Compensation of Divisional Managers: Peer Effects inside the Firm

Ran Duchin
University of Washington
duchin@uw.edu

Amir Goldberg
Stanford University
amirgo@gsb.stanford.edu

Denis Sosyura
University of Michigan
dsosyura@umich.edu

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Abstract

Using hand-collected data on divisional managers at S&P 1500 firms, we study how changes in one divisional manager's compensation affect the compensation of other divisional managers inside the same conglomerate. Our identification exploits industry shocks to managerial pay in select divisions, such as the discovery of shale gas deposits. A pay increase for a manager affected by the industry shock generates large spillover effects on the pay of other divisional managers in the same conglomerate, who receive pay raises of 54-87 cents for each dollar increase in the treated manager's pay. These spillover effects operate *only* within firm boundaries and are non-existent for the same industry pairs in stand-alone firms. The intra-firm convergence in executive pay is associated with weaker governance and lower firm value. Overall, we document the evidence of corporate socialism in conglomerates' executive pay.

Introduction

The majority of day-to-day corporate decisions are made by managers outside of the executive suite, such as divisional managers and functional area leaders. Yet, despite the direct responsibility of these managers for a firm's performance, we know relatively little about how firms establish compensation structure for divisional managers. This paper seeks to provide one of the first pieces of evidence in this direction.

Using a novel hand-collected dataset on divisional managers at S&P1500 firms, we study how the compensation of divisional managers is affected by the compensation of managers' peers *within the same firm*. Our focus on the within-firm peer effects in compensation is motivated by the evidence in labor economics that managers value not only the absolute, but also the relative level of pay with respect to other managers in the same firm. In particular, recent theoretical frameworks explicitly model a manager's utility as a function of his relative compensation with respect to other managers in the same firm. For example, in recent work, Hart and Moore (2008) show analytically that compensation contracts serve as reference points to support the notion of compensation fairness, a concept that dates back at least to Akerlof and Yellen (1990).

Our empirical analysis seeks to answer two main questions. First, how does a shock to one divisional manager's compensation affect the compensation of his peers inside the firm? Second, what are the consequences on divisional performance and firm value?

Our identification exploits variation in divisional managers' compensation driven by industry-specific shocks, such as the discovery of the fracking technology in oil & gas or the deregulation of the telecom sector, which raise industry surplus and managerial compensation in specific business sectors. To study within-firm peer effects in managerial compensation, we

examine how these industry-specific shocks affect divisional managers' compensation in unrelated business sectors within the boundaries of one firm – a conglomerate.

Our main finding is that a positive shock to one divisional manager's compensation leads to a large increase in the compensation of other divisional managers within the same firm, even if these managers oversee divisions in unrelated industries (e.g., telecommunications vs. paper products). The economic magnitude of this effect is substantial. For every dollar of an industry-driven increase in a divisional manager's compensation, divisional managers in unrelated segments inside the same conglomerate receive a pay raise of approximately 54-87 cents (or about $168,000 per year).

When the components of managerial compensation are analyzed separately, we find that within-firm spillovers affect all of the main components of managerial pay – salary, bonus, equity, and stock options – but to a different extent. In particular, the strongest economic effects are observed for the base salary and bonus, consistent with the view that these compensation components are salient and easy to benchmark within a firm. The effect on managerial pay appears to be asymmetric in direction, being driven primarily by pay increases. In contrast, a negative industry shock to a divisional manager's pay does not promulgate to other managers within the same firm, consistent with the notion of downward rigidity in compensation.

We demonstrate that the boundaries of a firm serve as a key mechanism through which compensation shocks promulgate. In particular, industry pay shocks affect the compensation of divisional managers *only* for the segments that operate as a unified firm. In contrast, in the analysis of stand-alone firms, we show that the same industry pairs exhibit no spillovers in managerial pay outside of the firm boundaries, when each firm operates as a separate entity. This

evidence suggests that managerial pay spillovers inside conglomerates are unlikely to be explained by industry linkages alone.

One alternative interpretation of the within-firm peer effects in managerial compensation is that a positive shock in one industry creates positive externalities for other industries, thereby increasing the marginal product of effort in other business segments. For example, technological innovations in one industry could be applied to another industry, raising a manager's marginal product. Under this interpretation, we would expect that the spillovers in pay should be stronger among divisions that operate in related industries, where synergies are more likely. In contrast, we find that within-firm peer effects manifest themselves equally strongly across unrelated industries (those that operate in different one-digit SIC codes and have virtually no overlap in their input-output matrix).

Next, we study the relation between within-firm peer effects in managerial compensation and subsequent outcomes: performance and firm value. This analysis seeks to distinguish between two possible interpretations. On the one hand, greater equity in managerial pay can increase a manager's utility from work, improve managerial effort, and lead to better operating performance. On the other hand, within-firm convergence in managerial pay can be symptomatic of intra-firm socialism and rent extraction by divisional managers.

Our evidence is more consistent with the agency explanation. We find no evidence that peer-driven pay raises for divisional managers in unrelated divisions are associated with improved performance. In contrast, an increase in pay convergence among divisional managers is associated with lower firm value and greater conglomerate discount. For example, a one standard deviation reduction in the dispersion of compensation among divisions is associated with a 6.5% increase in the conglomerate discount. Consistent with the agency explanation for

the observed peer effects, we find that the convergence in divisional managers' pay is significantly more pronounced at firms with lower governance quality, as measured by block holdings and the Gompers, Ishii, and Metrick (2003) governance index.

Overall, our findings have several implications. First, we provide one of the first pieces of evidence on the convergence in executive compensation inside a firm and demonstrate that firm boundaries serve as a key mechanism through which this effect operates. Second, in contrast to most previous work, which has focused on the internal capital market inside conglomerates, we focus on the internal market for executive talent and document the evidence of socialism in conglomerates' executive pay. Finally, we find that within-firm convergence in executive compensation helps explain the conglomerate discount.

Our findings are most closely related to the literature at the intersection of internal capital markets and internal labor markets inside a firm. Several recent papers, such as Glaser, Lopez-de-Silanes, and Sautner (2013), Graham, Harvey, and Puri (2010), and Duchin and Sosyura (2013) show that divisional managers play a central role in a firm's capital budgeting and have a direct effect on divisional performance. We complement this work by providing evidence on the compensation structure of divisional managers and highlighting the importance of within-firm peer benchmarking in executive compensation.

We also add to the recent strand of the literature that studies internal labor markets within conglomerates. So far, internal labor markets at conglomerates have been examined primarily in the context of factory workers. In a recent paper, Tate and Yang (2013) show that workers in diversified firms benefit from greater intra-firm mobility, which provides displaced workers with better opportunities for redeployment within the same firm. In another working paper, Silva (2013) shows that factory workers in lower-skill industries earn higher hourly wages in

conglomerates when these conglomerates also operate in high-wage industries, a pattern the author attributes to frictions in the internal labor market of conglomerates. Our paper adds to this literature by providing evidence on the compensation of executives with control rights over divisional cash flows, whose incentives are likely to have the strongest effect on shareholder value. We also extend this literature by establishing a link between the compensation structure for divisional managers, operating performance, and conglomerate value.

Finally, we add to the literature on the role of peer effects in executive compensation. So far, this literature has focused primarily on peer benchmarking in executive compensation across *different firms* (e.g., Bizjak, Lemmon, and Naveen (2008), Bizjak, Lemmon, and Nguyen (2011) and Faulkender and Yang (2010, 2013)). In contrast, we identify a new type of peer benchmarking – namely, the benchmarking of executive compensation against that of managers' peers in the same firm. We demonstrate that firm boundaries play a key role in establishing a peer group and provide evidence on the effect of intra-firm peer benchmarking in executive pay on managerial incentives and firm value.

The rest of the paper is organized as follows. Section I describes the data. Section II examines peer effects in the compensation of divisional managers and their impact on efficiency and conglomerate value. Section III summarizes and concludes.

I. Sample and Data

A. Firms and Divisions

We begin constructing our sample with all firms included in the S&P 1,500 index during any year in our sample period, January 2000 to December 2008. We start our sample in 2000 since BoardEx coverage in earlier years is very limited. Following the literature, we exclude financial firms (SIC codes 6000-6999) and utilities (SIC codes 4900-4949), as well as any divisions that operate in these sectors because they are subject to capital structure regulations.

Since we are interested in studying the joint determination of the compensation of divisional managers across divisions, we exclude single-segment firms, firms whose divisional managers' compensation data are missing from Execucomp, BoardEx, and Equilar, and firms whose financial data at the business segment level are unavailable on Compustat. We also exclude divisions with zero sales, such as corporate accounts, and various allocation adjustments, such as currency translations.

Our final sample includes 209 firms, 764 divisions, and 1,846 firm-division-year observations. We report summary statistics in Table I. An average (median) conglomerate owns book assets valued at $13.0 ($2.9) billion, has a Tobin's Q of 1.90 (1.58), operates in 3.5 (3) business segments, and has annual return on assets (ROA) of 3.9% (5.2%).

B. Divisional Managers

Our sample includes 684 divisional managers who served at our sample firms between 2000 and 2008. To collect biographical information on divisional managers, we use the following databases: BoardEx, Reuters, Forbes Executive Directory, Marquis Who's Who, and Notable Names Database (NNDB).

We cross-check the date of a divisional manager's appointment reported in the above sources by searching the firm's press releases that typically provide the manager's exact starting date. We take a manager to be in charge of a division if he or she is the highest-level executive with direct responsibility over the business segment during the respective time period.

C. Compensation

We use three measures of compensation in all of our tests: (1) salary and bonus (*comp1*), (2) salary, bonus, and other compensation (*comp2*), and (3) salary, bonus, other compensation, and stock holdings (*comp3*). Detailed definitions of these variables appear in the Appendix. Data on the compensation of divisional managers come from Execucomp, BoardEx, and Equilar.

Our simplest measure, *comp1*, is the annual salary and bonus paid to a divisional manager. Table I shows that the average (median) divisional manager earns \$0.73 (\$0.56) million every year. Our second measure of compensation, *comp2*, augments the previous measure with other compensation. As shown in Table I, the average (median) value of a divisional manager's salary, bonus, and other compensation is \$0.83 (\$0.62) million per year.

Our third measure of compensation, *comp3*, also includes the value of a divisional manager's stock holdings. As shown in Table I, the average (median) value of a divisional manager's salary, bonus, other compensation, and stock holdings is \$1.26 (\$0.83) million every year. Compared to the compensation of divisional managers that excludes stock holdings (*comp2*), these values represent an increase of 51.9% (33.9%) in annual compensation, suggesting that stock-based compensation is substantial in a divisional manager's compensation package.

II. Empirical Results

A. Industry Pay Shocks and Executive Compensation in Standalone Firms

We begin our analysis by presenting results on the relation between the annual percentage change in executive compensation in standalone firms and changes in industry-level compensation. Since our primary focus is on compensation spillovers across divisions in a conglomerate, a key identifying assumption is that these compensation spillovers are not a general feature of executive compensation in U.S. firms. We test this assumption by investigating the relation between executive compensation in a standalone firm and the compensation in: (1) its own industry, and (2) other industries. We hypothesize that executive compensation in standalone firms is affected by same-industry executive compensation, but is unaffected by the compensation in other industries. This view is consistent with industry-specific labor market equilibrium.

We test this assumption in a panel of standalone firm-year observations of U.S. public firms with executive compensation data available from Execucomp, BoardEx, and Equilar, and financial data available from Compustat. To be included in our sample, the firm is required to appear in Compustat's segments file and report a single business segment.

The dependent variable in our regression model is the annual percentage change in the compensation of a firm's CEO. We use all three measures of compensation (*comp1, comp2, comp3*), which capture the manager's salary, bonus, other compensation, and stock-based compensation. The key independent variables include the average annual percentage change in CEO compensation across all single-segment firms that operate in the firm's industry (Δ*Industry compensation*), where industry is defined based on the Fama-French 48 industry classification,

and the average annual percentage change in CEO compensation in the other industries (Δ*Other Industry compensation*).

In addition to the measures of industry-level changes in executive compensation, we also include proxies of firm performance and size. We control for performance because executive compensation may be tied to the firm's performance. We measure performance using both the accounting-based measures of return on assets (ROA) and the market-based measure of the market-to-book ratio (which is also typically viewed as a measure of growth opportunities). We control for size because executive compensation in bigger firms may behave differently and correlate with industry-level compensation. Our regressions also include firm fixed effects to control for unobservable, time-invariant firm attributes that may account for the variation in executive compensation. Standard errors are clustered at the firm level. Formally, we estimate the following regression model:

$$\Delta\text{Comp}_{i,t} = \beta_1 \Delta\text{Industry comp}_{i,t} + \beta_2 \Delta\text{Other industry comp}_{i,t} + \beta_3 \text{X}_{i,t} + \text{Y}_i + \varepsilon_{i,t} \qquad (1)$$

where: $\Delta\text{Comp}_{i,t}$ is the percentage change in the annual compensation of the CEO of firm *i* in year *t*, $\text{X}_{i,t}$ is a vector of firm level controls (ROA, Size, Market-to-book), and Y_i are firm fixed effects.

Table II reports the regression results. Each column corresponds to a separate regression, with a different measure of compensation as the dependent variable. The results in Table II indicate that changes in a CEO's compensation are strongly positively related to the average changes in compensation of CEOs in his industry. This relation is highly statistically significant at the 1% level (t-statistics of 9.8 to 12.2) and holds across all three measures of compensation. The economic magnitude of the effect is close to 1 and is similar across the three measures of compensation, ranging between 1.15 and 1.23.

More importantly, we find that changes in the compensation of CEOs in other industries do not have a significant effect on changes in the CEO's compensation, after controlling for other characteristics. The coefficients on the term Δ*Other Industry compensation* are never statistically significant at conventional levels and are economically small, ranging from 0.02 to 0.11. An analysis of other control variables reveals a weak positive relation between the percentage change in CEO compensation and firm performance.

Taken together, these findings suggest that executive compensation is strongly related to same-industry compensation shocks, consistent with industry-specific human capital and labor market clearing at the industry level. Executive compensation in single-segment firms, however, is unrelated to compensation shocks in other industries. In the next subsection, we test whether the equilibrium is different in multi-division firms. Specifically, we test whether industry-level shocks to executive compensation in the industry of other divisional managers affect the compensation of divisional managers.

B. Industry Shocks and the Compensation of Divisional Managers

In this subsection, we investigate the relation between the compensation of the divisional manager and the compensation in: (1) his own industry, and (2) the industry of the other divisional managers within the same firm. Our goal is to test whether the compensation of a divisional manager is affected by the compensation of other divisional managers in a way that is unrelated to division- and firm-level changes that may jointly affect the compensation of all the divisional managers. Our framework therefore focuses on industry-level shocks to executive compensation, with the key identifying assumption that same-industry shocks affect

compensation but industry shocks in other industries do not affect compensation outside the conglomerate. We corroborate this assumption in Table II.

Table III shows results of regressions of the annual change in the compensation of the divisional manager on the industry-average change in compensation of his own industry and the industries of other divisional managers. The regressions control for both firm-level and division-level performance (ROA and market-to-book) and size, and include firm fixed effects to absorb time invariant firm-level unobservable characteristics that may influence executive compensation inside the conglomerate.

Thus, our framework in similar to an instrumental variable approach in which the identifying assumption is that industry-level changes in average compensation are not positively correlated with unobserved, within-firm changes in performance or other determinants of the compensation of divisional managers. Formally, we estimate the following regression model:

$$\Delta\text{Comp}_{i,t} = \beta_1 \Delta\text{Industry comp}_{i,t} + \beta_2 \Delta\text{industry comp in other divisions}_{i,t} + \beta_3 \text{X}_{i,t} + \text{Y}_i + \varepsilon_{i,t} \qquad (2)$$

where: $\Delta\text{Comp}_{i,t}$ is the percentage change in the annual compensation of the manager of division *i* in year *t*, $\text{X}_{i,t}$ is a vector of division- and firm-level controls (ROA, Size, Market-to-book), and Y_i are firm fixed effects.

Table III considers two regression specifications. In columns (1)-(3), the regressions are estimated in a panel of division-year observations. In these regressions, the variable Δ*Industry compensation in other divisions* is defined as the average change in the annual compensation of CEOs of standalone firms that operate in the industries of the other divisions in the conglomerate. Formally, this variable is defined as follows:

$$\Delta Industry\ compensation\ in\ other\ divisions_i = \frac{\sum_{j \neq i} Average\ \Delta Compensation_j}{n-1} \qquad (3)$$

where the subscript *i* corresponds to division *i* and the subscript *j* corresponds to the industries of all other divisions in the conglomerate, with a total of *n* divisions.

One shortcoming of this approach is that it aggregates the changes in executive compensation across the industries of all other divisions, thus not allowing for the possibility that a divisional manager's compensation reacts to compensation changes in some industries (e.g., the ones with the highest compensation increase) but not others. To relax this assumption, in columns (4)-(6) of Table III, we generate a directed pairwise dataset of all intra-firm division pairs. Thus, for each pair of divisions *a* and *b*, we include two observations – (*a,b*) and (*b,a*) – and regress the change in the compensation of manager *a* on the average compensation change in *b*'s industry, and vice-versa. Hence, in columns (4)-(6), the variable Δ*Industry compensation in other divisions* is defined as the average change in the annual compensation of CEOs of standalone firms that operate in the industry of the other division in the pair. Formally, this variable is defined as:

$$\Delta Industry\ compensation\ in\ other\ divisions_i = Average\ \Delta Compensation_j \quad (4)$$

where the subscript *i* corresponds to division *i* and the subscript *j* corresponds to division *j*'s industry.

The empirical results in Table III indicate that industry-level shocks to the compensation of other divisional managers have a strong positive effect on the compensation of a given divisional manager. These results hold across the three measures of executive compensation and in both the division-year panel and the intra-firm pairwise division network. Across all 6 columns of Table III, the effects are significant at the 5% level or better and are similar in economic magnitude. An increase of 1 percentage point in the average industry compensation of

other divisional managers corresponds to an increase of 0.54 to 0.87 percentage points in the compensation of the divisional manager.

An analysis of the other control variables indicates that same-industry shocks to industry-level executive compensation continue to exert a significant influence on the compensation of divisional managers. The regression coefficients on the term Δ*Industry compensation* are always statistically significant at the 5% level, and the point estimates imply that an increase of 1 percentage point in same-industry compensation corresponds to an increase of 0.41 to 0.54 percentage points in the compensation of the divisional manager.

The compensation of divisional managers is also positively related to their division's ROA. These effects are statistically significant at the 10% level or better in 5 of the 6 cases. We also find a positive relation between the firm's market-based performance, as measured by Tobin's Q (the market-to-book ratio), and the compensation of divisional managers. This effect is statistically significant at the 5% level in 4 of the 6 cases.

C. Economic Spillovers across Divisions

One potential explanation for the impact of industry compensation shocks in other divisions on the compensation of the divisional manager is that the divisions are economically linked inside the conglomerate. In particular, it is possible that the compensation of divisional managers that oversee the larger, more important divisions inside the conglomerate affects the compensation of the other divisional managers, potentially because the performance of those divisions reflects or determines to a large extent the overall performance of the firm.

Another possible channel through which the compensation spillovers can operate is the industry channel. Conglomerate firms may operate in related industries, where the economic

shocks that affect executive compensation in one industry also impact the other industry and therefore impact executive compensation in that industry as well. While the results in Table II indicate that it is not generally the case that the same compensation shocks affect all industries, it might still be possible that conglomerate firms operate in close-enough industries such that they are simultaneously affected by the same shocks.

We test these possible explanations by interacting our measures of the industry compensation shocks in other divisions with the size (log of assets) and the industry relatedness (an indicator variable equal to 1 if the divisions share the first digit of their SIC codes) of the other divisions. According to the above hypotheses, the interaction terms Δ*Industry compensation in other divisions x Size* and Δ*Industry compensation in other divisions x Industry relatedness* should both be positive and statistically significant, implying that the compensation spillover effects are stronger when the other divisions are large or operate in a related industry.

Table IV reports the results from regressions that include these interaction terms. As before, the regressions control for both firm-level and division-level performance (ROA and Market-to-book) and size, and include firm fixed. In columns (1)-(3) of Table IV, the regressions are estimated in a panel of division-year observations. In these regressions, the variables *Size* and *Industry relatedness* in the interaction terms are averaged across all other divisions. In columns (4)-(6), the unit of analysis is a year-by-year directed pair of divisions in the same company. Hence, in columns (4)-(6), the variables *Size* and *Industry relatedness* in the interaction terms correspond to the other division in the pair.

The empirical results in Table IV indicate that the spillover effects of compensation across divisions are unaffected by division size. The regression coefficient on the interaction term Δ*Industry compensation in other divisions x Size* is never statistically significant at

conventional levels in columns (1)-(6), and flips signs between the division-year panel model (where it is negative) and the intra-firm divisional pair model (where it is positive). The results also suggest that industry relatedness across divisions does explain the cross-effects on divisional managers' compensation. The coefficient on the interaction term Δ*Industry compensation in other divisions x Industry relatedness* is always negative and mostly insignificant at conventional levels.

D. Divisional Managers' Compensation, Corporate Governance, and Conglomerate Value

The evidence so far indicates that the compensation of other divisional managers inside the conglomerate affects the compensation of the divisional manager. These findings are consistent with both the fairness and the agency hypotheses. The fairness hypothesis suggests that pay equity across divisional managers increases their sense of fairness and therefore increases their job satisfaction and productivity. Under this view, pay equity should be correlated with good corporate governance and higher conglomerate value.

An alternative explanation for the cross-division effects in compensation is that this is one manifestation of the agency problem between managers and shareholders. Typical characterizations of the agency conflict focus on top managers and overinvestment and perquisites. In this case, the agency conflict is further down in the organization where divisional managers exploit compensation shocks that affect other divisional managers to increase their own compensation. The industry shocks in other divisions provide the divisional managers with a credible reason, founded in compensation fairness, to have their compensation increased. This creates an agency conflict that is not mitigated by ex post settling up in the labor market as

described by Fama (1980). Under this view, pay equity should be correlated with poor corporate governance and lower conglomerate value.

We distinguish between these hypotheses in two ways. First, we investigate whether the impact of compensation shocks in other divisions on the divisional manager's compensation is stronger in poorly governed firms. Second, we investigate whether the value of the conglomerate is higher when there is less uniformity across the compensation of divisional managers.

To disentangle the fairness hypothesis from the agency view, we interact the industry change in the compensation of other divisional managers with measures of corporate governance. We use two measures of corporate governance: (1) the Gompers, Ishii, and Metrick (2003) governance index, (2) an indicator variable equal to one if the percentage of shares held by any single institutional investor is greater than 5%. Details on these variables are provided in the Appendix.

Panel A of Table V presents the results of division-year panel regressions in which the dependent variable is one of the measures of divisional manager's compensation. The independent variable of interest is the interaction term between Δ*Industry compensation in other divisions* and *Governance.* This term captures whether the association between the compensation of the divisional manager and the compensation of other divisional managers varies with governance quality. Other independent variables include: Δ*Industry compensation in other divisions,* the governance measure, and the same set of controls as in our main specification (which are not reported to conserve space). As before, we include firm fixed effects.

The interaction terms between managers' Δ*Industry compensation in other divisions* and the G-index (block holder dummy) are positive (negative) and significant for all measures of divisional managers' compensation. This evidence suggests that the compensation of other

divisional managers has a stronger effect on the compensation of the divisional managers in firms with more severe agency problems. In Panel B of Table V, we estimate the regressions in the division-pair dataset and obtain similar results.

To study the value implications of the pay equity of divisional managers, we examine the relation between the variation in divisional managers' pay equity across firms and their market value. In particular, we construct two firm-level measures of the overall intrafirm pay equity of divisional managers. The first variable, which we label *Compensation heterogeneity*, is the standard deviation of the compensation of divisional managers for a given firm-year. The second variable, which we label *Average compensation gap*, is the average difference between the percentage change in the compensation of the divisional manager and the average percentage change in the industry compensation of the other divisional managers, in absolute terms. We conjecture that a higher overall variation in compensation between divisional managers may amplify both the fairness and the agency effects on firm value.

To study the effect of pay equity on firm value, we follow Lang and Stulz (1994) and Berger and Ofek (1995) and define the excess value of a conglomerate as the natural logarithm of the ratio of the conglomerate's actual value to its imputed value. A firm's actual value is the sum of the book value of debt, liquidation value of preferred stock, and market value of equity. A firm's imputed value is the sum of the imputed values of its segments, where each segment's imputed value is equal to the segment's book assets multiplied by the median ratio of the market-to-book ratio for single-segment firms in the same industry (industry is defined based on the 48 Fama-French industry classification).

It should be noted that using single-segment firms as a benchmark for the valuation of conglomerates' segments is subject to self-selection bias (i.e., the firm's endogenous decision to

diversify). Graham, Lemmon, and Wolf (2002) empirically document this effect by showing that a large part of the difference in value between single-segment firms and their diversified peers can be explained by the decisions of conglomerates to acquire discounted firms. Campa and Kedia (2002) and Villalonga (2004) raise similar methodological issues and show that after controlling for selection, the diversification discount disappears. Hoberg and Phillips (2011) show that the traditional matching of conglomerates to pure-play firms by industry SIC codes can be imprecise, and propose an alternative matching scheme based on the textual analysis of firms' business descriptions. Whited (2001) and Colak and Whited (2007) stress the importance of accurate measurement of Tobin's Q. However, to the extent that the dispersion in pay equity within each conglomerate is not correlated with the measurement error in Tobin's Q, these issues are less likely to affect our results.

Table VI presents the results of pooled regressions of conglomerates' excess values on firm compensation heterogeneity (columns 1-3) and on firm average compensation gap (column 4-6). Other independent variables include controls such as firm size, cash flow, and the intrafirm dispersion in Tobin's Q across the firm's segments.

The coefficient on the variable *Compensation heterogeneity* is positive and statistically significant at the 5% level, suggesting that pay equity across divisional managers is associated with lower conglomerate value. Similarly, the coefficient on the variable *Average compensation gap* is also positive and statistically significant at the 10% level or better, suggesting that the conglomerate value is higher when the compensation of the divisional manager is not pegged to the compensation of other divisional managers.

In summary, pay equity across divisional managers is more pronounced in poorly governed firms and is negatively associated with firm value. These findings are consistent with

the agency hypothesis, in which the compensation of corporate executives increases with that of other executives, regardless of the performance of the firm and the units they oversee. Under this view, pay equity is exploited by managers to extract rents and capture a bigger slice of the conglomerate surplus.

III. Conclusion

This article examines peer effects in the compensation of divisional managers. Our empirical findings show significant peer effects in compensation inside conglomerate firms. The effects are stronger at firms with weak governance, which are more prone to agency-driven favoritism and rent-seeking, and are associated with lower conglomerate value.

A large body of empirical research focuses on the efficiency of capital allocation and investment inside conglomerate firms. Our evidence indicates that executive compensation inside conglomerate firms is also an important channel, which may provide new insights into the efficiency of internal resource allocation, agency problems, and conglomerate value.

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Appendix: **Variable Definitions**

Note: Entries in parentheses refer to the annual Compustat item name.

A. Firm-level Financial Variables

Excess Value – The natural logarithm of the ratio of the conglomerate's actual value to its imputed value. A firm's actual value is the sum of the book value of debt, liquidation value of preferred stock, and market value of equity. A firm's imputed value is the sum of the imputed values of its segments, where each segment's imputed value is equal to the segment's book assets multiplied by the median ratio of the market-to-book ratio for single-segment firms in the same industry (same Fama-French 48 industry).

Market-to-book – Market value of assets (book assets (at) + market value of common equity (csho*prcc) – common equity (ceq) – deferred taxes (txdb)) / (0.9*book value of assets (at) + 0.1*market value of assets).

Market-to-book Heterogeneity – The standard deviation of the industry-median market-to-book ratio of all divisions in the firm.

ROA – Net income (ni) / total assets (at).

B. Division-level Financial Variables

Industry market-to-book – The median market-to-book ratio across all single-segment firms in the segment's three-digit SIC code industry.

Industry relatedness – An indicator equal to 1 if two divisions share the first digit of the SIC code.

ROA – Annual operating profit of a segment (ops) divided by its book assets (at) as of the beginning of the year.

Size – The natural logarithm of the book assets (at) at the beginning of the year for the segment.

C. Compensation Variables

Average compensation gap – The average absolute difference between the annual change in the compensation of the divisional managers and the average change in compensation in their industries.

Compensation heterogeneity – The annual standard deviation of the compensation of the divisional managers for a given firm.

Comp1 – Salary and bonus.

Comp2 – Salary, bonus, and other compensation.

Comp3 – Salary, bonus, other compensation, and stock holdings.

Δ*Industry compensation* – The average percentage change in the annual compensation of all the managers of standalone firms in the industry (Fama-French 48 industry).

Δ*Industry compensation in other divisions* – The average percentage change in the industry compensation of the other divisional managers.

Δ*Other industry compensation* – The average percentage change in the compensation of all the managers of standalone firms in other industries (Fama-French 48 industry).

D. Governance Variables

G-index – The Gompers, Ishii, and Metrick (2003) index of shareholder rights.

Block holder dummy – An indicator equal to 1 if any single institutional investor holds more than 5% of the firm's outstanding shares.

TABLE I

Summary Statistics

This table reports summary statistics for the sample, which consists of all industrial companies in the S&P 1500 index that operate at least two divisions with nonmissing data on the compensation of the divisional managers. The values reported are time-series averages over the sample period. The sample period is from 2000 to 2008. We define three measures of managers' compensation: comp1 is salary and bonus; comp2 is salary, bonus, and other compensation; comp3 is salary, bonus, other compensation, and stock holdings. All other variable definitions are given in Appendix A.

Variable	Mean	25th percentile	Median	75th percentile	Standard deviation
Firm Level					
ROA	0.039	0.019	0.052	0.085	0.130
Assets, $millions	12,998	1,460	2,872	8,223	54,260
Market-to-book	1.901	1.249	1.583	2.118	1.159
Number of divisions	3.458	2.000	3.000	4.000	1.397
Division level					
ROA	0.092	0.020	0.078	0.197	0.892
Sales, $millions	2,941	347	1,055	2,811	6,208
Size (log assets)	6.900	5.861	6.965	7.946	1.534
Industry market-to-book	1.782	1.337	1.652	2.138	0.639
Compensation					
Comp1, $millions	0.729	0.386	0.557	0.869	0.672
Comp1, $millions	0.834	0.432	0.624	0.972	0.780
Comp3, $millions	1.261	0.518	0.827	1.403	1.623

TABLE II

The Effect of Industry Pay Shocks on Compensation in Standalone Firms

This table presents evidence on the relation between annual changes in the compensation of managers of standalone firms and industry-level shocks to the compensation of managers of other standalone firms. Each column reports estimates from a single regression, with t-statistics (robust and clustered by firm) in parentheses. The dependent variable is the annual change in the compensation of a manager in a standalone firm. The key independent variables are Δ*Industry compensation*, defined as the average percentage change in the annual compensation of all the managers of standalone firms in the industry, and Δ*Other Industry compensation*, defined as the average percentage change in the compensation of all the managers of standalone firms in the other industries. The industry definition is based on the Fama-French 48 industries. All regressions include an intercept and firm fixed effects, which are not shown. Variable definitions are given in Appendix A. Significance levels are indicated as follows: *=10%, **=5%, ***=1%.

Dependent variable	Firm-year panel		
	Δcomp1	Δcomp2	Δcomp3
Model	(1)	(2)	(3)
ΔOther industry compensation	0.108 [0.822]	0.059 [0.472]	0.019 [0.103]
ΔIndustry compensation	1.153*** [9.772]	1.230*** [11.820]	1.207*** [12.247]
ROA	0.102 [1.487]	0.085 [0.757]	0.182 [0.888]
Size	-0.060** [2.352]	-0.014 [0.445]	0.042 [1.003]
Market-to-book	0.004 [0.348]	0.005 [0.445]	0.029 [1.149]
Firm fixed effects	Yes	Yes	Yes
Adjusted R^2	0.051	0.068	0.072
N_obs	90,203	90,203	90,203

TABLE III

The Effect of Industry Pay Shocks on the Compensation of Divisional Managers

This table presents evidence on the relation between annual changes in the compensation of divisional managers and industry-level shocks to the compensation of other divisional managers. Each column reports estimates from a single regression, with t-statistics (robust and clustered by firm) in parentheses. The dependent variable is the annual change in the compensation of a divisional manager. The key independent variables are Δ*Industry compensation*, defined as the average percentage change in the annual compensation of all the managers of standalone firms in the industry, and Δ*Industry compensation in other divisions*, defined as the average percentage change in the industry compensation of the other divisional managers. In columns 1-3, the unit of analysis is a division-year, and the change in compensation is averaged across all the other divisional managers in the manager's company. In columns 4-6, the unit of analysis is a year-by-year directed pair of divisions in the same company, and the change in compensation is for an individual manager. The industry definition is based on the Fama-French 48 industries. All regressions include an intercept and firm fixed effects, which are not shown. Variable definitions are given in Appendix A. Significance levels are indicated as follows: *=10%, **=5%, ***=1%.

Dependent variable	Division-year panel			Intra-firm pairwise division network		
	Δcomp1	Δcomp2	Δcomp3	Δcomp1	Δcomp2	Δcomp3
Model	(1)	(2)	(3)	(4)	(5)	(6)
ΔIndustry compensation in other divisions	0.539** [2.431]	0.633** [2.477]	0.866*** [3.046]	0.621*** [2.951]	0.717*** [2.728]	0.714*** [3.440]
ΔIndustry compensation	0.485** [2.297]	0.412** [2.230]	0.467** [2.310]	0.542** [2.556]	0.455** [2.065]	0.544** [2.430]
Division ROA	0.013** [2.017]	0.021*** [2.609]	0.010 [1.583]	0.014*** [2.659]	0.020*** [3.015]	0.012* [1.972]
Division size	-0.027* [1.697]	-0.030 [1.524]	-0.038 [1.611]	-0.034 [1.636]	-0.025 [0.986]	-0.046 [1.526]
Industry market-to-book	-0.001 [0.103]	-0.002 [0.183]	0.010 [0.921]	-0.007 [0.895]	-0.006 [0.717]	0.001 [0.031]
Firm ROA	0.401 [0.874]	0.352 [0.781]	0.024 [0.051]	0.423 [1.334]	0.192 [0.531]	0.132 [0.253]
Firm size	-0.021 [0.341]	-0.016 [0.198]	0.154 [1.012]	-0.051 [0.538]	-0.067 [0.538]	0.099 [0.600]
Firm market-to-book	0.051 [1.241]	0.061 [1.160]	0.191** [2.079]	0.097** [2.148]	0.133** [2.152]	0.230** [2.353]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.252	0.214	0.226	0.232	0.178	0.193
N_obs	1,846	1,846	1,846	6,829	6,829	6,829

TABLE IV

Industry Pay Shocks and Economic Spillovers across Divisions

This table presents evidence on the relation between annual changes in the compensation of divisional managers and industry-level shocks to the compensation of other divisional managers. Each column reports estimates from a single regression, with t-statistics (robust and clustered by firm) in parentheses. The dependent variable is the annual change in the compensation of a divisional manager. The key independent variables are Δ*Industry compensation*, defined as the average percentage change in the annual compensation of all the managers of standalone firms in the industry, and Δ*Industry compensation in other divisions*, defined as the average percentage change in the industry compensation of the other divisional managers, and its interaction with division size and industry relatedness, defined as sharing the first digit of the SIC code. In columns 1-3, the unit of analysis is a division-year, and the change in compensation is averaged across all the other divisional managers in the manager's company. In the interaction terms, the variables *Size* and *Industry relatedness* are averaged across all other divisions. In columns 4-6, the unit of analysis is a year-by-year directed pair of divisions in the same company, and the change in compensation is for an individual manager. The industry definition is based on the Fama-French 48 industries. All regressions include an intercept and firm fixed effects, which are not shown. Variable definitions are given in Appendix A. Significance levels are indicated as follows: *=10%, **=5%, ***=1%.

	Division-year panel			Intra-firm pairwise division network		
Dependent variable	Δcomp1	Δcomp2	Δcomp3	Δcomp1	Δcomp2	Δcomp3
Model	(1)	(2)	(3)	(4)	(5)	(6)
ΔIndustry compensation in other divisions	1.243** [2.067]	1.646** [2.053]	1.670** [2.298]	0.710*** [2.756]	0.785** [2.581]	0.782*** [3.248]
ΔIndustry compensation in other divisions x Size	-0.536 [0.956]	-0.785 [1.051]	-0.646 [0.637]	0.588 [1.248]	0.509 [0.962]	-0.079 [0.123]
ΔIndustry compensation in other divisions x Industry relatedness	-0.768* [1.743]	-1.048* [1.932]	-0.465 [0.815]	-0.514 [1.141]	-0.399 [0.867]	-0.274 [0.667]
ΔIndustry compensation	0.401** [2.086]	0.422*** [2.600]	0.500*** [2.936]	0.584*** [3.348]	0.516*** [3.648]	0.589*** [3.171]
Division ROA	0.013* [1.877]	0.021*** [2.749]	0.006 [0.768]	0.014*** [2.771]	0.020*** [2.971]	0.011* [1.847]
Division size	-0.021 [1.394]	-0.021 [1.069]	-0.029 [1.152]	-0.035 [1.647]	-0.026 [0.976]	-0.046 [1.288]
Industry market-to-book	-0.001 [0.140]	-0.002 [0.227]	0.010 [0.931]	-0.007 [0.875]	-0.006 [0.718]	0.002 [0.185]
Firm ROA	0.355 [0.792]	0.289 [0.644]	-0.014 [0.030]	0.412 [1.325]	0.163 [0.450]	0.094 [0.174]
Firm size	-0.025 [0.418]	-0.019 [0.239]	0.157 [1.034]	-0.040 [0.426]	-0.057 [0.460]	0.114 [0.692]
Firm market-to-book	0.050 [1.196]	0.057 [1.075]	0.194** [2.087]	0.099** [2.190]	0.136** [2.173]	0.231** [2.350]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.269	0.224	0.227	0.236	0.181	0.192
N_obs	1,846	1,846	1,846	6,829	6,829	6,829

TABLE V

Industry Pay Shocks and Corporate Governance

This table presents evidence on the relation between annual changes in the compensation of divisional managers and industry-level shocks to the compensation of other divisional managers. Each column reports estimates from a single regression, with t-statistics (robust and clustered by firm) in parentheses. The dependent variable is the annual change in the compensation of a divisional manager. The key independent variables are Δ*Industry compensation*, defined as the average percentage change in the annual compensation of all the managers of standalone firms in the industry, and Δ*Industry compensation in other divisions*, defined as the average percentage change in the industry compensation of the other divisional managers, and its interaction with corporate governance. In panel A, the unit of analysis is a division-year, and the change in compensation is averaged across all the other divisional managers in the manager's company. In columns 4-6, the unit of analysis is a year-by-year directed pair of divisions in the same company, and the change in compensation is for an individual manager. The industry definition is based on the Fama-French 48 industries. All regressions include an intercept, the same controls as in previous tables, and firm fixed effects, which are not shown. Variable definitions are given in Appendix A. Significance levels are indicated as follows: *=10%, **=5%, ***=1%.

Panel A: Division-year panel

Governance measure	G-index			Block holder dummy		
Dependent variable	Δcomp1	Δcomp2	Δcomp3	Δcomp1	Δcomp2	Δcomp3
Model	(1)	(2)	(3)	(4)	(5)	(6)
ΔIndustry compensation in other divisions	0.255** [2.320]	0.284** [2.107]	0.339** [2.298]	0.952** [2.237]	1.642* [1.727]	1.396*** [2.619]
Governance	0.022 [0.277]	0.075 [0.789]	0.083 [1.025]	-0.091 [0.069]	-0.485 [1.441]	-0.449 [0.701]
ΔIndustry compensation in other divisions x Governance	0.622** [2.202]	0.634* [1.930]	0.529** [2.263]	-0.513** [2.363]	-1.353** [2.026]	-0.795** [1.999]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.275	0.233	0.230	0.291	0.254	0.252
N_obs	1,512	1,512	1,512	1,575	1,575	1,575

Panel B: Intra-firm pairwise division network

Governance measure	G-index			Block holder dummy		
Dependent variable	Δcomp1	Δcomp2	Δcomp3	Δcomp1	Δcomp2	Δcomp3
Model	(1)	(2)	(3)	(4)	(5)	(6)
ΔIndustry compensation in other divisions	0.706* [1.699]	0.580** [2.158]	0.565** [2.054]	1.102** [2.654]	1.059* [1.694]	1.383** [2.238]
Governance	0.078* [1.658]	0.105* [1.701]	0.060 [0.694]	-0.095 [0.660]	-0.411 [0.874]	0.407 [0.595]
ΔIndustry compensation in other divisions x Governance	0.205** [2.052]	0.391** [2.119]	0.477** [2.135]	-0.712** [2.467]	-0.508*** [2.615]	-0.690* [1.707]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.259	0.197	0.202	0.289	0.217	0.235
N_obs	5,846	5,846	5,846	5,962	5,962	5,962

TABLE VI

Industry Pay Shocks and Conglomerate Value

This table presents estimates from panel regressions in which the dependent variable is the firm's excess value. Compensation heterogeneity is the annual standard deviation of the compensation of the divisional managers for a given firm. Average compensation gap is the average absolute difference between the annual change in the compensation of the divisional managers and the average change in compensation in their industries. All variable definitions are given in Appendix A. All regressions include year fixed effects. The *t*-statistics (in brackets) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are indicated as follows: * = 10%, ** = 5%, and *** = 1%.

Compensation measure	comp1	comp2	comp3	comp1	comp2	comp3
Model	(1)	(2)	(3)	(4)	(5)	(6)
Compensation heterogeneity	0.054** [2.575]	0.095** [2.257]	0.124** [2.364]			
Average compensation gap				0.088** [2.158]	0.076** [2.221]	0.058* [1.948]
Market-to-book heterogeneity	-0.036*** [4.173]	-0.050*** [3.718]	-0.049*** [3.572]	-0.025** [2.022]	-0.024** [1.979]	-0.029*** [3.685]
Cash flow	1.840*** [9.104]	2.936*** [10.004]	3.045*** [9.994]	1.641*** [7.573]	1.643*** [7.572]	0.940*** [5.501]
Size	0.029** [2.167]	0.014 [0.649]	0.013 [0.629]	0.014 [0.724]	0.014 [0.720]	0.019 [1.492]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.136	0.129	0.140	0.138	0.131	0.143
N_obs	856	856	856	856	856	856