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Executive Pay and Market Value Sensitivity

Summary: Executive pay relative to that of average workers has risen dramatically worldwide. Such a high level of executive pay raises the question of whether a steep rise in executive pay affects firm value. This study examined the relationship between executive pay and firm value. A panel smooth transition regression model is adopted to determine an optimal level of executive pay that maximizes firm value for a sample of 512 Taiwanese-listed firms over the period 2006-2011. The finding is that when the ratio of executive pay to net income after tax exceeds 2.71%, the firm value increases. The results suggest a correlation between large executive ownership (corresponding to high executive pay) and both increased operational efficiencies and firm value. These findings may be useful when contemplating executive compensation policy.

Key words: Executive ownership, Firm value, Executive pay, Optimal level.

JEL: G30, G32, G35, G38.

Over the past few decades, executive pay relative to that of average workers has risen dramatically in Taiwan, and similar phenomena have occurred in most countries, including the U.S., Canada, and Germany. According to a 2005 estimate, the U.S. ratio of CEO to production worker pay is 39:1, compared with 31.8:1 in the U.K., 25.9:1 in Italy, and 24.9:1 in New Zealand (Heather Landy 2008). Some executive pay has outpaced corporate profits and economic growth. Even when these firms were in distress, the executives still received a bonus worth several millions of U.S. dollars. We expected this to be controversial. We also believe that when stocks are not increasing, executives should not be rewarded. The sudden increase in executive pay is a cause for concern to those who wonder whether this rise is a beneficial result of market competition for scarce managerial talent that can add greatly to firm value, or a socially harmful phenomenon created by social changes that have involved giving executives greater control over their own pay.

Is executive pay then a beneficial system in which executives are incentivized to perform well, thereby adding considerable value to a firm? Or, is the system hijacked by executives who have given themselves greater control over their own pay in spite of firm performance? To answer these questions, this study attempted to identify the suitability of incentive payments, as a way to alleviate conflicts between executives and shareholders. In contrast to traditional linear models, the distinction between firms that provide "high" and "low" executive pay is often based on an arbitrary threshold level of the variable used to split the sample. This study contributes to relevant literature by presenting the results of applying the panel smooth transition

regression (PSTR) model to determine an optimal level of executive pay that maximizes firm value.

The rest of this study is organized into four sections. Section 1 reviews the results of previous empirical research. Section 2 provides the methodology. Section 3 discusses the empirical results. Section 4 concludes and presents a few implications emerging from the findings.

1. Executive Pay and Firm Value

Agency problems typically arise as a result of conflicts of interest that often exist between the ownership (by shareholders) and control (by executives) of a corporation. A common means to establish an alignment of interests is to relate executive pay to company stock performance. Through pay-performance mechanisms, executive pay contracts can provide an incentive for the executive to promote the interests of shareholders. Whereas many studies have revealed both positive and negative relationships between executive pay and firm performance, others have found no such relationships. Thus far, studies on the relationship between executive pay and firm performance have not reached consistent conclusions.

Michael C. Jensen and Kevin J. Murphy (1990) revealed that a positive relationship exists between U.S. firm performance and executive pay during the period from 1973 to 1986, but that bonus payments comprising 50% of CEO compensation are not awarded in ways that are sensitive to market or accounting-based performance measures. Hamid Mehran (1995) studied the executive compensation structure of 153 manufacturing firms operating from 1979 to 1980 and provided evidence that firm value is positively related to the percentage of equity owned by managers and to the percentage of their equity-based compensation. Rajesh K. Aggarwal and Andrew A. Samwick (1999) investigated the 1,500 largest publicly traded U.S. firms operating from 1993 to 1996 and similarly concluded that the relationship between executive pay and firm performance is positive. Angela Morgan and Annette Poulsen (2001) observed that compensation plan announcements that align managerial compensation with shareholder interests are associated with positive abnormal returns. Tod Perry and Marc Zenner (2001) determined that the SEC Compensation Disclosure Rules have resulted in strong pay-performance relationships in the U.S. Takao Kato and Cheryl Long (2006) found that private company ownership seems to have a stronger executive pay-performance relationship than that of either government or collective ownership. Martin J. Conyon and Lerong He (2011) identified that executive pay and CEO incentives are lower in state-controlled firms and that firms with more independent directors on the board have a higher pay-for-performance link. By introducing the shirking cost to the relation-based manager and the caring cost to the owner under Chinese-style differential mode of association, Jiancai Pi (2011) reported evidence that under some conditions, it is optimal for the owner to choose the efficiency wage contract, and that under other conditions, it is optimal for the owner to choose the share-based incentive contract. In a study on 390 non-financial U.K. firms for the period between 1999 and 2005, Neslihan Ozkan (2011) found a positive relationship between CEO cash compensation and firm performance but no significant relationship between cash and equity-based compensation. Gilad Livne, Garen

Markarian, and Alistair Milne (2011) revealed a positive link between banks' CEO pay and fair value valuation available for sales assets. Francisco Gallego and Borja Larrain (2012) suggested that professional CEOs in family-controlled firms make around 30% more than CEOs in firms controlled by other large shareholders for three (Argentina, Brazil, and Chile) emerging markets. The family premium comes mostly from firms with the involvement of sons and where the founder is absent. Using a large database of firm conference call transcripts, Feng Li et al. (2014) indicated that communication appears to reveal knowledge. CEOs who speak more are also paid more, and firms whose CEO pay is not commensurate with CEO speaking have a lower industry-adjusted Tobin's Q. Paula Faria, Francisco Vitorino Martins, and Elísio Brandão (2014) revealed that there is a strong and positive relation between CEO compensation and firm performance in high-technology firms in the S&P 1500. Shou-Min Tsao, Che-Hung Lin, and Vincent Y. S. Chen (2015) proposed that in family firms, a compensation structure based on R&D investment enhances firm value in Taiwan's R&D-intensive industries. Huasheng Gao and Kai Li (2015) showed that both U.S. private and public firm CEO pays are positively and significantly related to firm accounting performance, and that the pay-performance link is much weaker in privately held firms.

Many studies have revealed a negative or non-linear relationship between executive pay and firm performance. Arijit Ghosh (2003) observed a non-linear positive relationship between CEO pay and performance at Indian firms, and that pay-performance sensitivity is higher for small than for large firms. Lucian Bebchuk and Jesse Fried (2004) suggested that some CEOs have received bonuses of several millions of U.S. dollars, even when their firms are in distress. In addition, some acquiring-company CEOs have received deal-completion bonuses even when their shareholders lost money following the completed deal (Yaniv Grinstein and Paul Hribar 2004). Piet Duffhues and Rez Kabir (2008) concluded a negative executive-pay-to-performance relationship among Dutch firms. Kose John, Mehran, and Yiming Qian (2010) found that the pay-performance sensitivity of bank CEO compensation positively relates to the monitoring intensity and decreases with the leverage ratio. Ben Amoako-Adu, Vishaal Baulkaran, and Brian F. Smith (2011) showed that family members in executive positions in dual-class companies are paid considerably more than those of single-class companies demonstrating concentrated control.

Several U.S. and U.K. studies have indicated that the link between pay and performance is rather weak. Using a Black-Scholes approach, David Yermack (1995) studied stock option awards given to CEOs of large U.S. firms and found weak support for both optimal compensation practices and theories of optimal compensation. Conyon (1997) discovered a positive pay-performance relationship in U.K. firms, although the relationship is weak. Philip J. McKnight and Cyril Tomkins (1999) revealed no obvious pay-performance relationships in U.K. firms, regarding both short- and long-term performance. Paul Gregg, Sarah Jewell, and Ian Tonks (2012) observed that the pay-performance sensitivity of large U.K. financial services companies is not considerably higher than those in other sectors. Using data from U.S. S&P 500 companies from 1994 to 2008, Chii-Shyan Kuo, Ming-Yuan Leon Li, and Shang-En Yu (2013) showed that not only is the positive impact of CEO equity incentives on firm performance more pronounced for companies with lower and moderate levels of

CEO stock-based incentive pay, but also for less profitable firms. Adrienne Rhodes (2016) found that when debt contracts contain an earnings-based covenant, the CEO's pay sensitivity to earnings is muted. Also, he found some evidence that pay sensitivity to earnings varies with earnings-based covenant slack.

2. Data and Methodology

2.1 Sample Set

I conducted my investigation using balanced panel data for a sample of 512 selected Taiwan stock exchange (TSE)-listed firms from 2006 to 2011. All data were obtained from the Taiwan Economic Journal (TEJ) database. Financial and insurance firms were excluded because the nature of capital and investment in these industries is not comparable to non-financial firms. The final sample is composed of 512 publicly traded firms, distributed across the 19 industry sectors as follows: electronics (258), chemical (44), construction (34), others (33), electric machinery (25), plastics (16), food (13), department store (13), oil, gas and electricity (12), iron and steel (11), textiles (11), transportation (10), tourism (7), rubber (6), electrical and cable (5), cement (5), automobile (4), glass and ceramics (3), and paper and pulp (2). The electronics industries account for about 50% of the sample; chemical, construction, and other industries each makes up less than 10%, while the remaining industries each makes up less than 5%.

2.2 Variables

This work adopted Tobin's Q as the proxy for firm value, because Q considers risk and the contribution of intangible assets. With other measures such as return on assets or return on equity, the results are likely to be distorted by such effects as growth options and human capital (Rafael La Porta et al. 2002; Benjamin Maury 2006). This study followed La Porta et al. (2002) in defining Tobin's Q as the book value of assets, minus the book value of equity, minus deferred taxes, plus the market value of common stock, divided by the book value of total assets.

The threshold variable, that is, executive pay, the percentage of a mixture of salaries, bonuses, cash dividends, stock dividends, benefits, and perquisites owned by the president and vice presidents to net income (Pay), is the key variable used to examine whether there is an asymmetric threshold effect of executive pay on firm value. This work also includes control variables commonly used in analyzing firm value (e.g. Maury 2006), namely, the ratio of total liabilities to total assets (Debt); the rate at which a firm is growing (sales growth, SG), calculated as the annual percentage change in sales. Following Torben M. Pedersen and Anne M. Elmer (2003), the real growth in GDP is to capture economic cycle. Consistent with Gary Dushnitsky and Michael J. Lenox (2006), measures of average industry Q (IQ) were employed to control time-variants and industry-specific variations. Industry Q is measured as the arithmetic average of all the firms in the same industry and the same year as the firm under consideration.

Table 1 presents the descriptive statistics for the pooled sample of 2006 to 2011. The total number of firms is 512, and there are 3,072 firm-year observations. The average (median) value of Tobin's Q is 1.69 (1.4). The ratio of executive pay to

net income after tax (Pay), on average (median), is 9.53 (4.02). As for the control variables, the Debt ratio is 33.84%, the real growth in GDP is 4.20%, the rate of sales growth is 34.81%, and the pooled mean of IQ is 1.53. Based on the Jarque-Bera test results, I rejected the normality of all the variables.

Table 1 Sample Descriptive Statistics

Variables	Average	Max.	Min.	Std. dev.	Median	Jarque-Bera
TQ	1.69	16.27	0.33	1.15	1.40	115532.7***
Pay	9.53	970.42	0.01	32.64	4.02	17602842***
Debt	33.84	86.14	1.87	14.75	32.73	124.1886***
GDP	4.20	10.76	-1.81	4.00	4.76	93.62215***
SG	34.81	75718.49	-99.14	1368.03	4.76	1.19E+09***
IQ	153.82	262.59	62.37	40.54	155.58	164.1284***

Notes: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Jarque-Bera test for normality. The sample size is 512 firms for each of the 2006-2011 periods and with a total of 3072 firm-year observation results. Tobin's Q (TQ) is measured as the book value of assets minus the book value of equity minus deferred taxes plus the market value of common stock divided by the book value of total assets. Executive pay (Pay) is defined as the compensation owned by the president and vice presidents. Debt is measured as the ratio of total liabilities to total assets. GDP is to capture economic cycle. Sales growth (SG) is calculated as the annual percentage change in sales. IQ is measured as the arithmetic average of all the firms in the same industry and the same year as the firm under consideration.

Source: Author.

2.3 Panel Unit-Root Models

The panel smooth transition regression model for evading spurious regressions, that is, an extension of the conventional least squares estimation method, requires that its variables remain stationary. Hence, the unit-root test was first to be carried out. Due to using only panel data in this study, the Andrew Levin, Chien-Fu Lin, and Chia-Shang James Chu (LLC) (2002), the augmented Dickey-Fuller (ADF) and the PP-Fisher Chi-square tests suggested by Laura Barbieri (2006) were then utilized. Owing to the nulls of the unit root majorly rejected, it was obvious, *via* the results of the stationary test of each panel (i.e. TQ, Pay, Debt, SG, GDP, and IQ) in Table 2, that all the variables have stationary characteristics.

Table 2 Panel Unit-Root Test Results

	LLC	IPS	ADF-Fisher	PP-Fisher Chi-square
TQ	202.236 [0***]	293.937 [0***]	3057.30 [0***]	2217.33 [0***]
Pay	418.967 [0***]	307.041 [0***]	4110.78 [0***]	4277.36 [0***]
Debt	44.1238 [0***]	45.1961 [0***]	1817.62 [0***]	1815.86 [0***]
GDP	123.230 [0***]	32.5406 [0***]	2462.85 [0***]	2193.36 [0***]

SG	170.351 [0***]	76.8719 [0***]	2234.80 [0***]	2494.28 [0***]
IQ	1529.32 [0***]	483.731 [0***]	5656.99 [0***]	2246.39 [0***]

Notes: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Jarque-Bera test for normality. The sample size is 512 firms for each of the 2006-2011 periods and with a total of 3072 firm-year observation results. Tobin's Q (TQ) is measured as the book value of assets minus the book value of equity minus deferred taxes plus the market value of common stock divided by the book value of total assets. Executive pay (Pay) is defined as the compensation owned by the president and vice presidents. Debt is measured as the ratio of total liabilities to total assets. Sales growth (SG) is calculated as the annual percentage change in sales. GDP is to capture economic cycle. IQ is measured as the arithmetic average of all the firms in the same industry and the same year as the firm under consideration.

Source: Author.

2.4 Panel Smooth Transition Regression Model

The research of Andrés González, Timo Teräsvirta, and Dick van Dijk (2004, 2005) was used for calculating the panel smooth transition regression model, its relevant procedures are briefly shown as follows:

$$TQ_{i,t} = \mu_i + \sum_{m=0}^{M} \sum_{k=1}^{K} \beta_{m,k} x_{i,t,k} g\left(Pay_{i,t}; \gamma, T_m\right) + \varepsilon_{i,t}, \tag{1}$$

where the variable, TQ (Tobin's Q), is defined as the book value of assets minus the book value of equity minus deferred taxes plus the market value of common stock divided by the book value of total assets. $x_{i,t,k}$ are $Pay_{i,t}$, $Debt_{i,t}$, $GDP_{i,t}$, $SG_{i,t}$, and $IQ_{i,t}$ for $k = 1$ to 5, individually. Pay is measured as the percentage of a mixture of benefits, bonuses, cash dividends, salary, stock dividends, and perquisites owned by the president and vice presidents to net income. Debt is defined as the ratio of total liabilities to total assets. GDP is to capture economic cycle. SG is measured as the yearly percentage change in sales. IQ is measured as the arithmetic average of all the companies in the same industry and the same year as the firm under consideration. If $T_m \leq Pay_{i,t}$, $h\left(Pay_{i,t}, T_m\right)$ is equal to 1. The regression with $T_0 = 0$ results in the values of T_m.

The symbol $g\left(Pay_{i,j}; \gamma, T_m\right)$ indicates a transition function relying on the variables previously mentioned where γ is used for determining the transition-function slope; and T is the threshold parameter.

Normalized to be bounded between 0 and 1, the transition function $g\left(Pay_{i,t}; \gamma, T_m\right)$ is a continuous and bounded threshold-variable $\left(Pay_{i,t}\right)$ function in the PSTR model and these extreme values are in connection with regression coefficients β_0 and $\beta_0 + \beta_1$. The value of $g\left(Pay_{i,t}; \gamma, T_m\right)$ for firm i at time t depends on the value of $\left(Pay_{i,t}\right)$ and the effective regression coefficients $\beta_0 + \beta_1$. According to Clive W. J. Granger and Teräsvirta (1993), Teräsvirta (1994) and Eilev S. Jansen and Teräsvirta (1996), this function is to be evaluated *via* the logistic transition function:

$$g(Pay_{i,t} : \gamma, T) = (1 + \exp(-\gamma \prod_{j=1}^{m} (Pay_{it} - T_j))^{-1}, \gamma > 0, T_1 \leq T_2 \leq ...T_m, \qquad (2)$$

where $T = T_1, T_2, ..., T_M$, is defined as an M-dimensional location-parameter vector and the parameter γ resolves the transition smoothness. In fact, it is commonly adequate to determine $m = 1$ or $m = 2$, while these values allow for a variation type commonly met in its parameters. The PSTR model is similar to the panel threshold model of Bruce E. Hansen (1999) if $m = 1$ and $\gamma \rightarrow \infty$. The different-regime number is still 2, with the transition function switching backward and forward between 0 and 1 at $T_1, ..., T_m$ if $m > 1$ and $\gamma \rightarrow \infty$. This model becomes a three-regime threshold model where its outer regimes are identical but various from the middle regime if $m = 2$ and $\gamma \rightarrow \infty$. Finally, the transition function (2) becomes constant if $\gamma \rightarrow 0$ for any value of m, in which case the model is divided into a homogenous or linear panel regression model with fixed effects.

The initial specification modeling-cycle stage is basically composed of testing homogeneity against the PSTR alternative; the PSTR model (1) with (2) is shortened into a homogenous model *via* imposing $H_0^2 : \beta_1 = 0$ or $H_1^2 : \gamma_1 = 0$. However, the relevant tests are nonstandard owing to unidentified nuisance parameters met in the PSTR model under either null hypothesis. These nuisance parameters are then solved *via* Hansen's study (1999). The null hypothesis $H_0 : \gamma = 0$ was used for test homogeneity; its first-order Taylor expansion around $\gamma = 0$ was replaced to avoid the identification problem, which resulted in the supplementary regression as follows:

$$TQ_{i,t} = \mu_i + \beta_0^{'*} x_{i,t} + \beta_1^{'*} x_{i,t} Pay_{i,t} + ... + \beta_m^{'*} x_{i,t} Pay_{i,t}^m + \varepsilon_{i,t}^*. \qquad (3)$$

Thus, the test *via* $H_0 : \gamma = 0$ in (1) is equal to the test *via* the null hypothesis $H_0 : \beta_0^{'*} = ... = \beta_m^{'*} = 0$ in (3). Note that under the null hypothesis $\{\varepsilon_{it}^*\} = \{\varepsilon_{it}\}$, the asymptotic distribution theory is then unaffected by the Taylor series approximation.

The homogeneity test can also be used to determine the proper order m of the logistic transition function in (2). A sequence of tests for selection between $m = 1$ and $m = 2$ was suggested by Granger and Teräsvirta (1993) and Teräsvirta (1994). Applied to the current condition, this testing sequence read as follows: The auxiliary regression (3) with $m = 3$ is used to test the null hypothesis $H_0 : \beta_2 = \beta_1 = \beta_0 = 0$. Then continuously proceed with the linear test as follows: $H_{04} : \beta_2 = 0$; $H_{03} : \beta_1 = \beta_2 = 0; H_{02} : \beta_0 = \beta_2 = 0; \beta_0 = \beta_1 = 0$ if rejected.

If the rejection of H_{03} is the strongest one, then select $m = 2$; otherwise, select $m = 1$. Proceed with model parameter estimation after the PSTR model resolves the variation types in its parameters. A relatively straightforward application of the fixed effects estimator and nonlinear least squares is used for the PSTR model (1).

3. Empirical Results

Table 3 provides the results *via* LM (chi-square statistic), LMF (*F*-statistic), and LRT (*T*-statistic) tests of homogeneity to gauge whether the model is non-linear. Homogeneity is rejected for the transition variable, the *p*-values are all significant at the 1% level; these tests propose that this model is non-linear model. The logistic function's order *m* is then to be determined *via* the sequence of tests discussed in the transition function (2). The specification-test-sequence results, indicated in Table 4, point at $m = 1$ as the strongest rejection not occurring for null hypotheses (H_{01}). The relevant results for null hypotheses ($r = 1$) are rejected *via* testing the number of regimes in this model; the *p*-values are all remarkable at the 1% level. Given the options of maximum $r = 2$, then the relevant results of testing the number of regimes are significant, and that at 1% level. Therefore, it is concluded *via* the robust test that there is one threshold effect of executive pay on firm value. This one threshold model was used for this study.

Table 5 lists the regression slope estimates in cooperation with the White-corrected standard errors for two regimes. All observations are divided into two regimes if a threshold effect of executive pay on firm value exists.

Table 3 Homogeneity Test Results

H_0:	$r = 0$		$r = 1$	
H_1:	$r = 1$		$r = 2$	
Transition variable $Pay_{i,t}$	Test	*p*-value	Test	*p*-value
Wald tests (LM)	83.666***	0	51.722***	0
Fisher tests (LMF)	4.75***	0	8.717***	0
LRT tests (LRT)	84.827***	0	52.162***	0

Notes: ***, **, and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively.

Source: Author.

Table 4 Sequence of Homogeneity Tests for Selecting m

	F-test	*p*-value
(m = 3) H_{03}: $\beta_3 = 0$	0.700	0.787
(m = 2) H_{02}: $\beta_2 = 0 \vert \beta_3 = 0$	1.074	0.375
(m = 1) H_{01}: $\beta_1 = 0 \vert \beta_3 = \beta_2 = 0$	2.955	0.000

Notes: ***, **, and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively.

Source: Author.

Table 5 Estimation Results of Two-Regime PSTR Model

Variable	β_0	β_1
Pay	-8.9169**	8.9746**
T-value	-2.038	2.0524
Threshold value C	C_1 2.71%	
Slope parameters	γ_1 197.6417	

Notes: ***, **, and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively. Executive pay (Pay) is defined as the compensation owned by the president and vice presidents. Debt is measured as the ratio of total liabilities to total assets.

Source: Author.

The estimated model from the empirical results is represented as follows:

$$TQ_{i,t} = \beta_0 x_{it\,1} + \beta_1 x_{it\,2}\left(Pay_{i,t}, 197.6417, 2.71\%\right) + \varepsilon_{i,t};$$

$$\beta_0 = (-8.9169,\ 0.2752,\ -1.3331,\ -0.0004,\ 1.2984);$$

$$\beta_1 = (8.9746,\ 0.0453,\ 0.2019,\ 0.537,\ -0.2458);$$

$$x_{it} = \left(Pay_{i,t}, Debt_{i,t},\ GDP_{i,t},\ SG_{i,t},\ \text{and}\ IQ_{i,t}\right).$$

The regimes depend on the various regression slopes, β_0 and β_1. In the first regime, where the executive pay is less than 2.71%, the estimate of coefficient β_0 is -8.9169, which is significant at the 5% level and which indicates that Tobin's Q decreases by 8.9169 with an increase of 1% in executive pay. In the second regime, where the executive pay is greater than 2.71%, the estimate of coefficient $\beta_0 + \beta_1$ is 0.0577, which is significant at the 5% level and which indicates that Tobin's Q increases by 0.0577 with an increase of 1% in executive pay. The estimates less than and greater than 2.71% are smaller and larger values, respectively, in the empirical distribution of the executive pay threshold variable. Thus, the two classes of firms shown by the point estimates are those with "low-pay" (executive pay $\leq$ 2.71%), and "high-pay" (executive pay > 2.71%). Comparing the low-pay regime with the high-pay regime, I find that the high-pay regime increases Tobin's Q 8.9746 (-8.9169 / 0.0577) times more than the low-pay regime does. Therefore, the results significantly demonstrate that the relationship between executive pay and firm value (i.e. the slope value) varies in accordance with different changes in executive pay, and that there is an increasing trend. In this study, the finding is that an optimal executive pay greater than 2.71% is where firm value is increasing. The executive pay, by contrast, increases firm value in high regime but decreases in low regime.

Table 6 shows the percentages of firms that fall into each of the two regimes yearly. It is indicated that the percentage in the low-pay category ranges from 32% to 39% of the sample over the 2006-2011 periods. Around 36% of the firms fall in the low-pay regime. The high-pay regime of firms also ranges from 61% to 68% of the sample over the same period, and 64% of the firms fall in the high-pay regime. Recall that Mehran (1995) showed that firm performance is positively relevant to the percentage of equity held by managers and to the percentage of their compensation that is equity-based. To determine the executive ownership under various executive pay regimes, this study further defined executive ownership as the percentage of equity held by the president and vice presidents to total equity. Comparing executive ownership in the high-pay regime with that in the low-pay regime, it is shown in this study that approximately 98% of executives at high-pay region firms hold ownership. In other words, merely 2% of executives at high-pay region firms hold no equity. By contrast, about 13% of executives at low-pay regime firms hold no equity, which means that executives with ownership in high-pay region firms receive 1.1 times (98% / 87%) higher pay than that of their counterparts in the low-pay regime. Thus, the larger the executive ownership is, the greater the executive pay, which in turn leads to increased operational efficiencies and firm value. Executives who hold equity commonly have an incentive to increase their pay but also tend to increase the operational efficiencies of their firms, thereby contributing to firm value.

In the coefficient estimations of the control variables indicated in Table 7, no matter which regime, Debt ratio is insignificantly relevant to Tobin's Q. GDP is significantly and negatively related to Tobin's Q in the low-pay regime, but is significantly related to Tobin's Q in high-pay regime. Sales growth is significantly and positively related to Tobin's Q in the high-pay regime, but insignificantly related to Tobin's Q in low-pay regime. IQ is significantly and positively related to Tobin's Q in low-pay regime, but significantly and negatively related to Tobin's Q in the high-pay regime.

Table 6 Number [Percentage] of Firms in Each Regime by Year

Two-regime	2006	2007	2008	2009	2010	2011	Average
Pay ≤ 2.71%	171	188	164	191	202	191	184.50
	[33]	[37]	[32]	[37]	[39]	[37]	[36]
Pay > 2.71%	341	324	348	321	310	321	327.50
	[67]	[63]	[68]	[63]	[61]	[63]	[64]

Notes: The numbers in brackets indicate the percentage of firms in each regime. Executive pay (Pay) is defined as the compensation owned by the president and vice presidents. Debt is measured as the ratio of total liabilities to total assets.

Source: Author.

Table 7 Estimation Results of Control Variables

	Pay ≤ 2.71%	Pay > 2.71%
	β_0	β_1
Debt	0.2752	0.0453
GDP	-1.3331***	0.2019
SG	-0.0004	0.537***
IQ	1.2984***	-0.2458***

Notes: ***, **, and * indicate significance at the 0.01, 0.05 and 0.1 levels, respectively. Executive pay (Pay) is defined as the compensation owned by the president and vice presidents. Debt is measured as the ratio of total liabilities to total assets. Sales growth (SG) is calculated as the annual percentage change in sales. GDP is to capture economic cycle. IQ is measured as the arithmetic average of all the firms in the same industry and the same year as the firm under consideration.

Source: Author.

4. Conclusion

Through pay-performance mechanisms, executive pay contracts provide incentive for the executive to promote the interests of shareholders. Over the past few decades, some executive pay has outpaced corporate profits and economic growth worldwide; hence, the explosion in huge executive pay has become controversial. In response to criticism over high levels of executive pay, since 2012, the Securities and Exchange Commission (SEC) has required that publicly traded companies establish independent remuneration committees that attempt to set pay packages at arms' length from the same executives who are receiving them. Since 2008, the SEC has asked publicly traded companies to report the ratio of total compensation to net income for executive members, and to disclose additional information explaining how their executives' pay relates to firm performance, and how it was determined in the annual re-

ports. Therefore, company stakeholders can know such details and decide whether the executive remuneration is fair.

It is to be expected that executives should be rewarded as their firm stocks increase. To confirm or disconfirm this expectation, this study attempted to identify optimal levels of executive pay that maximize firm value. The results substantiate the view that the optimal level of executive pay to net income exceeds 2.71%, a percentage that maximizes firm value. The results also propose that generally, executives who hold equity not only have an incentive to increase their pay but also to increase operational efficiencies, thereby contributing to firm value.

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