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# The interaction effects of CEO power, social connections and incentive compensation on firm value

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# **The interaction effects of CEO power, social connections and incentive compensation on firm value**

## **Abstract**

We study the relation between company value and the interplay between CEO power, CEO equity incentives and the friendliness of the board of directors. Following Bebchuk, Cremers and Peyer (2011), we measure CEO power as the proportion paid to the CEO of the total compensation paid to the top five executives of the firm. We find that strong CEO equity incentives and the presence of a friendly board of directors both individually moderate the negative effect of CEO power on Tobin's  $q$ . Moreover, these variables also work together. We find that firm value tends to increase when equity incentives are combined with a friendly board. We conclude that the negative effects of CEO power on firm value are limited to firms with weak CEO equity incentive compensation plans and arms-length boards of directors.

## **The interaction effects of CEO power, social connections and incentive compensation on firm value**

We study company value at the intersection of CEO power, board friendliness, and CEO incentive compensation. Using the CEO pay slice (CPS) to measure CEO power, Bebchuk, Cremers and Peyer (2011) show that powerful CEOs are associated with lower company value. This finding is consistent with their view that powerful CEOs use their influence over the board of directors to reduce the board's monitoring effectiveness, allowing the CEO to extract rents from shareholders. Westphal (1999) points out, however, that directors are not merely monitors of managerial behavior, but that they have the equally important role of using their combined experience and expertise to effectively advise management. These two roles, monitoring and counsel, can be at odds with each other. Strong monitoring requires an arms-length relationship between the board and the CEO, while effective advice and counsel is more collaborative and social. Adams and Ferreira (2007), model this tension between the board's monitoring and advising roles using information sharing between the CEO and board as the key decision element. CEOs are reluctant to share information with an arms-length or adversarial board, while full information is precisely what the board needs to provide effective advice. In Adams and Ferreira's model, shareholders benefit from a friendly, collaborative relationship between the CEO and the board as long as the value of better advice, derived from more complete information sharing, is greater than the value lost through economic rents extracted by the CEO due to weaker monitoring. Finally, Westphal (1999) argues that through well-structured CEO incentive compensation plans, companies can enjoy enhanced value inherent in effective board advising while mitigating value losses due to weaker board monitoring. We hypothesize that friendly boards can increase value

through enhanced advice and counsel when the cost of weaker monitoring is mitigated through strong CEO equity incentive compensation.

We find that the presence of a friendly board of directors and strong CEO equity incentive compensation each individually moderate the negative effect of CEO power on firm value reported by Bebchuk et al. (2011). These two characteristics also work together. We find that firm value increases when equity incentives are combined with a friendly board. We conclude that the negative effects of CEO power on firm value are confined mainly to firms with weak CEO equity incentive compensation plans. Due to the dominance of agency theory, the monitoring function of the board of directors has received most of the attention from finance scholars. The board's advising and consultation function, while more fully explored in the management literature, is less well developed in the finance literature. We are the first to study the combined effects of board friendliness and incentive equity compensation on the interplay between CEO power and company value.

In Section I, we review the related literature and further develop our hypotheses. We explain the methodology for testing our hypotheses in Section II. Section III contains a discussion of our sample selection and provides a brief description of our sample. We present and discuss the results in Section IV. Section V presents a summary of the paper and our conclusions.

## **I. Literature Review and Hypothesis Development**

### **a. CEO power and board monitoring**

Increasingly, “outsized” CEO compensation is increasingly becoming an important topic in academia, the popular press, and importantly, in government. For example, Howell (2013) writes that when CEO compensation becomes too high, “in some cases reaching 500 times (that)

of the average worker”, CEOs and business in general lose the respect of the public. The Dodd-Frank Wall Street Reform and Consumer Protection Act includes a political response to perceived “outsized” CEO compensation which requires shareholder advisory votes on executive pay. These rules were adopted by the SEC in 2011 (SEC (2011)). In advocating for increased shareholder say in the compensation of their firms’ executives, Bebchuk and Fried (2006) argue that CEO pay is largely insensitive to performance, and that current corporate governance processes give managers undue power over their own pay levels and structure. Bebchuk, Cremers and Peyer (2011) examine a new measure of this CEO power directly, the CPS, which is defined as the proportion of combined total compensation of the top five executives earned by the CEO alone. Although computed using compensation data, Bebchuk et al. (2011) present the CPS as a measure of the board’s perception of the importance or power of the CEO rather than a measure of his compensation. In this framework, the CEO may be *important to the firm* due to the firm’s need for a talented, decisive leader, in which case a high CPS may indicate a high-value, strategic leader. Or the CEO may be *important in the firm* due to his power and influence over the board and the firm’s other executives, in which case a high CPS may indicate a low-value, entrenched manager. Consistent with the latter, Bebchuk et al. (2011) show a significantly negative average relation between CPS and industry-adjusted Tobin’s q, which they attribute to the agency problem of a powerful CEO extracting rents from a captured board to the detriment of shareholders. Using these results, the authors argue for stronger, more independent boards of directors and more direct shareholder control, both of which are intended to more closely monitor management.

According to the Corporate Director’s Guidebook (2011), however, corporate directors “have a responsibility to act in the best interests of the corporation and its shareholders” and they “fulfill this responsibility through two primary board functions: decision-making and oversight”

(see section 3). In general, the oversight function involves monitoring the company's management and performance, while the decision-making function involves familiarity with and approval of corporate policy and strategy. These dual roles can be contradictory. Unbiased monitoring implies that directors maintain an arms-length, outsider-dominated relationship with the company's management (CEO). The monitoring capabilities of directors who are too dependent on or too friendly with the CEO may be compromised by this relationship (Bebchuk and Fried (2006)) leading to a captured board and consequential value decreases. Providing valuable advice and counsel on policy and strategy, on the other hand, requires trust between the CEO and the board for two closely related reasons. First, in order to provide timely, actionable advice the board depends on the CEO to reveal all pertinent information. Such information could potentially portray the CEO in a negative light. Ultimately, the CEO will only disclose full information when he trusts the board to use this information to benefit the company rather than to simply attack him (see Holmstrom (2005)). Without such trust, an arms-length, outsider-dominated board may not receive full information until it is released publicly or at time of crisis. And second, in order for the board to provide effective advice the CEO must reveal the need for and then accept and implement the recommendations of the board. CEO reluctance to disclose pertinent information to the board, or to ask for and then accept the board's recommendations limits the quality and usefulness of board advice. Adams and Ferreira (2007) model this tension between the monitoring and advisory roles of the board. In their model, both the value of the board's advice and the intensity of its monitoring increase as the CEO reveals more information. The increase in advice benefits both the firm and the CEO as firm performance increases, but increased monitoring intensity is personally detrimental to the CEO. The conclusion from the model is that shareholders benefit from a more friendly board when the marginal loss from reduced monitoring is less than

the marginal gain obtained when the CEO more freely shares information with and thereby obtains better advice and counsel from a CEO-friendly board. We test the deleterious effect of CEO power on company value.

### **b. Friendly boards**

Many prior studies examine the effects of friendly boards of directors. Many of those define board structure as the proportion of inside versus outside directors. Insiders are defined as directors who are also employees or former employees of the company, each of whom may be expressly dependent on the CEO. Outsiders include both directors who are fully independent of the firm, and gray directors whose outsider status is unclear. This latter group includes directors with business ties to the company and relatives of company officers. In this context, objectively defining a friendly board capable of providing valuable and timely advice, and in whom the CEO is willing to divulge full information, is difficult. Board insiders who are current employees are obviously subordinate to the CEO, which implies both a lower level of experience and a possible reluctance to “challenge the boss.” Board insiders may also include the former CEO, who may have the experience to provide advice, but may be reluctant to interfere with the new CEO or whose interference the new CEO may resent. Board outsiders are assumed to be arms-length monitors, and are therefore not friendly by definition. Using a relatively new database, we redefine board structure to include directors who are “friendly” with and those who are “not friendly” with the CEO. Boardex, developed by Management Diagnostics Ltd., contains biographical information on directors and senior executives throughout the world (see [corp.boardex.com](http://corp.boardex.com)). The biographical data contained in the BoardEx database includes educational details such as school, degree earned and graduation date; employment history; current employment details including



board memberships in other companies; and other social activities. Using this comprehensive database, we define a friendly director as an individual who has a high probability of actually being a friend of the CEO. Specifically, either the two individuals went to school together, worked together in the past, currently serve on a third company's board, or serve together as active officers or board members of a social club, philanthropic organization, athletic club, or other civic organization. With this history of being prominent in each other's social networks, it is likely that the CEO and the socially connected director know and trust each other. According to a pure form of agency theory, this situation would result in an entrenched manager who takes advantage of or colludes with such friendly directors in order to extract rents from stockholders. In the presence of strong equity incentive compensation, which may mitigate such agency problems, a well-motivated manager combined with a friendly, collaborative board of directors may be better equipped to maximize company value.

The question of trust has been examined in the management and sociology literature. Uzzi (1996) uses field research of apparel firms in New York's garment district to guide his development of a theory of trust and embeddedness. As defined by Uzzi, embeddedness is "the process by which social relations shape economic action." The effect of social relations is largely ignored by the economic logic of market exchange between arms-length, atomistic players. Uzzi finds embeddedness has "three features: trust, fine-grained information transfer, and joint problem-solving." Becoming embedded in the network implies having developed trust with network members through a series of mutual, non-obligatory, nonmarket exchanges. After having developed trust with the members of the network through these exchanges, trust becomes the governing mechanism through which behavioral expectations are formed and ultimately judged. Fine-grained information shared with network members is, according to Uzzi, detailed and

strategic, and increases the effectiveness and responsiveness of network members. Sharing this proprietary information requires absolute trust that the information will not be misused, while using the information requires trust in its accuracy. Joint problem-solving allows network members to coordinate actions and work out problems “on the fly” providing quicker and more direct feedback than can arms-length, contract-based relationships. Relating these findings to the context of corporate boards, it would be difficult for an outsider-dominated board to develop enough trust to induce the CEO to provide the fine-grained information the board needs to provide effective advice and consultation on policy and strategy (i.e., on-the-fly problem solving). This is where having a friendly director can facilitate trust-building between the CEO and the board, particularly if the board believes the CEO has strong alignment of incentives with shareholders. Westphal (1999) finds that higher levels of long-term, equity-based compensation, can enhance the connection between CEO-Board social ties and board advice while also reducing the negative aspects of weakened monitoring.

### **c. CEO monitoring through incentive compensation**

Reduced formal board monitoring by a friendly board does not necessarily imply an increase in agency problems such as entrenchment and ultimately lower firm value. Researchers have proposed many solutions to a firm’s agency problem including internal control mechanisms such as leverage (Jensen (1986)), managerial ownership (Stulz (1988)), and the takeover market (Jensen (1986) and Bebchuk, Cohen and Farrell (2009)). Bebchuk Cremers and Peyer (2011) examine each of these mechanisms empirically finding that firm leverage and a given manager’s protection from the takeover market have negative effects on firm value measured using industry-adjusted Tobin’s q, while finding no relation between firm value and managerial ownership. After

accounting for each of these control mechanisms, Bebchuk et al. (2011) report a strong negative relation between firm value and CEO power. Apparently, these three mechanisms are ineffectual in controlling the value-destroying agency problem associated with powerful CEOs.

One often proposed solution to the agency problem not examined by Bebchuk et al. (2011) is executive equity incentive compensation. Jensen and Murphy (1990) measure the sensitivity of CEO compensation to changes in share prices and find the average CEO's wealth increases by \$3.25 for each \$1,000 increase in firm value. Although this finding is statistically significant, Jensen and Murphy (1990) conclude that this level of pay-performance sensitivity is not high enough to induce incentive alignment with shareholders. Garen (1994) shows that Jensen and Murphy's conclusion about the level of pay-performance sensitivity holds little meaning due to high between-firm variability in measuring pay-performance sensitivity, and develops a principal-agent model that predicts significant between-firm variability in optimal pay-performance sensitivity. In his model, the variability in optimal pay-performance sensitivity is due to the underlying variability of the firm's profits. The higher the inherent variability in the firm's business (industry), the lower the optimal level of pay-performance sensitivity in the CEO's compensation contract, and the higher (lower) the salary (equity) component in his contract. Garen's modified model, which includes CEO choice of investment projects, indicates that CEO decision making becomes more risk-averse with a high pay-performance compensation contract. Garen's empirical work is consistent with his predictions: higher company variability tends to reduce pay-performance sensitivity and increase the salary component implying that pay-performance sensitivity may be company- or industry-specific. Using a new empirical methodology that explicitly accounts for this heterogeneity in compensation contracts across firms, Hermalin and Wallace (2001) find a significant positive relation between pay and performance.

Mehran (1995) provides evidence supporting the role of equity incentives in inducing managerial performance, reporting that firm performance is positively related to the percentage of compensation that is equity-based. We test the interaction between CEO equity incentive compensation, and its implied substitution for strong board monitoring, on the detrimental effects of CEO power on company value.

#### **d. Hypotheses**

Our first hypothesis relates to CEO power and company value. A powerful CEO may use that power to extract economic rents from the company and thereby reduce company value. On the other hand, a talented, well-motivated CEO intent on adding value to the company she leads needs the decision-making authority or power to do so. Following Bebchuk et al. (2011), our first hypothesis posits a negative average relation between CEO power and company value, but we do not expect this relation to hold in all cases. Our other hypotheses are related to the possible mitigation of this negative effect of CEO power on company value. If the board of directors is friendly with the CEO, it could imply either an entrenched, value-decreasing relationship or a collaborative, value-increasing relationship. While we do not posit the direction of the relation, in null form our second hypothesis states that social connections between the CEO and board of directors do not change the negative effect of CEO power on company value. If the CEO's interests are aligned with those of shareholders through a well-structured equity incentive compensation plan, we expect a mitigation of the negative effect of CEO power on company value. Therefore, we posit in our third hypothesis that powerful CEOs whose compensation plans contain a larger equity component will lead more valuable companies, while powerful CEOs compensated more with salary and bonuses will preside over less valuable companies. That is, when CEO's

incentives are aligned with the interests of shareholders, we expect the negative effect of CEO power on company values to be reduced. Our final hypothesis combines the previous hypotheses: when a friendly board of directors relies on a well-structured equity compensation plan for CEO monitoring, that this combination will lead to effective CEO-board collaboration, a self-monitored CEO, and consequentially higher company values.

## II. Empirical Methods

We study the moderating effects of and interaction between the friendliness of the board of directors and CEO equity incentive compensation on the relation between firm value and CEO power. As noted above, following Bebchuk, et al. (2011), we use *CPS* to measure CEO power and Tobin's  $q$  ( $Q$ ) to measure company value. *CPS* is the ratio of total CEO compensation to the combined total compensation of the top five executives in the firm, including the CEO.  $Q$  is the ratio of the firm's market value of assets, defined as total book value of assets less both book value of equity and deferred taxes plus market value of equity, to the firm's total book value of assets. We use the CEO's fraction of equity compensation (*FEC*) to measure CEO incentive compensation, defined as the fraction of the CEO's annual incentive equity compensation (grants of stock, restricted stock and the Black-Scholes value of option awards) to his total annual compensation. In developing our board friendliness measure, we follow Fracassi and Tate (2012) who identify four basic social ties included in Boardex data, (i) current employment (typically external directorships in other firms), (ii) overlapping past employment in a previous mutual employer, (iii) education (which we define as same school, same graduation year and same degree), and (iv) other activities (active membership in clubs, organizations or charities)<sup>1</sup> Our primary measure of board friendliness, *CONNEX*, is a dummy variable that equals one when at least one outside director has at least one of the four connections listed above. As a robustness test, we repeat our tests using the ratio of socially connected

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<sup>1</sup> See Fracassi and Tate (2012) for a more full description of this rich database.

directors to total outside directors (CONN (ratio)). Due to potential endogeneity among these variables, we lag all independent variables.

For control variables, we follow Bebchuk, et al. (2011). *E Index* is a measure of corporate governance developed by Bebchuk, Cohen and Farrell (2009), which is simply the number of antitakeover provisions present in a given company's charter.<sup>2</sup> The greater the E Index, the more protected or entrenched is management. In general, stronger corporate governance implies a lower E Index. *SIZE* is the natural logarithm of the firm's total assets. *ROA* is the ratio of a firm's operating income before depreciation to total assets. *LTD* is the ratio of a firm's long-term debt to total assets. *CFL* is a firm's cash flow to assets and equals the ratio of the sum of operating, investing and financing cash flow to total assets. *RnD* is the ratio of a firm's research and development expense to sales. *RnD MISS* is a dummy variable that equals one when Compustat reports research and development as missing and zero otherwise. *CAPEX* equals a firm's capital expenditures to total assets.

Our empirical methodology is similar to that of Bebchuk, et al. (2011), who run multiple OLS regressions with pooled time series and cross-sectional data using various combinations of firm and year fixed-effects dummies. As their measure of firm value, Bebchuk, et al, (2011) industry-adjust Tobin's q in order to control for industry shocks. Gormley and Matsa (2014) criticize industry-adjusting dependent variables to control for unobserved heterogeneity when used in regression analysis showing that such methods produce inconsistent estimates and can even reverse estimated relations between variables. Our first regression replicates that of Bebchuk et al. (2011), and uses industry-adjusted Tobin's q as the dependent variable, while all of our

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<sup>2</sup> Appendix A describes the governance characteristics that are included in the calculation of the entrenchment index. The data on governance characteristics are from the IRRC/Risk Metrics Group, Inc. databases. This data is collected by IRRC/Risk Metrics every two or three years. We use the lagged measure of E index in our analysis to avoid forward-looking bias.

subsequent regressions follow the suggestion of Gormley and Matsa (2014) using raw, unadjusted Tobin's  $q$ , instead. All regressions use time and industry fixed-effects dummy variables, as suggested by Gormley and Matsa (2014), to control for unobserved heterogeneity in time and industry. We do not use firm fixed-effects variables since several of our independent variables (e.g., E index and CONNEX) have little within-firm variability over time.

Our primary tests involve the use of various interaction terms. For example, we interact the dummy variable CONNEX with the continuous variable CPS in order to determine whether the negative effect of CEO power on firm value is moderated in the presence of a friendly board of directors. Interaction terms are relatively easy to interpret when one of the variables is dichotomous. In this case, the estimated coefficient on the interaction term CONNEXx $CPS$ , which we call the second-order effect, will capture the effect of CPS on  $Q$  when the board is friendly, while the coefficient on CPS alone will capture the effect of CPS on  $Q$  when the board is arms-length. The effect of CPS on  $Q$  depends on one of only two conditions: whether CONNEX equals one or zero. Interaction terms involving two continuous variables, however, are more difficult to interpret because each of the variables can take on an infinite number of possible values, and their interaction effects are conditional on a potentially infinite number of values. Because of this, it is advantageous to center the variables. In addition to improving the interpretation of the resulting estimates, centering the continuous variables to be interacted can also reduce the collinearity between the interaction variable and the two related independent variables (Afshartous and Preston (2011)). We choose to center our interacted continuous variables at their mean values. After centering the independent variables, interpretation of their estimated coefficients, the first-order or non-interaction effects, changes from the effect on  $Y$  when other variables equal zero to the effect on  $Y$  when other centered variables equal their mean values. Similarly, interpretation of the

interaction or second-order effect becomes the effect of one centered independent variable when both centered independent variables are at their mean value. Due to this conditionality, we illustrate our results using interaction plots that allow the centered independent variables to vary.

### **III. Sample Selection and Description**

Our initial sample consists of all firm-years for which data is available from various sources over the eleven years from 2000 through 2010. Our first data filter was availability of executive compensation data on Execucomp. Since we study the impact of various CEO-related factors on firm value, we require the CEO to be in office over an entire sample year. Otherwise, our tests may include some data for company performance over which the CEO had little or only partial control that year. Following Bebchuk, et al. (2011), we define the CPS as the proportion of the total compensation of the top five executives allocated to the CEO. Therefore, Execucomp must contain compensation data for the top five executives. Merging Execucomp data with that contained within Compustat resulted in a sample containing 22,056 firm-years. Merging our Boardex database into this preliminary sample resulted in 11,514 firm-year observations. And finally, merging with the E index data computed from IRRC/Risk Metrics Group, data, results in a final sample of 7,143 firm-year observations.

Table I presents various descriptive statistics for our sample. Sample firms have mean (median) total assets of around \$2.7 billion (\$2.3 billion), and mean (median) Tobin's q of about 1.8 (1.4). More interesting, CEO's garner a large part of total executive pay with a mean (median) CPS of 39.5% (39.6%). Sample CEOs have strong equity incentives with mean (median) CEO fraction of equity compensation (FEC) of 43.5% (46.5%). CONNEX is about 64%, implying that social connections between the CEO and board of directors are present in about 64% of our sample



firms. CONNEX (ratio) indicates that about 19% of the outside directors at the average firm are socially connected to the CEO.

INSERT TABLE I ABOUT HERE

Table II provides the distribution of social connections through time for our sample. Each row represents a different sample year, and for each year we show the total number of connections between the CEO and the board of directors, and the proportions of firms with no connections, one connection, two connections and greater than two connections. The percentages reported in each row sum to 100%. Focusing on the sample totals in the last row, note that about 36% of the sample firm-years had zero connections between the CEO and the board, implying that about 64% had at least one connection. Furthermore, 22% had one connection, 12% had two connections, and about 28% had more than two such connections.

INSERT TABLE II ABOUT HERE

Table III provides a matrix of estimated correlation coefficients for our variables. Among the independent variables, in general SIZE appears to be the variable with the highest correlations with other independent variables. The largest individual correlation coefficients are between Q and ROA (59%), capital expenditures and return on assets (46%), and Q and RnD (41%), which all seem intuitive. There is also a significantly positive correlation between SIZE and social connections (32%) indicating that larger firms are more likely to have social connections between the CEO and board of directors.

INSERT TABLE III ABOUT HERE

#### **IV. Results**

### **a. Firm value and the CEO pay slice**

We begin our analysis by replicating Bebchuk et al. (2011), the results of which we report in the first column of Table IV. Using the same control variables, and including year and industry dummy variables, we find a statistically significant negative relation between CPS and lagged, industry-adjusted Tobin's  $q$ . This is consistent with Bebchuk et al.'s (2011) finding that large CPS is related to lower industry-adjusted Tobin's  $q$ . As noted above, Gormley and Matsa (2014) show that using industry-adjusted dependent variables in pooled time-series cross-sectional regression analyses produces inconsistent coefficients and potentially incorrect inferences. Gormley and Matsa (2014) show that using unadjusted dependent variables instead along with the fixed-effects methodology provides consistent estimated coefficients and correct inferences. Following Gormley and Matsa (2014), we re-estimate our Bebchuk et al. (2011) replication using the raw, unadjusted  $Q$  and year and industry fixed-effects dummy variables. The column 2 results for several of the variables, when contrasted with the industry-adjusted replication results in column 1, highlight Gormley and Matsa's (2014) critique. For the R&D-missing dummy variable, the coefficient reverses from a statistically significant ( $t$ -statistic=8.06) positive value to a statistically significant ( $t$ -statistic=-3.20) negative value. For the size variable, the coefficient reverses from a statistically significant ( $t$ -statistic=5.04) positive value to a statistically insignificant ( $t$ -statistic=-0.95) negative value. Most importantly, the estimated coefficient for CPS changes from a statistically significant -0.231 ( $t$ -statistic=-3.61) to an insignificant -0.054 ( $t$ -statistic=-0.85). This result casts doubt on Bebchuk et al. (2011)'s conclusion relating higher levels of CPS with lower firm value.

Despite the statistical insignificance of this result, we hypothesize that CPS can indicate the importance of the CEO to the firm (e.g., talent) and consequential relative value increases in

some companies, while in others it may signal the importance of the CEO in the firm (e.g., entrenchment) and consequential value decreases. If CEO power is distributed somewhat equally, and are pooled together, we might expect to find insignificant results for the full sample as the value increases for one group tend to wash out value decreases for the other. We examine two variables, CEO incentive equity compensation and CEO social connections with the board of directors, which may help us distinguish between high CPS due to entrenchment from high CPS due to talent. The variable FEC, which as noted above we define as the fraction of a CEO's total annual compensation that comes in the form of incentive equity compensation, measures the CEO's economic incentive to act in the best interests of shareholders. To the extent that compensation can motivate managers in this way, higher FEC will reduce agency costs and lead to higher firm value. The relation between CEO social connections with the board of directors, CONNEX, however, is not as clear. Such social connections could produce a "captured" board and thus lead to entrenchment of the CEO, or it could indicate a well-functioning relationship between a properly motivated CEO and a friendly board. We report the relation between each of these and firm value in columns 3 and 4 of Table IV. The estimated coefficient on FEC reported in column 3 indicates a positive relation between firm value and incentive alignment (t-statistic=6.07), which is consistent with the hypothesis that the market recognizes the agency cost-reductions associated with incentive equity compensation and rewards companies with such incentive structures with higher valuations. The estimated coefficient on CONNEX, however, is insignificantly different from zero (t-statistic=0.13) indicating that either CEO social connections with the board do not have value implications or that the effect is more complex than presently modeled.

INSERT TABLE IV ABOUT HERE

**b. The interaction effects of incentive equity compensation and social connections.**

Next, we test the interaction effects of incentive equity compensation and social connections on firm value. In Section II above, we posit that strong compensation incentives can differentiate between firms with talented, powerful (i.e., high-CPS) CEOs and firms with entrenched, powerful CEOs. Well incentivized CEOs are more likely to be important to the firm by using the power indicated by their large pay slice to make full use of all the firm's resources, including the board of directors' knowledge and experience, to increase firm value. Column 1 of Table V reports the results of interacting FEC with CPS. Note first the positive relation between firm value and FEC indicating positive effects of equity compensation regardless of CEO power. The positive estimated coefficient on this interaction term indicates that higher CEO incentive compensation coupled with higher CPS tends to increase firm value. This finding is consistent with our hypothesis that powerful CEOs with strong incentive compensation use their power to increase firm value. Importantly, note that once this interaction is accounted for the estimate on CPS is significantly negative indicating that the high CPS of CEOs with lower levels of incentive compensation tend to be associated with lower firm value, which is consistent with entrenchment of powerful but poorly incentivized CEOs. We illustrate this interaction effect in Figure 1, which shows two line-plots indicating the change in Q (vertical axis) as CPS changes from its minimum to its maximum value (on the horizontal axis) at two values of FEC (two standard deviations above and below its mean). Note that when the CEO has low incentive equity compensation (downward sloping line), there is a negative relation between Q and CPS, but when the CEO has strong equity incentives (upwards sloping line) firm value increases with CPS.

## INSERT FIGURE 1 ABOUT HERE

In Section II above, we suggest that a friendly board can indicate either a captured board and an entrenched CEO who is important in the firm, or a collaborative board and a talented CEO who is important to the firm. If the former is true, our interaction of the social connections dummy with CPS should be negative indicating a reduction in firm value when social connections are present. If the latter is true, however, the interaction term should carry a positive estimated coefficient as collaboration between a friendly board and the CEO leads to higher firm value. Column 2 of Table V reports the results of interacting CONNEX with CPS. Note first the insignificant coefficient on CONNEX indicating no independent relation between firm value and social connections between the CEO and board of directors. The positive estimated coefficient on the interaction term, however, is consistent with the hypothesis that when socially connected to the board, powerful CEOs tend to use their power in ways that leads to increased firm value. Note again that once the interaction is accounted for the relation between CPS and firm value is negative which is consistent with deleterious effects on firm value of powerful CEOs combined with arms-length boards. We illustrate this interaction effect in Figure 2, which shows two line plots indicating the change in Q (vertical axis) as CPS changes from its minimum to its maximum value (along the horizontal axis) when the social connections dummy variable equals either one (with social connections and upward sloping line) or zero (without social connections and downward sloping line). Note the striking difference between the slopes of the two lines. Firm value increases with CPS in the presence of a friendly board, while CEO power has a negative effect on value with an arms-length board

## INSERT FIGURE 2 ABOUT HERE

Building on Adams and Ferreira (2007), Uzzi (1996), and Westphal (1999), our primary hypothesis is that firms with a friendly board and a powerful, well-motivated CEO with a friendly board will experience the benefits of a trust relationship between the board and management without the agency costs that might normally be associated with weak monitoring. In these firms the powerful CEO feels more comfortable sharing full information with and asking for input from the friendly board while potential agency problems are mitigated due to the self-monitoring provided by the compensation contract. Column 3 of Table V reports the results of a regression that includes the interaction terms between both CPS and FEC, and CPS and CONNEX. , and shows that the estimated coefficients on both interaction terms maintain their significantly positive relation to firm value. This is consistent with our hypothesis that powerful CEOs, when combined with a friendly, collaborative board of directors and the self-motivation derived from strong incentive equity compensation, add value separately and together to the firms they manage. Also note the continued strong positive relation between firm value and higher equity compensation. The estimated coefficient on CPS continues to be strongly negative indicating that firm value tends to be lower when managed by powerful CEOs working without the benefits of a friendly board of directors and a strong incentive equity compensation plan.

Our final regression directly tests our hypothesis. If a well incentivized, self-monitored CEO makes use of the power indicated by a high CPS coupled with a collaborative board of directors with which he shares full information and from which he obtains effective advice and counsel, a third-order interaction term between these three variables would be significantly positive. That is, if equity incentive compensation and social connections between the CEO and firm directors together moderate the negative effects associated with a powerful CEO, the

estimated coefficient on a third-order interaction term between these three variables should be significantly positive. Column 4 reports the results of this third-order interaction, and are consistent with our hypothesis. If the CEO is connected to the board, firm value increases as both the proportion of equity compensation and CPS increase. We illustrate the results of this third-order interaction regression in Figure 3, which shows two sets of line plots indicating the change in Q (vertical axis) as CPS changes from its minimum to its maximum (horizontal axis), when CONNEX equals either one (upward sloping and dark) or zero (downward sloping and red). The dotted lines surrounding each solid line show the range of Q values at each CPS value as FEC is varied plus or minus one standard deviation around its mean. Therefore, the set of three upward sloping lines (in dark) represents the effects on Q of a friendly board as CPS changes and FEC is varied. Note the divergence of the dotted lines from the mean. This indicates that when the board is friendly increases in equity incentives continue to add value. The set of three downward sloping lines (in red) represents the effects on Q of an arms-length board as CPS changes and FEC is varied. Note that when the board is arms-length, the negative effect of CPS on Q dominates no matter what the equity compensation (red dotted lines are parallel to mean). In summary, firm value increases with increases in CPS and FEC, but only in the presence of a friendly board of directors.

INSERT FIGURE 3 ABOUT HERE

INSERT TABLE V ABOUT HERE

## **V. Conclusion**

Using pay slice to indicate CEO power, Bebchuk et al. (2011) show that powerful, entrenched, overpaid CEOs are associated with diminished company values. A high pay slice, however, could also indicate a decisive, talented, fairly-compensated CEO. We develop a model that relies on CEO incentive compensation and board friendliness to separate these two CEO types. Boards of directors are tasked with seemingly contradictory functions of both monitoring and advising management. Effective monitoring implies an arms-length relationship, while effective advising requires full disclosure of pertinent information. Full disclosure, however, requires management to trust that directors will use the information to help the company and not to attack management. In our interaction model CEO incentive compensation substitutes strong self-motivation for strong, arms-length board monitoring, while social connections between management and the board produces trust facilitating full information disclosure.

Our empirical model tests the effects on company value of incentive compensation and board friendliness, interacted independently with CEO power, and interacted together with CEO power. Independently, incentive compensation is associated with higher company value, while board friendliness is not. When examined together, powerful CEOs with relatively strong incentive compensation increase value, while powerful CEOs with relatively weak incentive compensation tend to decrease company value. Similarly, companies with powerful CEOs and a friendly board of directors tend to have higher values than companies with powerful CEOs who do not have a social connection with the board. The estimated coefficient on a third-order interaction between incentive compensation, board friendliness and CEO power indicates that powerful CEOs with both friendly boards and stronger incentive compensation are associated with higher value. Taken together, these findings are consistent with our model of incentive



compensation acting to mitigate the agency costs associated with friendly boards of directors allowing those boards to provide effective advice and consultation, in conjunction with full information disclosure from the CEO to the board resulting from a higher level of trust, and ultimately higher company value.

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## **Appendix A**

### **Components of the Bebchuk, Cohen and Ferrell (2009) Entrenchment Index**

The index for a company receives a value of 1 for the presence of each of the six listed governance characteristics, thereby having a maximum value of 6.

- a. Presence of a classified (staggered) board
- b. Presence of limitations to shareholders' ability to amend the bylaws
- c. Presence of supermajority voting for business combinations
- d. Presence of supermajority requirements for charter amendments
- e. Presence of golden parachutes for management
- f. Presence of a poison pill

**Table I. Sample Summary Statistics**

This table contains summary statistics for our sample of 7,143 firm-years from 2000 through 2010. **Q** is Tobin's q, which we measure as the ratio of a firm's market value to its book value. **CPS** is the CEO pay slice, which is defined as the ratio of the CEO's total compensation to the total compensation of the firm's top five executives, including the CEO, as listed in Execucomp. **FEC** is the ratio of the CEO's reported equity compensation to the CEO's total compensation. **E Index** is Bebchuk's entrenchment index, available at (<http://www.law.harvard.edu/faculty/bebchuk/data.shtml>). **SIZE** is the natural logarithm of the firm's total assets. **ROA** is the ratio of a firm's operating income before depreciation to total assets. **LTD** is the ratio of a firm's long-term debt to total assets. **CFL** is a firm's cash flow to assets and equals the ratio of operating, investing and financing cash flow to total assets. **RnD** is the ratio of a firm's research and development expense to sales. **RnD MISS** is a dummy variable that equals one when Compustat reports research and development as missing and zero otherwise. **CAPEX** equals a firm's capital expenditures to total assets. **CONNEX** is a dummy variable that equals one if the CEO is socially connected to at least one member of the board of directors and zero otherwise. **CONNEX (ratio)** equals the ratio of the number of outside directors socially connected to the CEO divided by the total number of outside directors.

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum	Median
<b>Q</b>	7142	1.79	1.12	0.71	8.47	1.42
<b>CPS</b>	6871	0.40	0.12	0.08	0.75	0.40
<b>FEC</b>	4475	0.44	0.29	0	0.96	0.467
<b>E Index</b>	7143	2.97	1.34	0	6.00	3
<b>SIZE</b>	7142	7.88	1.62	3.97	12.10	7.73
<b>ROA</b>	7142	0.14	0.11	-0.24	0.54	0.13
<b>LTD</b>	7142	0.18	0.16	0	0.76	0.16
<b>CFL</b>	7142	0.01	0.06	-0.21	0.30	0.00
<b>RnD</b>	7142	0.04	0.09	0	0.78	0
<b>RnD MISS</b>	7143	0.46	0.50	0	1	0
<b>CAPEX</b>	7142	0.05	0.05	0	0.29	0.03
<b>CONNEX</b>	7143	0.64	0.48	0	1	1
<b>CONNEX (ratio)</b>	7143	0.19	0.22	0	0.95	0.11

**Table II. Distribution of social connections across time**

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Distribution of social connections among U.S. firms from 2000-2010. Our sample contains all executives and directors in the Boardex database whose companies are covered by the Compustat and CRSP databases. To be included in the final sample announcing firms must also have E index data available at Lucian Bebchuk's Website (<http://www.law.harvard.edu/faculty/bebchuk/data.shtml>).

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Year	Total Connections	Proportion with zero	Proportion with one	Proportion with two	Proportion with > two
2000	371	29.7%	22.1%	12.9%	35.3%
2001	423	30.0%	21.3%	13.0%	35.7%
2002	527	33.6%	22.2%	8.3%	32.4%
2003	622	33.0%	24.8%	11.3%	31.0%
2004	751	35.0%	23.2%	13.7%	28.1%
2005	772	35.9%	23.8%	13.1%	18.3%
2006	847	35.9%	22.6%	14.0%	27.5%
2007	999	40.1%	22.1%	11.7%	25.2%
2008	958	38.4%	22.0%	14.3%	25.3%
2009	401	40.4%	21.5%	12.0%	26.2%
2010	395	43.0%	20.8%	10.9%	25.3%
Totals	7066	35.91%	22.40%	12.29%	28.21%

**Table III: Means, standard deviations of variables and Pearson correlations among variables**

Q is a proxy for Tobin's Q computed as the ratio of market value to book value; CPS is the CEO pay slice computed as the proportion of CEO total compensation to the total compensation of the top five executives; FEC is the fraction of CEO equity compensation to total compensation; CONNEX is a dummy variable that equals one if there is the CEO is socially connected to at least one outside director according to Boardex data; E\_index is the Bebchuk, Cremers and Peyer (2011) entrenchment index; Size is the logarithm of total assets; ROA is the ratio of operating income before depreciation to total assets; LTD is the ratio of long term debt to total assets; CFL is the ratio of the sum of operating, investing and financial cash flows to total assets; RnD is the ratio of research and development to total assets; RnD\_miss is a dummy variable that equals one when RnD data is missing in Compustat; and Capex is the ratio of capital expenditures to total assets.

NAME	Mean	STD	Q	CPS	FEC	CONNEX	E	SIZE	ROA	LTD	CFL	RnD	RnD MISS	CAPEX
<b>Q</b>	1.89	1.18	1											
<b>CPS</b>	0.4	0.12	0.01	1										
<b>FEC</b>	0.44	0.29	0.21	0.4	1									
<b>CONNEX</b>	0.66	0.47	-0.11	0.07	0.02	1								
<b>E Index</b>	2.66	1.28	-0.14	0.1	-0.06	0.1	1							
<b>SIZE</b>	7.86	1.64	-0.29	0.14	0.09	0.32	0.01	1						
<b>ROA</b>	0.14	0.11	0.59	0.07	0.04	-0.07	-0.02	-0.17	1					
<b>LTD</b>	0.19	0.16	-0.27	0.08	-0.09	0.09	0.14	0.22	-0.03	1				
<b>CFL</b>	0.01	0.06	0.14	0.01	0.03	-0.04	-0.02	-0.05	0.11	-0.06	1			
<b>RnD</b>	0.04	0.1	0.41	-0.01	0.22	-0.17	-0.11	-0.28	0.04	-0.21	0.08	1		
<b>RnD MISS</b>	0.45	0.5	-0.41	-0.03	-0.16	0.17	0.03	0.29	-0.16	0.14	-0.08	-0.78	1	
<b>CAPEX</b>	0.05	0.05	0.17	0	0.02	-0.06	0	-0.15	0.46	0.15	-0.01	-0.03	-0.08	1



**Table IV: Bebchuk et al. (2012) replication and extension**

Pooled cross-sectional and time series regressions of Tobin's Q on CPS, Equity Comp, Connect Dummy, and a set of control variables. Following Bebchuk et al. (2012), we define Tobin's q as the market value of assets divided by their book value. The dependent variable in Column 1 is industry-adjusted Tobin's q, which is computed by subtracting the 4-digit SIC industry median Tobin's q from that of the firm. The other dependent variables are the unadjusted Tobin's q for each firm. All independent variables are lagged one period to help ameliorate endogeneity concerns. CPS is the fraction of the total compensation of a firm's top five executives paid to the CEO only. FEC is the fraction of CEO pay in the form of incentive equity compensation. CONNEX is a dummy variable which equals one if the CEO has at least one social connection with at least one board member (not including current employment connections). E index is the number of antitakeover provisions included in the firm's charter. SIZE is the natural logarithm of the firm's total assets. ROA is the firm's return on assets. LTD is the ratio of the firm's long-term debt to total assets. CFL is the ratio of the firm's cash flow from operations, investing and financing to total assets. RnD is the ratio of the firm's research and development expenses to total assets. RnD MISS is a dummy variable that equals one when a firm's reported research and development expense is set to missing by Compustat. CAPEX is the ratio of a firm's capital expenditures to total assets. All regressions include year and industry fixed effects dummy variables. \*\*\*, \*\*, \* indicates statistical significance below the one, five and ten percent level.

	SIC Adjusted Q	Unadjusted Q	Unadjusted Q	Unadjusted Q
CPS	-0.231*** (-3.61)	-0.054 (-0.85)		
FEC			0.190*** (6.07)	
CONNEX				0.003 (0.13)
E index	-0.034*** (-5.79)	-0.044*** (-6.98)	-0.051*** (-7.03)	-0.036*** (-4.42)
SIZE	0.025*** (5.04)	-0.006 (-0.95)	-0.012 (-1.59)	-0.010 (-1.32)
ROA	4.770*** (61.18)	5.471*** (64.29)	5.750*** (59.19)	5.668*** (49.44)
LTD	-0.281*** (-5.89)	-0.357*** (-6.05)	-0.334*** (-4.92)	-0.441*** (-5.68)
CFL	0.809*** (6.31)	0.991*** (8.11)	1.022*** (7.16)	0.859*** (5.80)
RnD	2.631*** (28.15)	3.573*** (30.16)	3.747*** (28.2)	3.061*** (20.04)
RnD MISS	0.136*** (8.06)	-0.087*** (-3.20)	-0.090*** (-2.88)	-0.127*** (-3.55)
CAPEX	-1.616*** (-10.03)	-0.506** (-2.46)	-0.873*** (-3.77)	-0.102 (-0.35)
Intercept	-0.396*** (-7.17)	1.074*** (10.50)	0.476 (0.61)	2.393*** (15.26)
F- statistic	9.3***	7.0***	6.45***	5.76***
Adjusted R <sup>2</sup>		54.1%	56.6%	55.9%

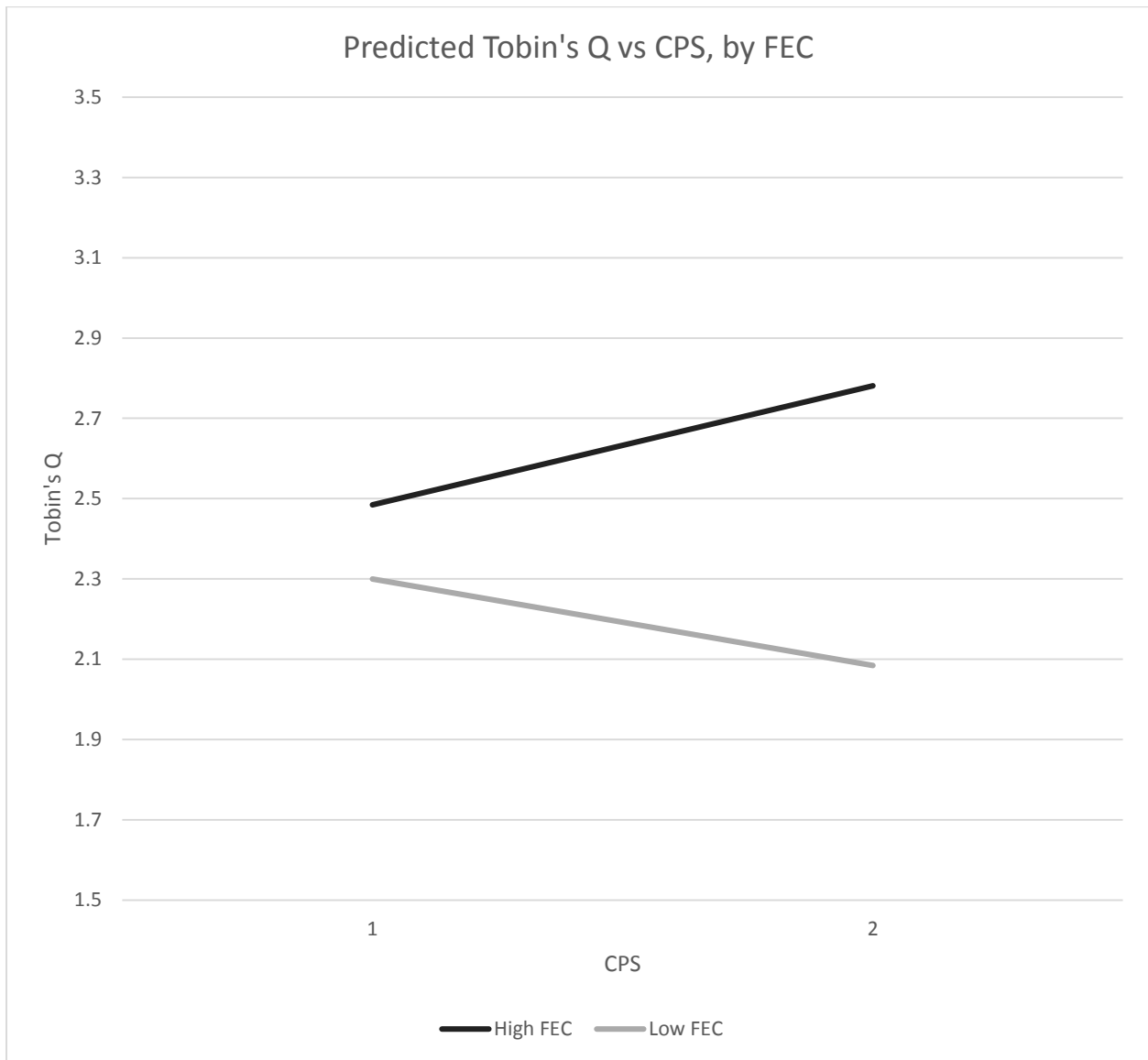
**Table V: Firm value and interactions among independent variables**

Pooled cross-sectional and time series regressions of Tobin's Q on CPS, Equity Comp, Connect Dummy, and a set of control variables. Following Bebchuk et al. (2012), we define Tobin's q as the market value of assets divided by their book value. The dependent variable in Column 1 is industry-adjusted Tobin's q, which is computed by subtracting the 4-digit SIC industry median Tobin's q from that of the firm. The other dependent variables are the unadjusted Tobin's q for each firm. All independent variables are lagged one period to help ameliorate endogeneity concerns. CPS is the fraction of the total compensation of a firm's top five executives paid to the CEO only. FEC is the fraction of CEO pay in the form of incentive equity compensation. CONNEX is a dummy variable which equals one if the CEO has at least one social connection with at least one board member (not including current employment connections). E index is the number of antitakeover provisions included in the firm's charter. SIZE is the natural logarithm of the firm's total assets. ROA is the firm's return on assets. LTD is the ratio of the firm's long-term debt to total assets. CFL is the ratio of the firm's cash flow from operations, investing and financing to total assets. RnD is the ratio of the firm's research and development expenses to total assets. RnD MISS is a dummy variable that equals one when a firm's reported research and development expense is set to missing by Compustat. CAPEX is the ratio of a firm's capital expenditures to total assets. All regressions include year and industry fixed effects dummy variables. \*\*\*, \*\*, \* indicates statistical significance below the one, five and ten percent level.

	Unadjusted Q	Unadjusted Q	Unadjusted Q	Unadjusted Q
CPS	-0.269** (-2.35)	-0.492*** (-3.95)	-0.755*** (-4.31)	-1.039*** (-5.74)
FEC	0.181*** (3.57)		0.192*** (3.78)	0.433*** (5.42)
CPS x FEC	0.624** (2.08)		0.596** (1.99)	-0.017 (-0.04)
CONNEX		-0.007 (-0.32)	-0.019 (-0.65)	-0.032 (-1.03)
CPS x CONNEX		0.616*** (3.82)	0.795*** (3.98)	1.212*** (5.40)
FEC x CONNEX				-0.385*** (-3.99)
CPS x FEC x CONNEX				1.120* (1.87)
E index	-0.045*** (-4.04)	-0.035*** (-4.18)	-0.035*** (-4.2)	-0.045*** (-4.03)
SIZE	-0.015 (-1.37)	-0.006 (-0.76)	-0.006 (-0.8)	-0.045 (-0.99)
ROA	6.387*** (42.03)	5.595*** (48.09)	5.595*** (48.1)	6.345*** (41.77)
LTD	-0.526*** (-5.16)	-0.428*** (-5.44)	-0.428** (-5.4)	-0.537*** (-5.28)
CFL	0.994*** (5.15)	0.950*** (6.36)	0.950*** (6.4)	0.974*** (5.06)
RnD	3.194*** (17.30)	3.058*** (19.96)	3.058*** (20.0)	3.157*** (17.12)
RnD MISS	-0.153*** (-3.29)	-0.116*** (-3.19)	-0.116*** (-3.2)	-0.150*** (-3.22)
CAPEX	0.505 (1.30)	-0.215 (-0.72)	-0.215 (-0.7)	-0.490 (-1.27)
Intercept	2.295*** (13.08)	2.559*** (15.82)	2.560*** (15.8)	2.505*** (12.8)
F- statistic	4.99***	5.70***	5.7***	5.3***
Adjusted R <sup>2</sup>	60.4%	56.2%	60.2%	60.6%

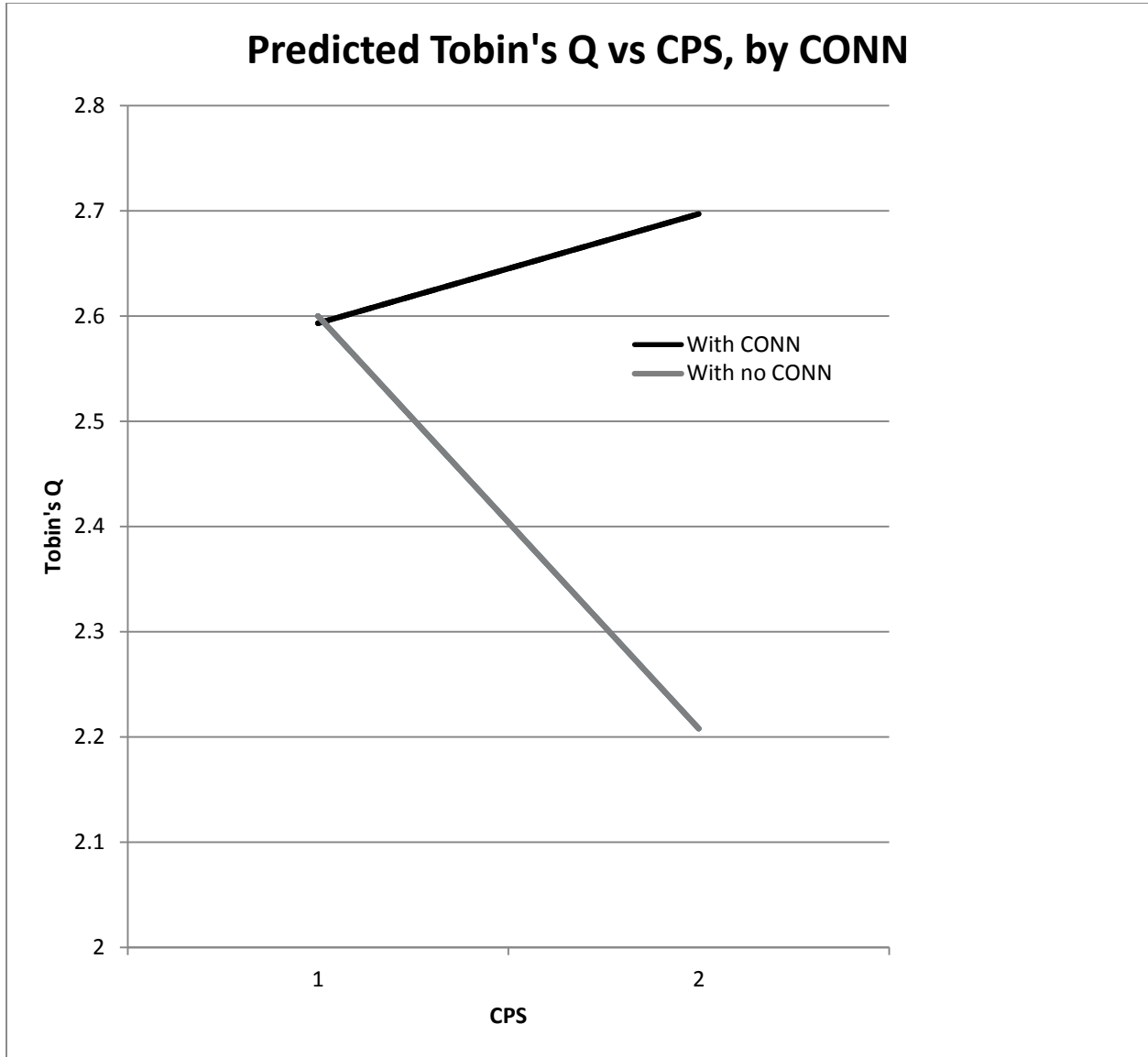
**Figure 1**

Plot of Tobin's q as CPS varies from its minimum to maximum, and FEC is either two standard deviations above or below its mean (all control variables are set to zero).



**Figure 2**

Plot of Tobin's q as CPS varies from its minimum to maximum, and the CONNEX dummy variable is either one (With CONNEX) or zero (With no CONNEX) (all control variables are set to zero).



**Figure 3**

Plot of Tobin's q as CPS varies from its minimum to maximum, the FEC variable varies from plus or minus one standard deviation, the CONNEX dummy variable is either one (CONNEX) or without (NoCon), and the third-level interaction term is included (all control variables are set to zero).

