&P 1500 was matched to its

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[1]Faleye (2011) argues that CEO-directors may overestimate the effort and skill requirements of the executive job and rationalize higher compensation packages for top executives.

outside directors' primary companies for which they serve (or served) as executives. We then calculated the average CEO pay of matched outside directors' primary companies. Based on this constructed sample, we tested whether the average level of CEO pay at directors' primary companies affects the level of CEO pay at a given company. If this finding is insignificant, we may not be able to state that the characteristics of outside directors' primary companies directly distort the executive pay decisions at a given company.

In our analysis, the test result was statistically significant. Using the fixed effects model with a panel data analysis, which is identical to the first-difference model in the given consecutive two-year sample, we observe a strong link between CEO pay at outside directors' primary companies and CEO pay at a given company; a $1.00 increase in CEO pay at outside directors' primary companies leads to an approximate $0.22 increase in CEO pay at a given firm. We also observe that a 1% increase in CEO pay at outside directors' primary companies is associated with a 0.13% increase in CEO pay at a given firm.

We obtained these test outcomes even after controlling for the size (and the entrenchment) associations between outside directors' primary companies and each given company. Taking all of the interlocking cross-directorship observations out of the samples made little difference in the test outcomes. The observed strong link may be generated by several other sources. For instance, the positive association between CEO pay levels is well supported by a psychological phenomenon known as the *anchoring effect* (Tversky and Kahneman 1974), which holds that outside directors may use the CEO pay levels at their primary companies as firsthand reference points when making CEO pay decisions at a given firm. It is also plausible that the homogeneity and cohesiveness of top executives, termed the *inner circle*, may affect the observed positive association between CEO pay levels.

Our empirical findings are noteworthy from a policy perspective because the additional agency problem within the supposedly "independent" BOD is difficult to control; despite the fact that we establish board independence through various imposed regulations and shareholder activism, this inherent characteristic of concurrent employment among board members continues to exist in the corporate governance systems of many advanced countries, unless the government imposes direct regulations on the board structure.

The paper is organized into the following sections. Section II describes the data sources and the procedure used to construct the dataset. Section III covers the methodologies used in the analysis. Section IV presents the test results. Section V discusses the implications of the findings, and Section VI concludes the paper.

II. Dataset and Variables

In this section, we describe the data sources and the process of constructing the dataset and explain the key variables used in the analysis. The Compustat Execomp (also known as ExecuComp) and Board Analyst databases were used as sources of the board and ownership characteristics and the economic information pertaining to the selected firms. Compustat Execomp, which began in 1994, provides data on compensation for the top five executives and basic economic performance metrics,

primarily for S&P 1500 companies. Board Analyst, which began in 2001, is a source of comprehensive, objective corporate governance and compensation information for more than 10,000 U.S. companies.

A. *Sample and Datasets*

The research in this paper covers the early 2000s because we use the first samples that the Board Analyst started to provide. More specifically, we constructed a dataset that contains two-year panel data (2002 and 2003) on 556 firm entries from the S&P 1500.[2] The most challenging aspect when constructing the datasets was to "match" the original company and the directors' primary company information. For each selected firm entry, background company information for at least two outside directors was entered successfully.

In detail, the 556 firm entries in the final sample were selected using the following procedure. First, we started with firm entries from the S&P 1500 in 2002 and 2003, after which we collected each firm's director information from "Directorships in Board Analyst" database, which included the names of the directors and their primary companies.

Second, CEO compensation and certain types of economic information for each firm were taken from "2002 and 2003 Compustat Execomp" database.

Third, to obtain CEO compensation information at the directors' primary companies, we matched the outside directors' primary companies against the "2002 and 2003 Compustat Execomp" database. Note that tiresome and time-consuming "hand matching" is required during this process because the names of the directors' primary companies contained in Board Analyst are displayed in a casual manner, whereas Compustat Execomp provides the companies' official names. Moreover, only outside directors' primary companies that are listed (or formerly listed) in the S&P 1500 index can be matched, as Compustat Execomp provides information exclusively on S&P 1500 companies.

Fourth, using the match success result, we selected firms that show at least two match successes (firms matched with at least two directors' primary companies).

Fifth, to control for the industry effect, we needed at least eight firm entries for each industry group identified using the two-digit Standard Industrial Classification (SIC) code. Thus, we eliminated firm entries with fewer than eight companies in the same industry group.

According to these criteria, 556 firm entries in total qualified for the test.[3] Larger firms are easier to match to their directors' primary companies listed in the S&P 1500. Thus, we find that most of the selected firms in the final sample are in the S&P 500. The match ratio is 2.78, indicating that each firm entry is matched to approximately three director companies.[4] The two-digit SIC code classification

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[2]The empirical findings in this paper could be verified more concretely using a panel dataset that reflects extended periods.

[3]Samples with excessive CEO pay could hinder the determination of the general business-sector trend. Thus, we removed outliers reflecting more than $40 million in CEO compensation, either for each given firm or as the average CEO compensation of directors' primary companies.

[4]In detail, 301 firm entries have 2 matched director companies; 129 firm entries have 3; 88 firm entries have

shows that the sample contains 15 different industries.

B. *Variables*

The dependent variable is *CEO pay*, which is the CEO's total compensation, including their salary, bonus, restricted stock grants, stock options, and other benefits. The variable of primary interest is *director company CEO pay*, which represents the average CEO pay in the matched directors' primary companies.

Table 1 (Variable Definitions) and Table 2 (Summary Statistics) describe all of the control variables used in the test. Below, we define the key control variables and explain the correlation of these variables with the dependent variable, *CEO pay*.

The following eleven board and ownership characteristics were collected for the test: *independent directors*, *chairman CEO*, *compensation chair appointment*, *director appointment by CEO*, *busy directors*, *aged directors*, *board size*, *insider ownership*, *institutional ownership majority*, *entrenchment index*, and *CEO tenure*.

The first four variables represent the degree of board independence: *independent directors*, *chairman CEO*, *compensation chair appointment*, and *director appointment by CEO*.[5] The next three variables indicate the degree of board effectiveness: *busy directors*, *aged directors*, and *board size*.[6] Boards that are more independent and more effective are expected to be negatively correlated with the level of CEO pay (Core *et al.* 1999).

The next two variables, *insider ownership* and *institutional ownership majority*, represent the ownership structure. *Insider ownership* is the expected percentage of shares held by top management and directors. *Institutional ownership majority* indicates whether a majority of outstanding shares are held by institutions. Larger insider ownership levels result in fewer agency problems and are thus expected to be negatively correlated with the level of CEO pay (Jensen and Meckling 1976). Institutions are expected to participate more actively in corporate governance issues. Thus, majority ownership by institutional investors may prevent excessive CEO pay.

To reflect the overall entrenchment of the management team, we use the entrenchment index of Bebchuck *et al.* (2009), which is composed of four "constitutional" provisions, including a supermajority requirement for mergers and a staggered board, along with two "takeover readiness" provisions, specifically poison pills and severance agreements. Stronger entrenchment may imply a weaker governance structure and thus may result in higher CEO pay.

Finally, *CEO tenure* is expected to be negatively correlated with CEO pay. Jensen *et al.* (2004) argue that the BOD almost invariably pays "too much" for

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4; 26 firm entries have 5; 6 firm entries have 6; 4 firm entries have 7; and 2 firm entries have 8.

[5]*Compensation chair appointment* indicates whether the chairman of the compensation committee was appointed by the current CEO. *Director appointment by CEO* is the ratio of outside directors appointed by the current CEO.

[6]*Busy directors* refers to the ratio of directors who serve on more than four boards. *Aged directors* is the ratio of directors who are older than 70 years old.

TABLE 1—VARIABLE DEFINITIONS

Table 1 presents definitions of the variables used in this paper. [CE] indicates that the data source is Compustat Execomp and [BA] indicates that the data source is Board Analyst.

Variables	Definitions [Source]
Key Variables	
CEO Pay	Total compensation for the firm's CEO, including the following: salary, bonus, restricted stock granted, stock options granted. [CE]
Director Company CEO Pay	Average total compensation rewarded to CEOs of all matched companies, in which the outside directors work as executives. [collected manually, CE]
Ratio of CEO-Directors	Ratio of CEO-directors to the total number of outside directors. CEO-director is defined as an outside director who is a CEO in his/her primary company. [collected manually, BA]
Director Company Variables	
Director Company Market Cap	Average market cap of all matched companies, in which the outside directors work as executives. [collected manually, CE]
Director Company Entrenchment	Average *entrenchment index* of all matched companies, in which the outside directors work as executives. [collected manually, Lucian Bebchuk's Web]
Board and Ownership Characteristics	
Independent Directors	Ratio of the number of independent outside directors to the total number of outside directors. [BA]
Busy Directors	Ratio of the number of directors who are on more than four boards to the total number of outside directors. [BA]
Aged Directors	Ratio of the number of directors who are older than 70 years to the total number of outside directors. [BA]
Insider Ownership	Estimated percentage of shares held by top management and directors, as reported in the company's most recent proxy statement. [BA]
Chairman CEO	Indicates whether the current CEO is also the current chairman of the board. [BA]
Board Size	Total number of directors on the board. [BA]
CEO Tenure	Number of years of service of the current CEO. [BA]
Institution Ownership Majority	Indicates whether a majority of outstanding shares are held by institutions. [BA]
Compensation Chair Appointment	Indicates whether the chairman of the compensation committee was appointed by the current CEO. [collected manually]
Director Appointment by CEO	Ratio of the number of outside directors who were appointed by the current CEO to the total number of outside directors. [collected manually]
Entrenchment Index	Entrenchment index developed by Bebchuk *et al.* (2009). [Lucian Bebchuk's Web]
Economic Variables	
Market Cap	Closing price for the fiscal year multiplied by the number of common shares outstanding of the company. [CE]
Operating Income Change	Year-to-year percentage change in *operating income before depreciation*. [CE]
Operating Income Growth	Three-year least squares annual growth rate of *operating income before depreciation*. [CE]
ROE	*Net income before extraordinary items and discontinued operations* divided by *total common equity*. This quotient is then multiplied by 100. [CE]
Relative Performance	Indicates whether a company outperformed or underperformed its industry by comparing five-year returns [BA]
ROA	*Net income before extraordinary items and discontinued operations* divided by total assets. This quotient is then multiplied by 100. [CE]
Stock Market Return	Three-year total return to shareholders, including monthly reinvestments of dividends. [CE]
Stock Volatility	Standard deviation volatility calculated over 60 months. [CE]
SP Index Yearly Average	Yearly average of the S&P 500 index calculated using the average of 12 monthly averages. [Standard and Poor's]
Two-digit SIC Code	The first two digits from the four-digit Standard Industrial Classification (SIC) Code. [CE]

TABLE 2—SUMMARY STATISTICS

Table 2 presents summary statistics pertaining to the variables in the constructed dataset, which is a two-year panel dataset composed of firms with a fiscal year ending between June of 2002 and May of 2004. We provide only pooled statistics.

Variable	Obs.	Mean	Std. Dev.	Min.	Max.	Unit
Key Variables						
CEO Pay	547	6163.7	5790.9	467.6	36946.1	Thousands of dollars
CEO Pay (Log)	547	8.3	0.9	6.1	10.5	
Director Company CEO Pay	555	7419.1	5736.8	549.1	38612.1	Thousands of dollars
Director Company CEO Pay (Log)	555	8.6	0.8	6.3	10.6	
Ratio of CEO-Directors	537	36.2	16.4	6.3	100.0	Percentage
Director Company Variables						
Director Company Market Cap	556	18,820.4	24,747.7	49	15,4579	Millions of dollars
Director Company Entrenchment	533	2.6	1.0	0	6	Number
Board and Ownership Characteristics						
Independent Directors	537	77.0	13.5	25	94	Percentage
Busy Directors	537	10.8	12.1	0	58	Percentage
Aged Directors	537	5.7	10.6	0	100	Percentage
Insider Ownership	519	13.1	15.1	0	83	Percentage
Chairman CEO	537	0.7	0.4	0	1	Dummy
Board Size	537	10.8	2.8	5	23	Number
CEO Tenure	537	5.4	5.3	0	41	Number
Institution Ownership Majority	519	0.8	0.4	0	1	Dummy
Compensation Chair Appointment	531	0.2	0.4	0	1	Dummy
Director Appointment by CEO	514	36.0	30.0	0	100	Percentage
Entrenchment Index	518	2.8	1.2	0	6	Number
Economic Variables						
Market Cap	552	13,909.3	31,024.3	91	271,002	Millions of dollars
Operating Income Change	538	13.9	377.2	−5,899	4,655	Percentage
Operating Income Growth	523	4.5	29.2	−58	390	Percentage
ROE	543	13.2	41.8	−314	454	Percentage
Relative Performance	518	6.5	6.5	−12	20	Percentage
ROA	554	3.0	14.0	−207	60	Percentage
Stock Market Return	534	2.3	20.1	−76	75	Percentage
Stock Volatility	553	0.4	0.2	0	2	Number
SP Index Yearly Average	556	978.2	10.3	968	989	Number

newly appointed CEOs.[7]

In addition to the board and ownership characteristics, the following eight performance variables were devised for the test: *market cap*, *operating income change*, *operating income growth*, *ROE*, *relative performance*, *ROA*, *stock market return (three-year)*, and *stock volatility*. Among them, *market cap* is used to reflect the size of the company. *Operating income change*, which is the year-to-year percentage change in operating income, represents short-term performance. *Operating income growth*, which is the three-year growth rate of operating income, represents long-term performance. *ROE (ROA)*, which is net income divided by total common equity (total assets), represents the profitability of the firm's operations. *Relative performance* indicates the degree to which a company outperformed or underperformed its industry in the stock market over the five previous years. These performance variables are expected to be positively correlated with CEO pay.

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[7]However, CEO tenure may also be a proxy for the CEO's job experience. If this is the case, tenure can be positively correlated with the wage variable, *CEO pay*.

Finally, to represent the macroeconomic condition in each year, the variable of the *SP index yearly average* is constructed, representing the average of 12 monthly averages of the S&P 500 index. To reflect the industry effect (Finkelstein and Hambrick 1995),[8] we also include the two-digit SIC code, consisting of the first two digits of the four-digit SIC code.[9]

III. Methodologies

In this section, we present the methodologies used for the panel data analysis. Primarily, we conduct the Breusch-Pagan Lagrange Multiplier (LM) test for random effects (Breusch and Pagan 1980). The null hypothesis of the test is that the variance of the unobserved firm-specific fixed effects is zero. Because the null is rejected in the test for various possible specifications, we confirm that a simple pooled OLS estimator is not efficient. (For instance, refer to the LM test result at the bottom of Table 3 for regression 3.) Either the random (or the fixed) effects models or a pooled OLS with cluster robust standard errors would be more appropriate.

A. *Regression Specification for the Hypothesis*

First, we search for suitable regression specifications to examine the relationship between CEO compensation in a given company and average CEO compensation in the directors' primary companies, presenting the empirical test outcomes for a pooled regression with cluster robust standard errors (Rogers 1993). The test outcomes are then compared with their alternatives — the random effects (RE) and the fixed effects (FE) models. We start with the following regression specification:

$$(1) \quad \begin{aligned} CEOpay_{it} &= \alpha \, DirCEOpay_{it} + \gamma \, B_{it} + \delta \, E_{it} \\ &+ \nu \, DI_i + \theta \, S_t + \upsilon \, DY_t + c_i + u_{it}. \end{aligned}$$

In this regression, $CEOpay_{it}$ is the level of CEO compensation in the given company (*CEO pay*), $DirCEOpay_{it}$ is the level of average CEO compensation in the directors' companies (*director company CEO pay*), B_{it} is the set of the eleven board and ownership characteristic variables, and E_{it} denotes the set of the eight performance variables, including *market cap* and *ROA*. DI_i is an industry dummy obtained from the two-digit SIC code, which is used to control for the industry fixed effect. S_t is the S&P 500 index yearly average, which is included to reflect the macroeconomic conditions for each year.

The residuals for a given year may be correlated across different firms according to a concept known as "time effects" or "spatial correlation." To handle time effects, year dummies (DY_t) are included in the regression. On the other hand, the residuals for a given firm may be correlated across years, a concept referred to as

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[8]Finkelstein and Hambrick (1995) argue that CEOs are frequently compensated in relation to CEOs in the same industry, with the empirical finding that a 1% increase in CEO pay within an industry is associated with a 1.37% increase in the pay of the focal CEOs in their sample.

[9]The two-digit SIC code represents 83 industry categories in the United States.

TABLE 3—EFFECTS OF DIRECTOR COMPANY CEO PAY

Table 3 presents the test results of the pooled regression with cluster robust standard errors (1–2), the random effects model (3), and the fixed effects model (4). The dependent variable is *CEO pay*. The key variable of interest is *Director Company CEO Pay*. The Breusch and Pagan LM test and Hausman's specification tests are reported at the bottom. In each regression, the following economic variables are controlled, together with *Market Cap* and *ROA*: *Operating Income Change*, *Operating Income Growth*, *ROE*, *Relative Performance*, *Stock Market Return*, *Stock Volatility*, and *SP Index Yearly Average*. Standard errors are reported in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

Dependent Variable: CEO Pay	(1) Pooled OLS (Cluster)	(2) Pooled OLS (Cluster)	(3) Random Effects	(4) Fixed Effects
Director Company CEO Pay	**0.12***	**0.14***	**0.17***	**0.22***
	(0.0)	**(0.04)**	**(0.05)**	**(0.07)**
Director Company Market Cap		0.003	0.002	0.020
		(0.014)	(0.013)	(0.040)
Director Company Entrenchment		378.6	431.5	.
		(292.0)	(299.5)	.
Independent Directors	−25.0	−17.5	−10.2	−6.2
	(22.6)	(20.8)	(19.2)	(28.8)
Busy Directors	36.2*	40.9**	31.9	23.8
	(19.7)	(19.8)	(19.6)	(33.1)
Aged Directors	19.8	29.9	−12.8	−94.9***
	(72.2)	(73.2)	(22.7)	(35.0)
Insider Ownership	−30.6	−32.5*	−25.2	−16.7
	(18.8)	(19.5)	(17.8)	(21.5)
Chairman CEO	528.6	489.3	203.2	76.7
	(430.8)	(420.3)	(394.0)	(465.8)
Board Size	65.5	78.1	144	189.7
	(102.3)	(106.0)	(109.6)	(195.8)
CEO Tenure	17.4	39.3	80.7	347.1
	(77.2)	(76.8)	(87.6)	(212.0)
Institution Ownership Majority	453.4	253.1	525.4	893.4
	(698.1)	(712.7)	(597.1)	(819.9)
Compensation Chair Appointment	−2,428.2***	−2,261.4***	−1,104.2	935.6
	(797.7)	(790.1)	(699.5)	(988.5)
Director Appointment by CEO	13.1	13.2	0.33	−36.8
	(12.2)	(12.8)	(13.6)	(24.5)
Entrenchment Index	87.3	129.6	133.0	.
	(235.9)	(249.5)	(254.5)	.
Market Cap	0.082***	0.083***	0.078***	0.0087
	(0.011)	(0.012)	(0.009)	(0.034)
ROA	−4.44	20.1	102.1*	172.7*
	(69.5)	(67.1)	(58.3)	(89.6)
Economics Variables Controlled	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
Observation	414	401	401	401
R-squared	0.52	0.54		
Breusch and Pagan LM Test			0.00	
Hausman p-value (FE/RE)				0.0001
Hausman p-value (FE/Pooled OLS)				0.0000

"firm-specific effects" or "temporal correlation." This unobserved firm-specific effect is denoted by c_i in the given specification. Finally, u_{it} represents the idiosyncratic error.
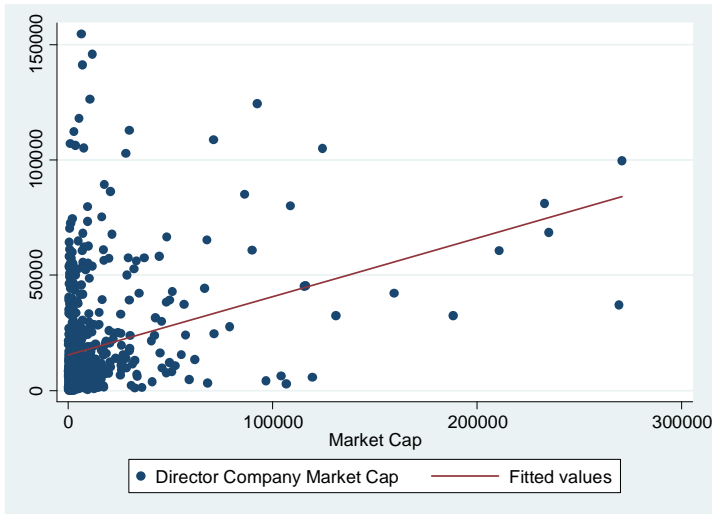
PANEL 1
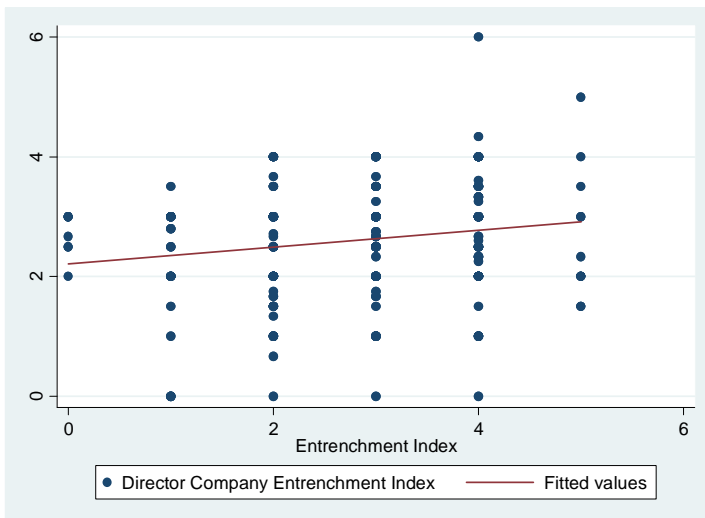
PANEL 2

FIGURE 1—CHARACTERISTICS OF DIRECTORS' PRIMARY COMPANIES

Panel 1 presents a scatterplot of *director company market cap* versus *market cap* and its fitted line. Panel 2 presents a scatterplot of *director company entrenchment* versus *entrenchment index* and its fitted line.

As a primary estimation, we use a pooled OLS regression with cluster robust standard errors. Regression 1 in Table 3 presents the test result, which shows a significant coefficient for the variable of interest, $DirCEOpay_{it}$, where a \$1.00 increase in CEO pay at the directors' primary companies is associated with an approximate \$0.12 increase in CEO pay at the given firm.

The first concern with this initial specification is that the coefficient of the variable of interest $DirCEOpay_{it}$ may not capture the direct relationship between the two CEO pay variables. This concern arises out of the director selection procedure; large firms tend to hire outside directors from other large firms, and the size of director firms is strongly correlated with the level of CEO pay at the director firms. Panel 1 in Figure 1 indicates the potential seriousness of this concern: larger firms are more likely to hire directors from other larger firms. Thus, even without the strong direct effect of $DirCEOpay$ on $CEOpay$, the coefficient for the variable of interest, α, could be significant in the test results. For example, $DirCEOpay$ could simply be a proxy for the size of the directors' companies. To control for this possible bias, we include the size variable of director firms, *director company market cap*, as a control variable, representing the average market capitalization of all of the matched directors' companies.

Similarly, the coefficient for the variable of interest $DirCEOpay_{it}$ may reflect the positive correlation between the entrenchment in the directors' primary companies and that in the given company. Panel 2 in Figure 1 shows the potential seriousness of this concern: more strongly entrenched firms tend to hire outside directors from other entrenched firms. To control for this bias, we also include the entrenchment variable of director firms *director company entrenchment* as a control variable, representing the average entrenchment index of all of the matched directors' companies.

Thus, we arrive at the following adjusted specification, in which $DirComp_{it}$ represents a set of two additional control variables, *director company market cap* and *director company entrenchment*:

$$
\begin{aligned}
CEOpay_{it} = {} & \alpha DirCEOpay_{it} + \beta DirComp_{it} + \gamma B_{it} + \delta E_{it} \\
& + \nu DI_i + \theta S_t + \upsilon DY_t + c_i + u_{it.}
\end{aligned}
$$
(2)

The pooled OLS regression with the adjusted specification is displayed in the results for regression 2 in Table 3. This reconfirms the significant coefficient α for the variable of interest, $DirCEOpay_{it}$, which is estimated to be 0.14.

B. *Alternative Econometric Models*

We present the test results from other alternatives — the random and the fixed effects models — in regressions 3 and 4, respectively. Both regressions confirm the significant coefficients for the variable of interest, $DirCEOpay_{it}$, which are estimated to be 0.17 (RE) and 0.22 (FE).

The fixed effects model generates a consistent estimate even when the firm-specific effects are correlated with any of the independent variables. [10] Consequently, we conduct the Hausman (1978) specification test to compare the fixed effects model and several alternative estimators, shown at the bottom of Table

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[10] According to Petersen's simulations (2009), the pooled regression with cluster robust standard error generates a consistent estimate when the firm-specific fixed effects vary over time. However, it does not make sense to assume time-varying fixed effects in the given two-period sample.

3, for regression 4, in which the null hypothesis is that the firm-specific effect (c_i) is not correlated with other regressors. Because the null is rejected in each test, both the random effects model and the pooled OLS model are biased.

Therefore, the fixed effects estimator used in regression 4, which is identical to the unbiased first-difference (FD) estimator owing to the two periods in the given sample, solely remains consistent. According to the fixed effects estimation, we conclude that a reliable estimate of the coefficient for the variable of interest, α, is 0.22.

IV. Empirical Analysis

In this section, we summarize the test results from the previously described panel data analysis. Table 3 indicates the test results for the given hypothesis using the pooled OLS (with cluster robust standard errors) and its alternative RE/FE models. In all of the regressions, the coefficient for *director company CEO pay* is positive and significant at the 1% level. However, the Hausman specification test demonstrates the unacceptability of the pooled OLS and random effects models against the fixed effects model. The unbiased FE(FD) estimation in regression 4 suggests that a $1.00 increase in CEO pay at the outside directors' primary companies results in an approximate $0.22 increase in CEO pay.

As a robustness check, we also report the elasticity estimates in Table 4 using the logarithm transformations of *CEO pay* and *director company CEO pay*. The three regressions present the elasticity of the two compensation variables in the pooled OLS, RE, and FE models. (The Breusch-Pagan LM test for random effects and Hausman's specification tests are reported at the bottom.)

The elasticities estimated using the three different regressions are found to be very close to each other, at approximately 0.12~0.13. According to the unbiased FE(FD) estimate, it is interpreted that a 1% increase in CEO pay at the outside directors' primary companies is associated with a 0.13% increase in CEO pay at a given firm. Except for the FE model, the coefficients of the variable of interest, *director company CEO pay (Log)*, are positive and significant at the 5% level. The coefficient of the FE model is significant at the 10% level when using a one-sided test, which is acceptable in the given analysis because we conjecture that the negative association between the two compensation variables is unreasonable.

TABLE 4—ROBUSTNESS CHECK (ELASTICITY)

Table 4 presents the test results of the pooled regressions with cluster robust standard errors (1), the random effects models (2), and the fixed effects models (3). The dependent variable is *CEO pay (Log)*. The key variable of interest is *Director Company CEO Pay (Log)*. The Breusch and Pagan LM test and Hausman's specification tests are reported at the bottom. In each regression, the following economic variables are controlled together with *Market Cap* and *ROA*: *Operating Income Change*, *Operating Income Growth*, *ROE*, *Relative Performance*, *Stock Market Return*, *Stock Volatility*, and *SP Index Yearly Average.* Standard errors are reported in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively. [*] indicates significance at the 10% level according to a one-sided test.

Dependent Variable: CEO Pay (Log)	(1) Pooled OLS (Cluster)	(2) Random Effects	(3) Fixed Effects
Director Company CEO Pay (Log)	**0.12****	**0.12****	**0.13[*]**
	(0.059)	**(0.057)**	**(0.088)**
Director Company Market Cap	1.2E–06	1.2E–06	–3.5E–09
	(0.000)	(0.000)	(0.000)
Director Company Entrenchment	0.056	0.059	.
	(0.056)	(0.054)	.
Independent Directors	–0.005	–0.004	–0.003
	(0.004)	(0.003)	(0.005)
Busy Directors	0.008**	0.005	0.000
	(0.003)	(0.003)	(0.005)
Aged Directors	–0.001	–0.005	–0.006
	(0.009)	(0.004)	(0.006)
Insider Ownership	–0.007**	–0.004	–0.002
	(0.004)	(0.003)	(0.003)
Chairman CEO	0.020	0.019	0.027
	(0.075)	(0.063)	(0.073)
Board Size	0.055***	0.042**	0.0031
	(0.019)	(0.019)	(0.031)
CEO Tenure	–0.002	0.000	0.006
	(0.018)	(0.015)	(0.033)
Institution Ownership Majority	0.180	0.220**	0.210
	(0.140)	(0.099)	(0.130)
Compensation Chair Appointment	–0.390***	–0.150	0.110
	(0.150)	(0.120)	(0.160)
Director Appointment by CEO	0.004	0.002	0.001
	(0.003)	(0.002)	(0.004)
Entrenchment Index	0.022	0.033	.
	(0.046)	(0.046)	.
Market Cap	8.1E–06***	8.9E–06***	3.4E–06
	(0.000)	(0.000)	(0.000)
ROA	0.005	0.017*	0.029**
	(0.011)	(0.010)	(0.014)
Economics Variables Controlled	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Observation	401	401	401
R-squared	0.46		
Breusch and Pagan LM Test		0.00	
Hausman p-value (FE/RE)			0.22
Hausman p-value (FE/Pooled OLS)			0.00

V. Discussion

The positive association between CEO pay at outside directors' primary companies and CEO pay at a given company may stem from either 1) the direct positive association between the size of the director firms and that of the given firm, or 2) the direct positive association between the degree of entrenchment in the director firms and that of the given firm; larger firms tend to hire outside directors from other large firms and more entrenched firms tend to hire outside directors from other entrenched firms. However, as discussed in Section III, the positive effect (observed in Tables 3 and 4) of the change in CEO pay at outside directors' primary companies on the change in CEO pay at a given company is not easily attributable to the direct positive associations between the director firms and the given firm because we include both *director company market cap* and *director company entrenchment* as control variables in the regression analysis.

On the other hand, some may argue that the observed positive effect is attributable to cross-directorship, in which outside directors favor CEOs who serve as outside directors at their own primary companies (e.g., Hallock 1997). However, it is noteworthy that while reciprocal CEO interlocks exist occasionally, they are not very common practice in the business world as it exists today.[11] In our limited sample of 556 firm entries, we observe only several interlocking relationships. Indeed, we find that removing those few entries from the sample makes little difference in the test outcomes. Therefore, without hesitation, we conclude that cross-directorship is not a major driving force behind the observed positive effect in the above analysis.

Among other possible sources that may generate the observed effect, we pay close attention to the following two phenomena: 1) the psychological phenomenon known as the *anchoring effect*, and 2) the societal phenomenon termed the *inner circle*. Tversky and Kahneman (1974) suggest that individuals make estimates by starting from an "initial value" (anchor) that is adjusted to yield the final answer. Because adjustments are typically insufficient, different starting points yield different estimates that are biased toward the initial value. According to this theory, CEO compensation in outside directors' primary companies may serve as a firsthand reference point for directors' decisions on CEO pay. Once their primary companies pay higher CEO compensation, they are more likely to choose a higher value for CEO pay in a given company and to accept a CEO's request to increase his or her salary. Thus, all else being equal, CEO compensation in a given firm may reflect the level of CEO compensation at the directors' primary companies. This anchoring effect may be a primary source of the observed sensitivity between the change in CEO pay at the directors' primary companies and the change in CEO pay at a given company.

Top corporate executives tend to be a relatively homogeneous, cohesive collection of individuals, which Useem (1984) calls the *inner circle*.[12] Outside directors who are top executives at other firms find it difficult to be fully objective

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[11]For instance, even in Hallock's (1997) study, only 8% of CEOs are reciprocally interlocked.
[12]The term *inner circle* is defined as all corporate executives who serve on the board of directors of two or more big corporations.
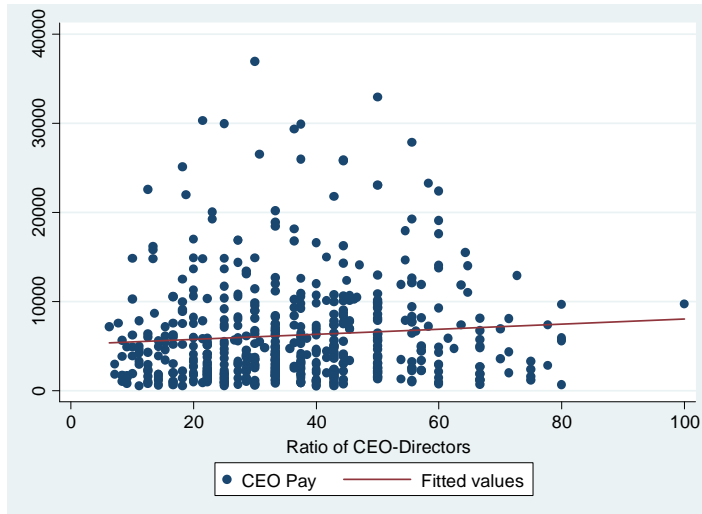
FIGURE 2. CEO PAY AND THE RATIO OF CEO-DIRECTORS

The figure presents a scatterplot of *ratio of CEO-directors* versus *CEO pay* with its fitted line.

about issues related to executive compensation. For instance, the pay consultant Watson Wyatt conducted a survey of two separate groups — directors and institutional investors — on the subject of the U.S. executive pay model.[13] The survey reveals that the two groups have very different views of the current pay system; 65 percent of directors and only 22 percent of institutional investors believe that the stock-based pay model in the U.S. has contributed to superior corporate performance; 90 percent of institutional investors think that executives at most companies are overpaid, compared to only 60 percent of directors. This homogeneity of the top executives and the concurrent executive employment of outside directors may contribute to the observed positive association between CEO pay levels as far as they can stimulate implicit collusion among executives. The more cohesive the top executives (outside directors) are in a specific industrial sector (or in a specific regional market), the more closely linked CEO pay levels of the relevant companies are.

As supplementary evidence to support this *inner circle* argument, we checked whether a higher number of outside directors who are active CEOs in other firms results in the board granting a higher level of CEO compensation. A higher number of CEO-directors on the board may help the CEO in a given firm propose suggestions that are favorable to his interests and position; CEO-directors are more likely to appreciate the CEO's efforts and contributions and, thus, willingly increase his salary. Let the variable *ratio of CEO-directors* represent the ratio of CEO-directors to the total number of outside directors on the board (c.f., Tables 1 and 2). At first glance, the scatterplot and the fitted line in Figure 2 imply a possible positive association between *CEO pay* and *ratio of CEO-directors*.

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[13]In the survey, 55 institutions managing $800 billion in assets participated, along with 50 directors. The survey was conducted with institutional investors in 2005 and with directors in 2006 (Watson Wyatt, 2006).

TABLE 5—SUPPLEMENTARY ANALYSIS (RATIO OF CEO-DIRECTORS)

Table 5 presents the test results of the pooled regression with cluster robust standard errors (1), random effects model (2), and fixed effects model (3). The dependent variable is *CEO pay*. The key variable of interest is the *ratio of CEO-directors.* The Breusch and Pagan LM test and Hausman's specification tests are reported at the bottom. In each regression, the following economic variables are controlled, together with *Market Cap* and *ROA*: *Operating Income Change*, *Operating Income Growth*, *ROE*, *Relative Performance*, *Stock Market Return*, *Stock Volatility*, and *SP Index Yearly Average.* Standard errors are reported in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

Dependent Variable: CEO Pay	(1) Pooled OLS (Cluster)	(2) Random Effects	(3) Fixed Effects
Ratio of CEO-Directors	**43.6*****	**33.3*****	**31.5***
	(15.9)	**(12.9)**	**(17.9)**
Independent Directors	−25.0	−17.8	−3.0
	(21.1)	(19.3)	(29.6)
Busy Directors	33.5*	29.8	38.5
	(20.2)	(19.9)	(34.2)
Aged Directors	29.9	−13.3	−95.2***
	(69.0)	(23.2)	(36.4)
Insider Ownership	−27.6	−22.3	−14.1
	(18.7)	(18.0)	(21.6)
Chairman CEO	528.0	128.9	−200.4
	(429.6)	(398.5)	(467.6)
Board Size	125.6	200.1*	291.6
	(102.7)	(112.5)	(200.3)
CEO Tenure	16.0	44.1	274.5
	(79.6)	(83.8)	(198.0)
Institution Ownership Majority	453.8	689.8	929.0
	(689.7)	(610.6)	(835.5)
Compensation Chair Appointment	−2350.5***	−1318.0*	687.2
	(782.9)	(695.6)	(964.1)
Director Appointment by CEO	10.5	2.7	−22.9
	(11.9)	(13.2)	(22.3)
Entrenchment Index	−6.6	−2.8	.
	(225.5)	(246.4)	.
Market Cap	0.087***	0.082***	0.0002
	(0.011)	(0.009)	(0.034)
ROA	−39.0	59.9	166.3*
	(71.3)	(58.3)	(89.9)
Economics Variables Controlled	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Observation	415	415	415
R-squared	0.53		
Breusch and Pagan LM Test		0.00	
Hausman p-value (FE/RE)			0.0001
Hausman p-value (FE/Pooled OLS)			0.0000

Table 5 reports the estimation results of the pooled OLS (with cluster robust standard errors), the random effects model, and the fixed effects model. According to the fixed effects estimation, the unbiased estimate of the coefficient for the variable of interest is 31.5, indicating that an increase of one percentage point in the ratio of outside directors who are active CEOs in other firms results in an

approximate $31,500 increase in CEO pay.[14]

In the given sample, the average number of outside directors on the board is 9.3, indicating that one additional CEO-director on the board is equivalent to a 10.8% increase in the *ratio of CEO-directors*. Therefore, the replacement of a non-CEO outside director with a CEO-director may result in an approximate $0.34 million increase in CEO pay, a significant amount considering that the average CEO pay in the sample is approximately $6 million. This observation supports the argument that CEO-directors tend to view the BOD (either consciously or subconsciously) through the eyes of a CEO.

There may be other valid factors influencing the observed strong link between CEO pay at outside directors' primary companies and CEO pay at a given company. Further explorations are left for future research.[15]

VI. Conclusion

Since the early 1990s, many articles have been published on executive pay (Boyd *et al.* 2012). Some academic publications have focused on the optimal compensation contract and the pay–performance relationship when debating stock-based pay and soaring executive pay (e.g., Jensen and Murphy 1990a, 1990b; Hall and Liebman 1998; Hall and Murphy 2003; Aggarwal and Samwick 1999; Bebchuk and Fried 2003). Others have focused on the relationship between board characteristics and CEO compensation, concentrating on corporate governance weaknesses and BOD independence (e.g., Core *et al.* 1999; Jensen 1993). The primary concern in the literature has been connected to the agency problem caused by the management team, or what is termed a "captured" BOD.

However, the literature has not put much weight on the agency problem that may be caused purely by the BOD, including a concurrent employment issue of board members which may seriously affect their decision processes as related to the level of CEO compensation. As a complement to the "social network" literature that emphasizes the impact of cross-directorship on the level of CEO compensation, the empirical work in this paper provides a new approach to the issue of concurrent employment on a board.

The unbiased fixed effects estimation confirms a strong link between CEO pay at outside directors' primary companies and CEO pay in a given company, even after controlling for both the size (and the entrenchment) associations between the directors' primary companies and the given firm. Furthermore, we find that the

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[14]We utilize the Breusch-Pagan LM test for random effects and present the test result at the bottom of Table 5 for regression 2. Because the null is rejected, a pooled OLS estimator is not efficient. Subsequently, we conduct the Hausman tests to compare the fixed and random effects models and to compare the fixed effects and pooled OLS models. The test results at the bottom of Table 5 indicate that the nulls are rejected. Thus, both the random effects and the pooled OLS estimators are biased, while only the fixed effects estimator remains unbiased and consistent.

[15]There may be a positive association between the CEO pay levels due to a CEO-director ability effect: When a talented CEO who is paid higher in firm A serves as an outside director in firm B, the CEO pay in firm B can be higher as well owing to the talented outside director's contribution to the productivity of firm B. However, the observed strong link in this paper cannot be attributable to this CEO-director ability effect because we report the test outcomes from the first-difference (FD) panel estimations. That is, the ability of CEO-director does not vary across the years and thus this omitted variable does not affect the estimation outcomes.

number of cross-directorship relationships is very small in the sample here; thus, the "social network" argument does not support the observed strong link. Instead, we do not rule out the possibility that the link results from unintended psychological bias, often known as the *anchoring effect*. It is also plausible that the pay inefficiency originates from the homogeneous and cohesive collection of individuals (the *inner circle*) who serve as top executives as well as outside directors.

The degrees of psychological bias and pay inefficiency will be greater when outside directors are more negligent or less considerate. Thus, these factors cannot be excuses for the violation of the directors' duty to care. Moreover, this may introduce improper incentives for CEOs, as they may be tempted to recruit outside directors who serve for companies paying greater CEO compensation or from their own *inner circle*.

This additional agency problem — caused by the BOD and not by the management team — will be difficult to control as long as concurrent executive employment on boards continues to exist. As suggested by some governance experts, including Jensen *et al.* (2004) and Brenner and Schwalbach (2009), this conflict may be alleviated through specific legal rules that make boards more accountable to shareholders, such as strengthening the procedural rights of shareholders who vote to elect directors.

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