Management Science

Publication details, including instructions for authors and subscription information:
http://pubsonline.informs.org

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To cite this article:
Shashwat Alok, Radhakrishnan Gopalan (2018) Managerial Compensation in Multidivision Firms. Management Science 64(6):2856-2874. https://doi.org/10.1287/mnsc.2016.2672

http://pubsonline.informs.org/journal/mnsc/

MANAGEMENT SCIENCE
Vol. 64, No. 6, 2018, pp. 2856–2874
ISSN 0025-1909 (print), ISSN 1526-5501 (online)

Managerial Compensation in Multidivision Firms

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Received: March 16, 2015
Revised: December 16, 2015; June 20, 2016
Accepted: September 8, 2016
Published Online in Articles in Advance: March 20, 2017

https://doi.org/10.1287/mnsc.2016.2672

Abstract. Using hand-collected data on division manager (DM) pay contracts, we document that DM pay is related to the performance of both the DM's division and the other divisions in the firm. There is substantial heterogeneity in DM pay for performance. DM pay for division performance is lower in industries with less informative accounting earnings. DM pay is more sensitive to other-division performance if the DM's division is related to the rest of the firm, if the DM's division has fewer growth opportunities, and if the DM's division receives less capital from the rest of the firm. Consistent with optimal contracting view, DMs receive greater pay for other-division performance in better-governed firms. Overall, our evidence suggests that DM compensation is structured to account for the information and agency problems in multidivision firms.

History: Accepted by Amit Seru, finance.
Supplemental Material: The Internet appendix is available at https://doi.org/10.1287/mnsc.2016.2672.

Keywords: conglomerates • division managers • incentive contracts • compensation • executive compensation • manager • divisions • business segments • corporate governance

1. Introduction

Managerial decision making in multidivision firms (hereafter referred to as conglomerates) vis-à-vis single-division firms has been of significant research interest (see Stein 2003 and Maksimovic and Phillips 2007 for surveys). Of particular interest is whether asymmetric information and agency problems between the conglomerate's headquarters and the manager of a division can result in inefficient managerial behavior (see Stein 2002 and 2003). A properly designed incentive contract for the division manager (DM) can potentially minimize distortions in managerial decisions. For the most part, because of a lack of data, the literature on conglomerates has not studied if and how firms use incentive contracts for DMs to minimize agency costs. The objective of this paper is to fill this gap. We obtain data on DM pay for over 4,000 division-years to document the structure of DM pay and its variation across divisions and firms.

Incentive contracting for DMs is unique for two reasons. First, there is lack of market-based measures of performance such as stock prices. This constrains the contracts to be based on accounting measures, which may be less informative about true performance. This also limits what one can learn about DM pay from the vast literature on chief executive officer (CEO) compensation that focuses on stock price–linked pay. Second, the divisions of a conglomerate may be linked with one another. Such links can be real, such as when divisions sell to a common customer (Hoberg and Phillips 2017), or financial, such as when divisions share a common pool of capital (Maksimovic and Phillips 2002). The actions of the DM can thus not only directly affect the value of that division but also indirectly affect the value of other divisions in the firm. This may necessitate linking DM pay to the performance of both her division and the other divisions. This will occur even in situations where the performance of the other divisions does not provide incremental information about DM effort (Holmstrom 1979) and will ensure that the DM accounts for the externality of her actions. We refer to this as the *externality hypothesis*. The DM pay for other-division performance could vary with the nature and extent of relatedness of the divisions and their level of investment opportunities.

We contrast the predictions of the externality hypothesis with those of the more standard *risk hypothesis* (Holmstrom 1979), which predicts that to the extent that the DM directly controls only the performance of her division, she should obtain pay only for her division's performance. If anything, to the extent that the performance of other divisions informs the headquarters about common risk factors, optimal risk sharing would call for relative performance evaluation and hence a negative relationship between DM pay and the performance of other divisions.

The unique aspect of our paper is the data that combine DM pay with information about the performance of the divisions in the DM's firm. This allows us to measure the extent to which DM pay varies with the performance of both her division and the other divisions within the firm.[1] This allows us to estimate how the link between DM pay and divisional performance

varies across divisions and firms. These estimates help us distinguish between the risk hypothesis and the externality hypothesis.

We obtain our data by hand matching two commonly used databases, ExecuComp and Compustat business segment files. ExecuComp provides compensation data for the top-five highest-paid executives of S&P 1500 firms. Along with compensation, ExecuComp also provides each executive's designation, which reveals some of them to be high- ranking officials in divisions. For example, the designation of "Mr. Arun Sobti" in "ADC Telecommunications Inc." for the year 2000 is "President-Broadband Access and Transport Group." We hand match all designations in ExecuComp with names of divisions from Compustat business segment files. This provides us with a matched sample of DM compensation (from ExecuComp) and division performance (from Compustat business segment files). Our sample only includes DMs who are among the top-five highest-paid executives in their firm. Such executives manage the more important or larger divisions within a firm. While, on the one hand, it is useful to focus on the managers of larger divisions, on the other hand, this limits the generalizability of the results to managers of less important divisions.

We begin our empirical analysis by relating DM pay to the performance of the DM's division and that of the other divisions in the firm. We use the return on assets (ROA), which we calculate as the ratio of operating profits over book value of total assets as our measure of performance. Our analysis of actual pay contracts shows that conglomerates typically use profit-based performance goals to design DM pay (see Section 2). We find evidence for significant pay for performance for DMs. For the average DM in our sample, a 1% increase in divisional ROA is associated with a 0.311% increase in DM total pay. Given the mean division size and DM pay in our sample, this translates into a \$0.84 increase in DM pay for every \$1,000 increase in annual divisional profits.

Consistent with the externality hypothesis, we find that in our full sample, DM pay is positively related to the performance of the other divisions in the firm. Consistent with the DM having a greater influence over her division's performance, DM pay is more sensitive to her division's performance than the performance of the other divisions. Specifically, a 1% increase in the ROA of the other divisions is associated with only a 0.22% increase in DM pay.

We employ two industry-level proxies for accounting informativeness to estimate its effect on DM pay for performance. The first is the volatility of accounting profits of all single-segment firms in the industry, with a higher volatility indicating less informative accounting performance (Lambert and Larcker 1987, Bushman et al. 1996, Baginski et al. 2004). Our second proxy is the extent to which accounting profits are related to contemporaneous stock returns. We measure this by regressing stock returns on accounting profits for all single-segment firms within an industry (Kothari 2001, Ball et al. 2000, Bushman et al. 2004), and we classify industries with an above-median regression coefficient as having more informative accounting profits. Consistent with the risk hypothesis, we find that DM pay for division performance in industries with more informative accounting profits is twice that in industries with less informative accounting profits. The lower pay for performance for DMs in industries with less informative accounting performance may be an important cost of conglomeration.

To test predictions of the externality hypothesis, we construct two measures of relatedness. Our first measure classifies divisions in firms with another division in the same three-digit Standard Industrial Classification (SIC) code industry as being related to the rest of the firm. For our second measure, we estimate the degree of complementarity of the industries in which the divisions of a conglomerate are present (Hoberg and Phillips 2017). The degree of complementarity between any two industries is the extent of similarity in their customer profiles. We obtain an industry's customer profile using the 1992 industry-level input–output tables for the U.S. economy.[2] We construct the firm-level measure of relatedness as the asset-weighted average level of complementarity of all the nonprimary divisions of the firm with the primary (or largest) division (Fan and Lang 2000). Consistent with the externality hypothesis, we find that DMs of divisions that are related to the rest of the firm obtain greater pay for the other-division performance. When we differentiate between short-term and long-term pay, we find that even the short-term pay (salary and bonus) of a DM is related to the performance of other related divisions in the firm. This ensures that the correlations we document are not just a mechanical effect of better overall firm performance increasing the stock price and hence the grant date fair value of stock awards. To the best of our knowledge, we are the first to document this. We further expand on the externality hypothesis below.

Information and agency problems within conglomerates can sometimes lead to suboptimally high capital allocation to a division with poor investment opportunities (Scharfstein and Stein 2000). Such distortions can be minimized by linking the pay of a low-growth-opportunity division's manager to the performance of the other divisions in the firm. Consistent with this conjecture, we find that DMs of divisions with low growth opportunities obtain higher pay for other-division performance.[3] When we differentiate between periods of industry distress and normal times, we find

that DM pay in the distressed division is more sensitive to the performance of the nondistressed divisions. While such pay arrangements may facilitate transfer of capital out of the divisions with fewer investment opportunities into ones with better opportunities, they may also be a sign of agency problems in the firm where pay does not decrease when performance (read prospect) declines.[4]

To distinguish the optimal contracting explanation from the rent extraction explanation (Core et al. 1999), we analyze how the sensitivity of a DM's pay to other-division performance varies with the strength of corporate governance within the firm.[5] We use three alternative measures for corporate governance. These are the two indices of takeover protection as proposed in Bebchuk et al. (2009) and Gompers et al. (2003), respectively, and the proportion of institutional shareholding in the firm. We find that DMs receive greater pay for other-division performance in firms with fewer antitakeover provisions and higher institutional ownership. This is inconsistent with a rent extraction explanation.

Summarizing, our evidence is consistent with the thesis that DM incentive contracts are designed to overcome information and agency problems within conglomerates. The robust positive relationship between DM pay and the performance of other divisions that we document highlights the limitations of the risk hypothesis as a description of pay design for DMs. The cross-sectional patterns in pay for other-division performance that we document highlights that conglomerates do account for the need for DMs to cooperate with one another in designing their pay arrangements. This needs to be given sufficient importance by studies on potential distortions in capital allocation in conglomerates. A final caveat about our study is that since we lack exogenous instruments for own- and other-division performance, what we document are some very interesting cross-sectional patterns in the association between division performance and DM pay that are consistent with the predictions of theory.

The rest of the paper is organized as follows. In the next section, we discuss the related literature. In Section 3, we develop the hypotheses. In Section 4, we describe our empirical specification and key variables, and we discuss sample-selection issues. Section 5 describes the data and provides the summary statistics. In Section 6, we discuss our empirical results. Section 7 concludes.

2. Related Literature

Conglomeration can have both a bright and a dark side. On the bright side, conglomerates can create value by redeploying capital from low-growth divisions to high-growth divisions (Stein 1997). Indeed, Maksimovic and Phillips (2002) provide some supportive evidence. However, conflicts of interest between rent-seeking DMs and CEOs can hinder such capital reallocation (see Scharfstein and Stein 2000 and Rajan et al. 2000). Our results indicate that DM incentive contracts may be an important tool conglomerates employ to overcome such conflicts and achieve efficient capital allocation.

Hoberg and Phillips (2017) find that conglomerates choose to operate in industry segments that exhibit higher degrees of asset complementarity that can generate product–market synergies. Such synergies can only be realized if the DMs of different divisions efficiently cooperate with one other. Cooperation across divisions can be encouraged by linking DM pay to the performance of the other divisions (Auriol et al. 2002). Indeed, we find that pay for other-division performance is greater for DMs of divisions in firms in which there is a higher degree of complementarity across divisions.[6]

The closest papers to our study are Cichello et al. (2009), Blackwell et al. (1994), Wulf (2002), and Aggarwal and Samwick (2003). Cichello et al. (2009) find division ROA to be most closely tied to turnover and promotions of DMs. While they find evidence of relative performance evaluation (RPE) in promotion decisions, they do not find a similar effect for turnover decisions. In contrast, Blackwell et al. (1994) find that turnovers rather than promotions are based on RPE in multibank holding companies in Texas. By contrast, we focus on the structure of DM compensation contracts and do not find much evidence for RPE.

Among 131 multidivision firms for the year 1993, Wulf (2002) finds that the sensitivity of divisional investment to divisions' performance is lower (higher) when DMs have higher (lower) pay for firm performance. Lacking pay for individual DMs, the author uses the average DM level pay to represent the pay of the largest division's manager. Unlike Wulf (2002), we employ a large panel of DM pay contracts from 708 firms to document how DM pay varies in the cross section and through time and thus test a number of different hypotheses.

Aggarwal and Samwick (2003) examine the effect of executive rank on the sensitivity of pay to performance (PPS). They document that PPS is highest for CEOs, is followed by other C-suite executives who they term as "oversight executives," and is lowest for managers with divisional oversight. They also find that the pay of the division manager is sensitive to both firm and divisional sales growth.

In contrast to Aggarwal and Samwick (2003), our main focus is to understand how DM compensation is structured to overcome the information and agency problems between conglomerate headquarters and the DMs. In light of this, our main tests document how

the sensitivity of DM pay to the performance of her division and other divisions varies across divisions and across firms depending on the extent of information and agency problems. As discussed above, our tests highlight substantial heterogeneity in the structure of DM pay. Another important difference between the papers is that while we use ROA as a measure of division performance, Aggarwal and Samwick (2003) use sales growth. Our analysis of actual pay contracts obtained from Incentive Lab indicate that for a subsample of the DMs in our sample, about 68% of DM-year pay contracts make pay contingent on a measure of profitability while only 15% of the DM-year contracts link pay to a sales-based metric.[7]

The next section discusses our main hypotheses.

3. Hypotheses

In this section, we outline the hypotheses that have predictions relevant for our setting. We divide the hypotheses into two groups: the *risk hypothesis* and the *externality hypothesis*.

Holmstrom (1979) predicts that an agent's pay should depend only on performance measures that are informative about that agent's actions. To the extent that the performance of the division under the manager's direct control is likely to be more informative about that manager's actions, the "informativeness principle" of Holmstrom (1979) implies that the division manager's pay should be more sensitive to such actions. We refer to this as the *risk hypothesis*. The risk hypothesis predicts that DM pay should be related to the division's performance. Since accounting-based measures of divisional performance are typically noisy, the risk hypothesis also predicts lower pay for division performance in industries with less informative accounting profits. A division's performance may be affected by both the DM's effort and exogenous factors—say, market conditions—outside the DM's control. If a conglomerate's divisions are related and thus subject to similar risk factors, the performance of other divisions will reveal information about the exogenous factors. Holmstrom (1979) predicts that in such cases, it is optimal to reward the DM for divisional performance relative to the performance of the other divisions.

The *externality hypothesis* is based on the idea that divisions within a conglomerate are often linked. The links can be real, such as when divisions produce complementary products (Hoberg and Phillips 2017), or financial, such as when divisions share a common pool of capital (Maksimovic and Phillips 2002). The actions of the DM can thus affect the value of not only her division but also the other divisions in the firm. This would call for linking DM pay to the performance of both her division and the other divisions in the firm. The pay for other-division performance should vary with the nature and extent of relatedness of the divisions. Note that the externality hypothesis would call for linking managerial pay to other-division performance even if it does not provide incremental information about the DM's effort. Say, for example, if other-division performance is perfectly negatively correlated with own-division performance, it is not likely to provide incremental information about the agent's effort. Even in this case, the firm will link DM pay to other-division performance to make sure the DM internalizes the externality of her effort. Maximizing own-division performance may not maximize firm value in the setting.

Information and agency problems within conglomerates can lead to suboptimally high capital allocation to a division with poor investment opportunities (see Rajan et al. 2000 and Scharfstein and Stein 2000). The conglomerate can minimize such distortions by linking the pay of a low-growth-opportunity division's manager to the performance of the other divisions in the firm. On the other hand, Anctil and Dutta (1999) argue that DMs of divisions that are investing and expanding fast may have greater ability to affect the performance of other divisions. Thus, Anctil and Dutta (1999) predict greater pay for other-division performance for DMs of high-growth divisions.

If DMs obtain private benefits from managing larger divisions, conglomerate CEOs can reward DMs by linking capital allocation to prior divisional performance. To the extent that pay and capital allocation are substitute incentive mechanisms, we should expect lower pay for division performance in divisions that get more capital from the headquarters.

4. Empirical Design, Key Variables, and Sample Selection

4.1. Empirical Design and Key Variables

We are interested in understanding how DM pay is related to the performance of that DM's division and that of the other divisions in the firm. To achieve this, we estimate variants of the following model:

$$\begin{aligned}\log(Total\_compensation)_{ijt} &= \alpha + \beta_1 \times Division\_ROA_{jt} + \beta_2 \times Other\text{-}division\_ROA_{it} \\ &\quad + \gamma \times Z_{ijt} + \mu_t + \varepsilon_{ijt}, \end{aligned} \tag{1}$$

where subscript i refers to the firm, subscript j refers to the division, and subscript t refers to time in years. The dependent variable $Total\_compensation_{ijt}$ is the sum of annual salary, bonus, present value of stock awards, present value of stock option awards, other annual compensation, long-term incentive payouts, and other cash payouts. We use the log transformation of compensation to mitigate the effect of outliers. *Division_ROA* (*Other-division_ROA*) is the return on assets

of the division (other divisions). We calculate *ROA* as the ratio of operating profits over total assets. In the case of other divisions, we aggregate their operating profits and their total assets in calculating their ROA. These performance measures are winsorized at the 1% level to mitigate the effect of outliers.

To test how DM pay for performance varies with the extent to which a division is related to the rest of the firm, we employ two measures of relatedness. Our first measure identifies divisions in firms with another division in the same three-digit SIC code industry as being related to the rest of the firm. Our second measure is constructed from the industry input–output tables for the U.S. economy. Using the 1992 tables available at the Bureau of Economic Analysis website (http://www.bea.gov/industry/io_benchmark.htm, accessed June 2011), for each industry i, we calculate the dollar value of output used by industry $k \in K$ ($Input_{ik}$), where K represents the set of all industries. For any pair of industries i and j, we compute the degree of complementarity as the correlation between $Input_{ik}$ and $Input_{jk}$, for all $k \in K$. A large correlation indicates similarity in the final consumers of industries i and j. We then construct the firm-level measure of relatedness as the asset-weighted average level of complementarity between the nonprimary divisions and the primary division. We classify the largest division of a conglomerate as its primary division.

To test how DM pay for performance varies with the informativeness of accounting earnings, we employ two industry-level measures of accounting informativeness:[8] the historic volatility of accounting earnings of firms within an industry (Lambert and Larcker 1987, Bushman et al. 1996, Baginski et al. 2004) and the value relevance of earnings, which we measure as the extent to which accounting earnings are related to contemporaneous stock returns (Lambert and Larcker 1987, Bushman et al. 1996, Baginski et al. 2004). We obtain this measure by regressing annual stock returns of all firms in an industry on their annual earnings per share. The coefficient estimate is referred to as the value relevance of accounting earnings. To test our prediction, we divide our sample into divisions with high and low levels of accounting informativeness and estimate Equation (1) in the subsamples and compare our estimates of β_1 and β_2 across the two subsamples. Note that this is equivalent to estimating Equation (1) with a full set of interaction terms between, *High_information*, a dummy variable that identifies industries with more informative accounting profits and all the independent variables and testing for significance of the coefficients on *High_information* × *Division_ROA* and *High_information* × *Other-division_ROA*. We employ a similar procedure to test all of our cross-sectional predictions.

To investigate whether DM pay is structured to encourage cross-subsidization across divisions, we use three alternative measures of divisional investment opportunities: industry market-to-book ratio, industry sales growth, and instances of industry distress that we identify using the procedure in Titman and Wessels (1988). We classify industries with above-median market-to-book ratio or sales growth as having more investment opportunities.

In all of our regressions, we control for firm size using log(*Total_assets*), division size using log(*Division_assets*), and time fixed effects. The standard errors in all of our regressions are robust to heteroscedasticity and are clustered at the individual firm level.

Although we estimate specifications with firm- and industry-year fixed effects, to the extent that we lack exogenous instruments for own-division and other-division performance, we will not be able to make any causal statements about how performance affects pay. While the cross-sectional tests we perform do offer some evidence of systematic variation in pay for performance as predicted by theory, these estimates can also potentially be biased by omitted variables and reverse causality. Hence, we are cautious to note that what we document are some interesting patterns in the association between division performance and DM pay that are consistent with what one would expect from theory.

5. Data and Summary Statistics

5.1. Data

The data for our paper are obtained from five standard sources. Stock returns and firm financial data are from a Center for Research in Security Prices–Compustat merged database. Financial data for individual business divisions are from Compustat business segment files. The data on division manager compensation and designation are collected from ExecuComp and Def 14A proxy statement files. Our sample period extends from 1992 to 2009.

ExecuComp provides the annual compensation of the top-five highest-paid executives for all S&P 1500 firms. Along with their compensation, ExecuComp also provides the executive's designation, which sometimes reveals them to be a high-ranking official in a division. We hand-match the division name as indicated in the executive's designation with names of divisions from Compustat business segment files to obtain a matched sample of DM compensation and division performance. From the overall sample, we retain divisions in firms with a minimum of two divisions resulting in 6,747 individual division-year observations. From this sample, we drop division-year observations with missing values of operating profits (1,371 observations), missing/negative values of total assets (533 observations), negative sales (9 observations), and

divisions for which SIC codes are not reported in Compustat (17 observations). This leaves us with 4,326 observations. Since our tests rely on relating DM to pay to the performance of both their division and that of other division-year observations, we also drop those division-year observations for which information on operating profits or assets of other divisions within a firm are missing (246 observations). Our final sample consists of 4,080 division-years with 1,856 unique DMs in 1,497 different divisions across 708 firms.

5.2. Summary Statistics

In panel A of Table 1, we provide the summary pay characteristics of DMs in our sample. In the top portion of panel A, we provide the pay characteristics of the DMs of divisions with positive sales; in the bottom portion, we provide the pay characteristics of DMs with missing sales. We find that both total compensation and the various components of compensation are not statistically significantly different across the top and bottom portions. We also find that the DMs of divisions with positive sales are slightly older than DMs of divisions with missing sales. Although the bulk of DM compensation consists of the present value of stock and option grants—whose value varies with firm performance—this by itself does not imply that DMs obtain significant pay-for-firm performance. To the extent that the number of stock and option grants

Table 1. Summary Statistics

Panel A: Division manager compensation

Matched subsample

Variable	*N*	Mean	Median	Std. dev.
Total_compensation	4,080	1,672.868	995.638	3,261.495
Salary	4,080	359.714	324.19	180.124
Bonus	4,080	240.757	116.834	896.729
Stock_grants	4,080	264.341	0	798.182
Stock_option_grants	4,080	537.041	164.157	2,549.380
LTIP	4,080	173.884	0	530.604
Age	1,612	51.922	52	6.573
Sample—Missing sales				
Total_compensation	2,154	1,987.546	1,190.553	2,536.913
Salary	2,154	379.475	338.589	177.212
Bonus	2,154	260.818	97.499	564.466
Stock_grants	2,154	369.154	0	1,079.710
Stock_option_grants	2,154	632.751	231.562	1,247.666
LTIP	2,154	231.569	0	745.462
Age	977	50.573	50	6.655

Panel B: Division and industry characteristics

Variables	*N*	Mean	Median	Std. dev.
log(*Division_assets*)	4,080	6.433	6.392	1.551
log(*Other-division_assets*)	4,080	7.064	6.986	1.639
log(*Total_assets*)	4,080	7.748	7.608	1.441
Division_ROA	4,080	0.142	0.124	0.202
Other-division_ROA	4,080	0.113	0.106	0.179
Division_capital_expenditure	3,734	0.059	0.042	0.064
Other-division_capital_expenditure	3,734	0.056	0.04	0.054
Division_sales_growth	3,549	0.133	0.07	0.513
Other-division_sales_growth	3,496	0.193	0.074	0.693
Ind._market-to-book	3,861	1.613	1.453	0.626
Earnings_volatility	3,728	0.280	0.145	0.933
Distress	3,997	0.224	0.000	0.417
E-index	2,875	2.770	3.000	1.117
G-index	3,148	10.306	10.000	2.456
Institutional_holding	4,080	0.309	0.345	0.187

Notes. This table reports the summary statistics of the key variables used in our analysis. Panel A reports pay characteristics of DMs in our sample. Panel B reports division and industry financial characteristics for our sample. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files.

varies with division performance, firms may be using these grants to reward DMs for superior division performance. In such cases, the choice between stock and bonus (cash) may only indicate a choice of the "currency" used to reward the DM. This is especially the case if these awards have a short vesting period (Gopalan et al. 2014). Hence, we rely on our regressions that relate DM total compensation to division and firm performance to tease out the actual pay for performance for DMs.

In panel B of Table 1, we provide the summary financial characteristics of the divisions in our sample. The mean log(*Division_assets*) of our sample is 6.43, which translates into a book value of division assets of $620.17 million. The median value of log(*Division_assets*) is comparable to the mean value. In comparison, the mean value of log(*Other-division_assets*)—the natural logarithm of the book value of total assets of all the other divisions in the firm—is 7.06. Thus, the size of the division for which we have DM pay is comparable to the size of the rest of the firm. Since our sample firms have three divisions on average, we likely have pay characteristics of the DM of the largest division. This is not surprising because the DM of the largest division is more likely to be among the top-five highest-paid executives in the firm. Our sample comprises the larger firms in Compustat. The mean value of log(*Total_assets*) of our sample is 7.75 compared with 5.66 for all firms in Compustat. We find that the divisions in our sample are on average profitable as seen from the mean value of *Division_ROA* of 0.14. Our divisions also tend to be more profitable than the rest of the firm as can be seen by comparing the mean value of *Division_ROA* to that of *Other-division_ROA*. The divisions for which we have pay data are also growing fast (mean value of *Division_sales_growth* is 0.13), but the rest of the firm appears to be growing at a faster rate (mean value of *Other-division_sales_growth* is 0.19). The divisions in our sample have growth opportunities as seen from the mean value of *Industry_market-to-book* of 1.61. We classify about 22.4% of the division-years in our sample as distressed as can be seen from the mean value of *Distress*.

We employ three alternative measures of corporate governance. The first one is the entrenchment index proposed in Bebchuk et al. (2009), *E-index*, with a higher value indicating weaker governance. The average value of *E-index* for the firms in our sample is 2.77. Our second measure of governance is the *G-index* proposed in Gompers et al. (2003), which works similarly to the *E-index*. The average value of *G-index* for our sample firms is 10.31. Our third measure of corporate governance is the aggregate shareholding of the 10 largest institutional shareholders of the firm (*Institutional_holding*). To the extent that institutional owners have both greater ability and incentives to monitor firm performance, we expect firms with greater institutional ownership to have stronger governance. The mean value of *Institutional_holding* for our sample firms is 0.31.

6. Empirical Results

6.1. DM Pay for Performance

We estimate our baseline specification (1) for the full sample and present the results in Table 2. The dependent variable is log(*Total_compensation*). Focusing on column (1), the positive and significant coefficient on *Division_ROA* indicates that DMs obtain pay for their division's performance. This is consistent with the risk hypothesis. We also find that the coefficient on *Other-division_ROA* is also positive but not significant. From the coefficients on the control variables, we find that managers of larger divisions and those in bigger firms obtain higher total compensation.

In column (2), we repeat our test after including firm fixed effects and find that the coefficient on both *Division_ROA* and *Other-division_ROA* is positive and significant. Comparing column (2) to column (1), we find that the coefficient on *Other-division_ROA* is higher and its standard error lower in column (2). Thus, once we control for firm fixed effects, our results are consistent with the externality hypothesis. Consistent with DMs having a greater influence on their division's performance, we find that the pay for own-division performance is greater than the pay for other-division performance. The coefficient on *Division_ROA* in column (2) indicates that a 1% increase in divisional ROA is associated with a 0.311% increase in DM pay. Given the average value of division total assets and DM compensation in our sample, this translates into a $0.84 increase in DM pay for every $1,000 increase in annual divisional profits. The coefficient on *Other-division_ROA* in column (2) indicates that a 1% increase in other-division ROA is associated with a 0.22% increase in DM pay. In dollar terms, a $1,000 increase in the profits of the other divisions is associated with a $0.38 increase in DM pay.

To ensure that our estimates are robust to time-varying industry shocks, in column (3), we repeat our tests after simultaneously controlling for both firm and industry-year fixed effects (FE) and obtain qualitatively similar results.

Given that we have pay characteristics of the manager of the largest division, one concern with our tests would be the extent to which *Division_ROA* and *Other-division_ROA* are correlated and hence our ability to independently estimate pay for own-division and other-division performance. However, in the full sample, the correlation between *Division_ROA* and *Other-division_ROA* is modest at 0.269. This helps us allay any concerns of multicollinearity.[9]

Table 2. DM Pay for Performance: Overall and Short- vs. Long-Term DM Compensation

Panel A: DM pay for performance

	DM		
	(1)	(2)	(3)
Division_ROA	0.423***	0.311***	0.336***
	(0.086)	(0.086)	(0.089)
Other-division_ROA	0.170	0.224**	0.235***
	(0.109)	(0.087)	(0.091)
log(*Division_assets*)	0.074***	0.103***	0.108***
	(0.019)	(0.014)	(0.017)
log(*Total_assets*)	0.316***	0.236***	0.270***
	(0.022)	(0.049)	(0.058)
Constant	3.385***	3.900***	3.942***
	(0.211)	(0.313)	(0.420)
Year FE	Yes	Yes	Yes
Firm FE	No	Yes	Yes
Industry × Year FE	No	No	Yes
Observations	4,080	4,080	4,080
R^2	0.507	0.789	0.846

Panel B: DM pay for performance (short- vs. long-term pay)

	Short-term pay			Long-term pay		
	(1)	(2)	(3)	(4)	(5)	(6)
Division_ROA	0.321***	0.209***	0.189***	0.674***	0.511***	0.542**
	(0.070)	(0.061)	(0.059)	(0.141)	(0.188)	(0.224)
Other-division_ROA	0.064	0.029	0.098	0.340	0.658**	0.568**
	(0.059)	(0.058)	(0.069)	(0.255)	(0.275)	(0.262)
log(*Division_assets*)	0.048***	0.062***	0.053***	0.120***	0.154***	0.176***
	(0.013)	(0.011)	(0.011)	(0.034)	(0.035)	(0.042)
log(*Total_assets*)	0.202***	0.106***	0.110***	0.473***	0.390***	0.445***
	(0.019)	(0.035)	(0.042)	(0.040)	(0.121)	(0.152)
Constant	4.033***	4.711***	4.417***	0.259	0.665	5.452***
	(0.156)	(0.246)	(0.332)	(0.458)	(0.816)	(1.306)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	Yes	No	Yes	Yes
Industry × Year FE	No	No	Yes	No	No	Yes
Observations	4,080	4,080	4,080	4,080	4,080	4,080
R^2	0.435	0.778	0.847	0.350	0.626	0.713

Notes. Panel A reports the results of a panel data regression of DM and CEO compensation on division and other-division ROA. Specifically, we estimate the following panel regression model:

$$y_{ijt} = \alpha + \beta_1 \times Division\_ROA_{jt} + \beta_2 \times Other\text{-}division\_ROA_{it} + \beta_3 \times \log(Total\_assets)_{it} + \beta_4 \times \log(Division\_assets)_{jt} + \text{Time FE} + \text{Firm FE},$$

where the dependent variable y is *DM_compensation*. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level. Panel B reports the results of a panel data regression of DM compensation on division and other-division ROA. Specifically, we estimate the following panel regression model:

$$y_{ijt} = \alpha + \beta_1 \times Division\_ROA_{jt} + \beta_2 \times Other\text{-}division\_ROA_{it} + \beta_3 \times \log(Total\_assets)_{it} + \beta_4 \times \log(Division\_assets)_{jt} + \text{Time FE} + \text{Firm FE},$$

where the dependent variable y is *Short-term_DM_compensation* in columns (1)–(3) and *Long-term_DM_compensation* in columns (4)–(6). All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

6.1.1. Long-Term Pay vs. Short-Term Pay. In the next set of tests, we look at the individual pay components to see whether there is any systematic pattern in how they are employed to align DM incentives. Specifically, we distinguish between short-term (salary + bonus) and long-term (option grants + restricted stock grants + other long-term incentive payouts) components of DM pay and estimate their sensitivity to performance. Stock-based long-term awards may better align the interests of the DM with that of maximizing firm value because changes in firm performance are likely to directly impact their value.

From column (1) of panel B in Table 2, we find that short-term component of DM pay loads positively on *Division_ROA*. However, the loading of short-term component of DM pay on *Other-division_ROA* is statistically indistinguishable from zero. In columns (2) and (3), we repeat these tests after controlling for firm and industry-year fixed effects and obtain qualitatively similar results. In columns (4)–(6), we repeat these tests for long-term component of DM pay. Focusing on these columns, we find that the long-term component of DM pay loads positively on both *Division_ROA* and *Other-division_ROA* once we control for firm and industry-year fixed effects (columns (5) and (6)). Taken together, these results suggest that while firms use short-term awards to reward DMs for division performance, they use long-term stock and option grants to align the incentives of DMs with that of maximizing overall firm value.

6.1.2. Other Concerns and Robustness. We now discuss some potential concerns with our baseline tests and our approach at mitigating these concerns. If the number of stock and option grants is persistent through time (Shue and Townsend 2017), the firm's stock return may create a spurious positive correlation between DM pay and division profitability. An increase in division profitability may increase the firm's stock price, which in turn may increase the pay of DM. While on the one hand such an increase in pay may be just reward for the increase in division profitability, on the other hand, the positive correlation between pay and profitability may be unintended and not a result of externalities across divisions. To control for this, we first repeat our tests after controlling for stock returns in Table 3, column (1). We find that our results remain robust and that the coefficient estimates obtained from these tests are qualitatively similar to those reported in Table 2, panel A. Second, in column (2), we repeat our baseline tests after explicitly controlling for the rigidity of option grants. This variable is motivated by Shue and Townsend (2017). Since successive-year pay information is not available for a large number of the DMs in our sample, we construct this measure by focusing on the option grants to the CEO. We classify a DM-year as involving rigid grants, if the firm's CEO obtains the same number of option grants as the previous year. The idea is that persistence in the structure of DM and CEO pay should be similar, and thus if the firm's CEO obtains rigid grants, it is likely that the DM may also obtain rigid grants. We find that controlling for rigidity does not materially affect our results.

Apart from pay-for-performance incentives, firms may also employ promotion-based tournament incentives to motivate division managers (Kale et al. 2009). To the extent that performance-based compensation and promotion-based incentives are substitutes, firms may use promotion-based incentives when performance measures are noisy. Thus, the absence of pay for performance by itself does not imply weak incentives for the DM. To account for potentially confounding effects of tournament incentives on our estimates, we repeat all of our tests after explicitly controlling for such incentives measured as the natural logarithm of difference in total compensation received by the CEO and second-highest-paid C-suite executive within a firm (hereafter referred to as log(*Pay_gap*)) (Kale et al. 2009, Kini and Williams 2012). Since this potentially measures the reward from being promoted to CEO, it is commonly used as a proxy for promotion-based incentives.[10] Column (3) of Table 3 reports the results from these tests. We find that our results are qualitatively unchanged (the coefficient estimates are similar to those reported in Table 2). Furthermore, in columns (4) and (5), we split our sample into divisions in firms with above- and below-median values of log(*Pay_gap*) to analyze whether the relationship between DM pay and performance is different between the two subsamples. From the rows titled "Δ*Division_ROA*" and "Δ*Other-division_ROA*," we find that the coefficients are statistically indistinguishable between the two columns.

Note that the coefficient on *Other-division_ROA* is insignificant in both the high and low pay gap subsamples both because of small sample sizes (relative to the number of coefficients we estimate) and because our later tests show that pay for other division's performance is only significant if the other divisions are related to a manager's own division or if there are differences in investment opportunities. To the extent that the use of tournament incentives is not correlated with these characteristics, we may not obtain a significant relationship between DM pay and the performance of other divisions in the subsamples.

Summarizing, our evidence shows that DMs receive pay for both their own division's performance and the performance of the other divisions in the firm. This result is robust to controlling for stock returns, pay rigidity, and tournament incentives.

6.2. DM Pay for Performance and Relatedness of Divisions

In Table 4, we estimate how DM pay for performance varies with the degree of relatedness of the divisions

Table 3. DM Pay for Performance: Controlling for Option Grant Rigidity, Stock Return, and Tournament Incentives

	Full sample			High pay gap	Low pay gap
	(1)	(2)	(3)	(4)	(5)
Division_ROA	0.321***	0.336***	0.330***	0.458***	0.321***
	(0.087)	(0.088)	(0.089)	(0.095)	(0.109)
Other-division_ROA	0.220**	0.235***	0.234***	0.136	0.101
	(0.092)	(0.091)	(0.090)	(0.160)	(0.124)
Stock_return	0.028				
	(0.035)				
Grant_rigidity		0.067			
		(0.048)			
log(*Pay_gap*)			0.009*		
			(0.005)		
log(*Division_assets*)	0.110***	0.108***	0.108***	0.066***	0.075***
	(0.017)	(0.017)	(0.017)	(0.022)	(0.023)
log(*Total_assets*)	0.272***	0.270***	0.269***	0.263***	0.307***
	(0.058)	(0.058)	(0.058)	(0.026)	(0.036)
Constant	3.942***	3.938***	3.877***	3.835***	3.442***
	(0.428)	(0.415)	(0.416)	(0.228)	(0.189)
Year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	No	No
Industry × Year FE	Yes	Yes	Yes	No	No
Observations	4,056	4,080	4,080	2,072	2,008
R^2	0.846	0.846	0.847	0.491	0.407
Δ*Division_ROA*				0.136	
				(0.129)	
Δ*Other-division_ROA*				0.035	
				(0.197)	

Notes. This table reports the results of a panel data regression of DM compensation on division and other-division ROA. Specifically, we estimate the following panel regression model:

$$y_{ijt} = \alpha + \beta_1 \times Division\_ROA_{jt} + \beta_2 \times Other\text{-}division\_ROA_{it} + \beta_3 \times \log(Total\_assets)_{it} + \beta_4 \times \log(Division\_assets)_{jt} + \beta_5 Grant\_rigidity \text{ or } Stock\_return \text{or } \log(Pay\_gap) + \text{Time FE} + \text{Firm FE},$$

where the dependent variable y is *DM_compensation*. In columns (1), (2), and (3), we control for stock return, option grant rigidity, and natural logged pay gap, respectively. In column (4) (column (5)), we report the results for subsample of divisions in firms with log(*Pay_gap*) above (below) the median. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

in the firm. We classify divisions in firms with another division in the same three-digit SIC code industry as being related to the rest of the firm and estimate Equation (1) in the two subsamples of related (column (1)) and unrelated divisions (column (2)). Note that, in these tests, we not only estimate twice the number of coefficients as in our level tests but also have less than two to three observations per firm in each subsample. Given the persistence in executive pay for a given firm, we are unable to rely only on within-firm variation to estimate our coefficients. Hence, we do not include firm fixed effects in these tests. To this extent, our results derive from both within-firm and across-firm variation in the dependent and independent variables.

The evidence in columns (1) and (2) indicate that, consistent with the externality hypothesis and inconsistent with RPE, DM pay is positively related to other-division performance especially if the DM's division is related to the rest of the firm. The loading on *Other division_ROA* in column (1) is statistically significant at the 1% level, and the coefficient in column (2) is not statistically different from zero. From the row titled "Δ*Other-division_ROA*," we find that the coefficient on *Other-division_ROA* is significantly different between columns (1) and (2). In unreported tests, we find that our results are robust to defining relatedness at the two-digit SIC code level.

Table 4. DM Pay for Performance and Division Relatedness

Panel A: DM pay for performance and division relatedness

	Related	Not related	High complementarity	Low complementarity
	(1)	(2)	(3)	(4)
Division_ROA	0.256*	0.457***	0.423***	0.382**
	(0.134)	(0.100)	(0.107)	(0.149)
Other-division_ROA	0.600***	0.089	0.315***	−0.002
	(0.165)	(0.109)	(0.108)	(0.152)
log(*Division_assets*)	0.049	0.081***	0.053**	0.105***
	(0.038)	(0.021)	(0.026)	(0.029)
log(*Total_assets*)	0.379***	0.301***	0.340***	0.291***
	(0.041)	(0.025)	(0.031)	(0.029)
Constant	2.820***	3.460***	3.049***	3.659***
	(0.205)	(0.222)	(0.223)	(0.294)
Observations	662	3,418	2,010	1,998
R^2	0.617	0.491	0.484	0.546
Δ*Division_ROA*	−0.201		0.041	
	(0.164)		(0.183)	
Δ*Other-division_ROA*	0.511***		0.317*	
	(0.195)		(0.183)	

Panel B: Short-term vs. long-term pay and division relatedness

	Short-term pay				Long-term pay			
	Related	Not related	High complementarity	Low complementarity	Related	Not related	High complementarity	Low complementarity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Division_ROA	0.247***	0.336***	0.282***	0.353***	0.475**	0.705***	0.712***	0.591***
	(0.074)	(0.042)	(0.053)	(0.053)	(0.237)	(0.124)	(0.156)	(0.161)
Other-division_ROA	0.260**	0.027	0.128**	−0.011	1.062***	0.219*	0.456**	0.191
	(0.103)	(0.045)	(0.063)	(0.054)	(0.329)	(0.132)	(0.187)	(0.165)
log(*Division_assets*)	0.014	0.058***	0.023*	0.084***	0.131**	0.118***	0.107***	0.140***
	(0.020)	(0.010)	(0.013)	(0.012)	(0.064)	(0.029)	(0.038)	(0.038)
log(*Total_assets*)	0.222***	0.195***	0.216***	0.179***	0.535***	0.459***	0.501***	0.446***
	(0.022)	(0.011)	(0.014)	(0.013)	(0.069)	(0.031)	(0.041)	(0.040)
Constant	4.118***	4.021***	3.870***	4.183***	−0.463	0.392	−0.313	0.744*
	(0.435)	(0.102)	(0.149)	(0.126)	(1.395)	(0.299)	(0.441)	(0.384)
Observations	662	3,418	2,010	1,998	662	3,418	2,010	1,998
R^2	0.464	0.435	0.383	0.507	0.396	0.346	0.324	0.391
Δ*Division_ROA*	−0.089		−0.072		−0.231		0.121	
	(0.127)		(0.145)		(0.264)		(0.226)	
Δ*Other-division_ROA*	0.233**		0.239*		0.843**		0.265	
	(0.118)		(0.083)		(0.350)		(0.249)	

Notes. Panel A reports the results of a panel data regression of DM compensation on division and other-division ROA for the subsamples based on a segment's relatedness to other divisions. The specification is the same as that in Table 2, column (1); *y* is *DM_compensation*. In column (1) (column (2)), we report the results for a subsample of divisions with the number of other divisions in the firm in the same three-digit SIC code industry greater than (less than or equal to) 1, and in column (3) (column (4)), we report the results for a subsample of divisions in firms with the value of complementarity measure above (below) the median. Δ*Division_ROA*and Δ*Other-division_ROA*are the difference in coefficient estimates for the subsamples. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level. Panel B reports the results of a panel data regression of DM compensation on division and other-division ROA for the subsamples based on a segment's relatedness to other divisions. The specification is the same as that in Table 2, column (1); *y* is *Short-term_DM_compensation* in columns (1)–(4) and *Long-term_DM_compensation* in columns (5)–(8). In column (1) (column (2)), we report the results for a subsample of divisions with the number of other divisions in the firm in the same three-digit SIC code industry greater than (less than or equal to) 1, and in column (3) (column (4)), we report the results for a subsample of divisions in firms with the value of complementarity measure above (below) the median. The subsamples for columns (5)–(8) are defined analogously. Δ*Division_ROA*and Δ*Other-division_ROA*are the difference in coefficient estimates for the subsamples. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

An interesting aspect of our results is that the coefficient on *Other-division_ROA* is larger than the coefficient on *Division_ROA* in column (1). Accounting for the mean value of *Other-division_ROA* and *Division_ROA*, our results in column (1) imply that the DM obtains \$0.69 (\$0.86) higher total compensation for every \$1,000 increase in *Division_ROA* (*Other-division_ROA*). Thus, in firms with related divisions, DMs seem to obtain greater pay for other-division performance than their own-division performance. While surprising at first blush, this result is consistent with the predictions in Che and Yoo (2001), who show that such contracts are optimal in a setting where there exists greater synergy across divisions that repeatedly interact with one another.[11]

In columns (3) and (4), we use our second measure of relatedness. As mentioned before, we construct a firm-level measure of relatedness as the asset-weighted average level of relatedness of the nonprimary divisions of a conglomerate to its primary division. The results from columns (3) and (4) show that DM pay is significantly related to the performance of other divisions only in the firms with related divisions. From the row titled "Δ*Other-division_ROA*," we find that the coefficient on *Other-division_ROA* is significantly different between columns (3) and (4).

In panel B of Table 4, we seek to analyze whether firms with related divisions differ in terms of structuring the long-term and short-term components of DM pay. We find that both the short-term and long-term components of DM pay load positively on *Other-division_ROA* for related divisions (columns (1) and (5)). The coefficient estimates translate into a \$0.13 increase in short-term pay and \$0.88 increase in long-term pay for every \$1,000 increase in the profits of the other divisions. Thus, DM pay-for-performance sensitivity of short-term pay is almost 15% of that of the long-term pay for DMs of related divisions. Although the loading of long-term pay on other-division performance is significant (at the 10% level) even for the subsample of unrelated divisions (column (6)), the coefficient on *Other-division_ROA* in column (5) is five times that in column (6). Moreover, the coefficient estimates across the two subsamples are significantly different from one another for both short-term and long-term pay (see the row titled "Δ*Other-division_ROA*").

Note that the above analysis further alleviates the concern that the relationship between DM pay and other-division performance is possibly driven by multiyear stock or option grants. First, even the short-term (cash) component of DM pay loads positively on other-division ROA only for related divisions. Second, the sensitivity of long-term compensation to other-division performance is significantly different across related and unrelated divisions. It is not obvious why the persistence/rigidity in the number of stock or option grants should vary with division relatedness.[12]

Summarizing, our results in Table 4 are consistent with the externality hypothesis in that DMs obtain greater pay for other-division performance when their division is related to the other divisions in the firm.

6.3. Pay for Division and Firm Performance and Accounting Informativeness

In Table 5, we analyze the effect of accounting informativeness on the structure of DM pay. We use the volatility of earnings of firms in an industry as our first measure of accounting informativeness and divide our sample into divisions in industries with above and below median earnings volatility, and estimate Equation (1) in the two subsamples (columns (1) and (2)). The results indicate that, consistent with the risk hypothesis, DM pay for division performance is indeed

Table 5. DM Pay for Performance and Accounting Informativeness

	High earnings volatility	Low earnings volatility	High earnings coefficient	Low earnings coefficient
	(1)	(2)	(3)	(4)
Division_ROA	0.292***	0.613***	0.597***	0.269**
	(0.087)	(0.175)	(0.136)	(0.120)
Other-division_ROA	0.038	0.193*	0.092	0.197
	(0.112)	(0.111)	(0.126)	(0.143)
log(*Division_assets*)	0.064***	0.086***	0.064**	0.086***
	(0.023)	(0.028)	(0.029)	(0.024)
log(*Total_assets*)	0.362***	0.284***	0.294***	0.342***
	(0.031)	(0.025)	(0.029)	(0.030)
Constant	3.231***	3.433***	3.727***	2.748***
	(0.309)	(0.234)	(0.251)	(0.246)
Observations	1,923	1,963	1,935	1,963
R^2	0.542	0.516	0.501	0.532
Δ*Division_ROA*	−0.321*		0.328*	
	(0.186)		(0.185)	
Δ*Other-division_ROA*	−0.155		−0.105	
	(0.110)		(0.189)	

Notes. This table reports the results of a panel data regression of DM compensation on division and other-division ROA. The specification is the same as that in Table 2, column (1). In column (1) (column (2)), we report the results for a subsample of divisions in industries with earnings volatility above (below) the median, and in column (3) (column (4)), we report the results for a subsample of divisions in industries with earnings coefficient above (below) the median. Δ*Division_ROA*and Δ*Other-division_ROA*are the difference in coefficient estimates for the subsamples. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

lower (higher) for divisions in industries with high (low) earnings volatility. The DM pay for division performance in industries with more informative accounting profits is approximately twice that in industries with less informative accounting profits. Interestingly, we do not find any significant difference in pay for other-division performance across the two subsamples. From the row titled "Δ*Division_ROA*," we find that the coefficients on *Division_ROA* are significantly different across columns (1) and (2).

In the next two columns, we use the value relevance of accounting earnings as our measure of earnings informativeness, divide our sample into divisions in industries with above and below median earnings value relevance, and estimate Equation (1) within the two subsamples. Our results indicate that DM pay for division performance is greater for divisions in industries with more informative earnings. Here, again, the coefficient in column (3) is more than twice as large as that in column (4), and the difference is significant at the less than 10% level.

In summary, our results in Table 5 offer significant support for the risk hypothesis and highlight an important cost of conglomeration. Conglomerates with divisions in industries with less informative accounting profits offer lower pay for performance to the DM. To the extent that pay for performance is useful in providing incentives for the DM, this may be costly for the firm.[13]

6.4. DM Pay for Performance and Divisional Investment Opportunities

In Table 6, we estimate the effect of divisional investment opportunities on DM pay for performance. In columns (1) and (2), we split our sample into divisions in industries with above- and below-median industry market-to-book ratio and estimate DM pay for performance within the two subsamples.

Our results from columns (1) and (2) show that, consistent with the idea of encouraging capital flow from low-growth divisions to high-growth divisions, DMs of divisions in industries with a low market-to-book ratio do get significantly greater pay for other-division performance compared with DMs of divisions in industries with a high market-to-book ratio. In fact, we do not find any evidence of pay for other-division performance among divisions in industries with a high market-to-book ratio. We also find that the coefficient on *Other-division_ROA* is significantly different across the two subsamples. This result highlights that conglomerates design DM incentive contracts so that managers of divisions with low investment opportunities will care about the performance of divisions with better investment opportunities. This, in turn, may facilitate capital reallocation within the conglomerate.

In columns (3) and (4), we repeat our tests using past division sales growth as a measure of investment opportunities. Here, again, we find that pay for other-division performance is significantly higher in divisions with low past sales growth rates.

Table 6. DM Pay for Performance and Divisional Investment Opportunities

	High ind. MTB	Low ind. MTB	High sales growth	Low sales growth
	(1)	(2)	(3)	(4)
Division_ROA	0.307***	0.510***	0.689***	0.316***
	(0.116)	(0.131)	(0.139)	(0.118)
Other-division_ROA	0.007	0.261*	0.071	0.281**
	(0.103)	(0.158)	(0.146)	(0.116)
log(*Division_assets*)	0.093***	0.059**	0.111***	0.043*
	(0.024)	(0.025)	(0.029)	(0.024)
log(*Total_assets*)	0.343***	0.310***	0.295***	0.337***
	(0.032)	(0.027)	(0.032)	(0.027)
Constant	2.959***	3.379***	3.548***	3.173***
	(0.265)	(0.273)	(0.296)	(0.213)
Observations	1,896	1,965	1,761	1,788
R^2	0.539	0.516	0.532	0.512
Δ*Division_ROA*	−0.203		0.374**	
	(0.169)		(0.167)	
Δ*Other-division_ROA*	−0.254*		−0.210*	
	(0.151)		(0.120)	

Notes. This table reports the results of a panel data regression of DM compensation on division and other-division ROA for the subsamples based on segment growth potential. The specification is the same as that in Table 2, column (1); *y* is *DM_compensation*. In column (1) (column (2)), we report the results for a subsample of divisions in industries with *Ind._market-to-book* above (below) the median, and in column (3) (column (4)), we report the results for a subsample of divisions with sales growth above (below) the median. Δ*Division_ROA* and Δ*Other-division_ROA* are the difference in coefficient estimates for the subsamples. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

6.5. DM Pay for Performance and Industry Distress

Gopalan and Xie (2011) show that conglomerate divisions in distress have higher cash flows and R&D expenditure but similar levels of investments compared with single-division firms. The similar level of investments between distressed conglomerate divisions (despite having higher cash flows) and single-segment firms may be due to cash transfers out of the distressed division. The distressed division's manager can be incentivized to go along with such transfers by linking her pay to the performance of the nondistressed divisions. Alternatively, if the higher R&D investment in distressed conglomerate divisions is due to cash support from the nondistressed divisions, the DMs of these divisions can be made to support such transfers if

Table 7. DM Pay for Performance and Industry Condition

Panel A: DM pay for performance and industry condition

	Own distressed Other distressed	Own distressed Other nondistressed	Own nondistressed Other distressed	Own nondistressed Other nondistressed
	(1)	(2)	(3)	(4)
Division_ROA	0.005	0.186	0.697***	0.718***
	(0.106)	(0.261)	(0.203)	(0.117)
Other-division_ROA	−0.020	1.011**	−0.219*	0.396***
	(0.133)	(0.396)	(0.121)	(0.107)
log(*Division_assets*)	0.046	−0.014	0.189***	0.070***
	(0.034)	(0.074)	(0.039)	(0.021)
log(*Total_assets*)	0.376***	0.414***	0.224***	0.320***
	(0.041)	(0.080)	(0.042)	(0.025)
Constant	3.006***	3.836***	4.102***	3.341***
	(0.179)	(0.311)	(0.237)	(0.239)
Observations	666	186	534	2,475
R^2	0.580	0.532	0.559	0.499
Δ*Division_ROA*	−0.182		−0.021	
	(0.269)		(0.218)	
Δ*Other-division_ROA*	−1.031**		−0.615**	
	(0.218)		(0.513)	

their pay is linked to the performance of the distressed division.

To analyze the impact of financial distress on DM pay, we classify an industry at the three-digit SIC code level to be in distress if the median two-year stock return of all single segment firms is less than −30% (see Opler and Titman 1994 and Gopalan and Xie 2011). Formally, we estimate Equation (1) for the subsample of divisions in distressed and nondistressed industries.

Column (1) of Table 7 reports the results for the subsample of distressed divisions in firms in which at least one other division is also in distress, while column (2) reports the results for the subsample of distressed divisions in firms in which none of the other divisions are in distress. Likewise, in column (3) (column (4)), we report the results for subsample of nondistressed divisions in firms with at least one (no) distressed division.

The first result from our tests is lower pay for own-division performance during distress periods (columns (1) and (2)) compared with during nondistress periods (columns (3) and (4)). This is consistent with the large literature on asymmetric benchmarking in CEO compensation, which documents lower CEO pay for performance during industry downturns compared with during industry upturns (see Garvey and Milbourn 2003).

Focusing on columns (1) and (2), our results indicate greater pay for other-division performance for DMs of distressed divisions when none of the other divisions in the firm are in distress. This is consistent with the idea that DMs of distressed divisions are cross-subsidized in pay possibly to encourage them to transfer capital to nondistressed divisions.

From columns (3) and (4), we find that DMs of nondistressed divisions receive greater pay for other-division performance only when other divisions are not in distress. Thus, DMs of nondistressed divisions are not penalized for the poor performance of the distressed division.

In panel B of Table 7, we analyze whether pay-for-performance sensitivity of short-term and long-term components of DM pay varies with industry conditions. Consistent with the asymmetric benchmarking literature, we find that both short-term and long-term pay do not load on division performance during times of industry distress (columns (1) and (2)). Consistent with encouraging executives of distressed divisions to transfer capital to nondistressed divisions, we find that long-term component of DM pay is positively related to other-division performance when other divisions are not in distress (column (6)).

When we focus on executives of nondistressed divisions in firms with distressed other divisions, we find that both short-term and long-term pay load negatively on other-division performance, although the loading for long-term pay is not statistically significant. This again is inconsistent with pay for other-division performance being mechanically driven by pay rigidity. We find that pay for other-division performance systematically varies across divisions, consistent with the predictions of theory. Finally, we find that both short-term and long-term pay exhibit positive and statistically significant coefficients on own- and other-division performance only when none of the divisions within the firm are in distress.

Table 7. (Continued)

Panel B: Short-term vs. long-term pay and industry condition

	Short-term pay				Long-term pay			
	Own distressed Other distressed	Own distressed Other nondistressed	Own nondistressed Other distressed	Own nondistressed Other nondistressed	Own distressed Other distressed	Own distressed Other nondistressed	Own nondistressed Other distressed	Own nondistressed Other nondistressed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Division_ROA	0.030	0.194	0.333***	0.522***	0.041	0.177	1.448***	1.112***
	(0.090)	(0.144)	(0.124)	(0.100)	(0.208)	(0.507)	(0.461)	(0.207)
Other-division_ROA	0.021	0.138	−0.151*	0.173**	0.050	1.747**	−0.329	0.715***
	(0.072)	(0.246)	(0.088)	(0.079)	(0.428)	(0.811)	(0.275)	(0.245)
log(*Division_assets*)	0.050*	0.070*	0.089***	0.035**	0.130*	−0.013	0.378***	0.090**
	(0.026)	(0.040)	(0.028)	(0.016)	(0.073)	(0.140)	(0.075)	(0.040)
log(*Total_assets*)	0.185***	0.179***	0.182***	0.220***	0.465***	0.607***	0.237***	0.520***
	(0.031)	(0.049)	(0.032)	(0.023)	(0.083)	(0.159)	(0.081)	(0.044)
Constant	4.140***	4.853***	4.533***	3.966***	0.165	0.157	1.487***	0.009
	(0.145)	(0.261)	(0.203)	(0.183)	(0.332)	(0.988)	(0.516)	(0.523)
Observations	666	186	534	2,475	666	186	534	2,475
R^2	0.436	0.512	0.493	0.441	0.372	0.407	0.400	0.349
Δ*Division_ROA*	−0.164		−0.189		−0.137		0.335	
	(0.165)		(0.150)		(0.530)		(0.480)	
Δ*Other-division_ROA*	−0.1173		−0.323***		−1.697*		−1.044***	
	(0.246)		(0.112)		(0.871)		(0.360)	

Notes. Panel A reports the results of a panel data regression of DM compensation on division and other-division ROA for the subsamples based on industry conditions. The specification is the same as that in Table 2, column (1); *y* is *DM_compensation*. In columns (1) and (2), we focus on the managers of divisions that are in distressed industries. We then further split this sample into two, depending on whether another division in the firm is in distress (column (1)) or not (column (2)). Similarly, in columns (3) and (4), we focus on pay for performance of division managers of nondistressed divisions within a firm and again further split this sample into two, depending on whether another division in the firm is in distress (column (3)) or not (column (4)). Δ*Division_ROA*and Δ*Other-division_ROA* are the difference in coefficient estimates for the subsamples. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level. Panel B reports the results of a panel data regression of DM compensation on division and other-division ROA for the subsamples based on industry conditions. The specification is the same as that in Table 2, column (1); *y* is *Short-term_DM_compensation* in columns (1)–(4) and *Long-term_DM_compensation* in columns (5)–(8). In columns (1) and (2), we compare pay (short-term) for performance of division managers of divisions that are in distressed industries when another division in the firm is also in distress (column (1)) and when none of the other divisions in the firm are in distress (column (2)). Similarly, in columns (3) and (4), we focus on pay for performance of division managers of nondistressed divisions within a firm and again further split this sample into two depending on whether another division in the firm is in distress (column (3)) or not (column (4)). The subsamples for columns (5)–(8) are defined analogously. Δ*Division_ROA*and Δ*Other-division_ROA* are the difference in coefficient estimates for the subsamples. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Overall, the results in this section provide evidence consistent with the externality hypothesis.

6.6. DM Pay for Performance and Divisional Subsidy

In Table 8, we investigate the effect of divisional subsidy on DM pay for performance. To do this, in columns (1) and (2), we split our sample into divisions with above- and below-median value of *subsidy* and repeat our tests. We find greater pay for performance in divisions with fewer subsidies. This is consistent with pay and capital being substitute incentive mechanisms. Interestingly, we also find that there is significant pay for other-division performance only for divisions with low subsidy. This indicates that conglomerates link the pay of DMs of divisions with low subsidy to the performance of the other divisions so as to align their incentives with the whole firm. However, because of noise in our estimates, we find that the coefficient on *Other-division_ROA* is not significantly different between columns (1) and (2).

To better distinguish between divisions receiving and transferring capital, in unreported tests, we split our sample into divisions with negative (transferring capital) and positive subsidy (receiving capital) and

Table 8. DM Pay for Performance and Divisional Subsidy

	High subsidy	Low subsidy	Positive subsidy	Negative subsidy
	(1)	(2)	(3)	(4)
Division_ROA	0.146	0.658***	0.088	0.680***
	(0.119)	(0.152)	(0.120)	(0.152)
Other-division_ROA	0.135	0.295**	0.118	0.312**
	(0.197)	(0.134)	(0.197)	(0.131)
log(*Division_assets*)	0.066***	0.139***	0.075***	0.133***
	(0.023)	(0.028)	(0.025)	(0.027)
log(*Total_assets*)	0.313***	0.297***	0.309***	0.302***
	(0.026)	(0.032)	(0.027)	(0.031)
Constant	3.371***	3.553***	3.347***	3.492***
	(0.235)	(0.291)	(0.249)	(0.288)
Observations	1,702	1,728	1,623	1,807
R^2	0.494	0.548	0.499	0.553
Δ*Division_ROA*	−0.512***		−0.592**	
	(0.194)		(0.195)	
Δ*Other-division_ROA*	−0.160		(−0.194)	
	(0.239)		(0.239)	

Notes. This table reports the results of a panel data regression of DM compensation on division and other-division ROA for the subsamples based on segment investments. The specification is the same as that in Table 2, column (1); *y* is *DM_compensation*. In column (1) (column (2)), we report the results for a subsample of divisions with divisional subsidy above (below) the median, and in column (3) (column (4)), we report the results for a subsample of divisions with positive (negative) divisional subsidy. Δ*Division_ROA*and Δ*Other-division_ROA* are the difference in coefficient estimates for the subsamples. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

obtain results that are quantitatively and qualitatively similar to those reported in columns (1) and (2).

6.7. DM Pay for Performance and Corporate Governance

A higher pay for other-division performance, especially if asymmetric, could indicate rent extraction by the DM (Bebchuk and Fried 2004). To distinguish the optimal contracting explanation from the rent extraction explanation, in Table 9, we analyze how DM pay-for-performance varies with the quality of corporate governance in the firm. In columns (1) and (2), we use *Institutional_holding* as a measure of governance, divide our sample into firms with above- and below-median value of *Institutional_holding*, and repeat our tests. As mentioned before, we expect firms with higher institutional ownership to have stronger governance. We find that firms with higher *Institutional_holding* offer greater pay for other-division performance. This is inconsistent with pay for other-division performance, implying rent extraction by the manager. Furthermore, from the row titled "Δ*Other-division_ROA*," we find that the coefficient on *Other-division_ROA* is significantly different across the two columns. In unreported tests, we repeat our estimation based on proportion of shares held by all institutions and obtain similar results to those reported.

In columns (3) and (4), we divide our sample into firms with above- and below-median value of *E-index* and again find greater pay for other-division performance among DMs in firms with a lower *E-index*. Note that a higher value of *E-index* indicates a firm with weaker corporate governance. However, from the row titled "Δ*Other-division_ROA*," we find that the coefficients are not significantly different between the two columns.

In columns (5) and (6), we divide our sample into firms with above and below median value of *G-index* and again find greater pay for other-division performance among DMs in firms with lower *G-index*. This again is inconsistent with the rent extraction story.

7. Conclusion

In this paper, we use a large sample of division manager incentive contracts to document the structure of DM pay and the extent to which it varies with division performance and across firms. The unique aspect of our paper is our ability to combine DM pay data with the performance of both her division and the other divisions in the firm. This allows us, for the first time, to our knowledge, in the literature, to measure the extent of pay for performance for DMs.

DMs obtain significant pay for their own division's performance. A $1,000 increase in the profits of a DM's division is associated with a $0.84 increase in DM pay. The sensitivity of DM pay to divisional performance is decreasing in the precision of the performance measure. This highlights an important cost of conglomeration. DMs of divisions with fewer investment opportunities obtain greater pay for other-division performance. Along similar lines, we find that DMs of distressed divisions receive greater pay for other-division performance when other divisions are not in distress. This is likely to align their interest with the rest of the firm and enable the firm to shift capital toward the other divisions.

Consistent with the idea of encouraging DMs to cooperate and exploit potential synergies from working together, we find that DMs of divisions that are related to other divisions obtain greater pay for other-division performance. DM pay is more sensitive to the performance of the other divisions in firms with stronger corporate governance.

Overall, our analysis sheds light on the role of DM compensation contracts in helping mitigate agency conflicts in conglomerates, and it also highlights some of the constraints on the contracting environment.

Table 9. DM Pay for Performance and Corporate Governance

	High Inst. own	Low Inst. own	Low *E*-index	High *E*-index	Low *G*-index	High *G*-index
	(1)	(2)	(3)	(4)	(5)	(6)
Division_ROA	0.392***	0.442***	0.468***	0.336**	0.283**	0.541***
	(0.084)	(0.140)	(0.145)	(0.146)	(0.117)	(0.161)
Other-division_ROA	0.410***	0.030	0.299*	0.097	0.269**	0.044
	(0.108)	(0.128)	(0.171)	(0.179)	(0.128)	(0.188)
log(*Division_assets*)	0.095***	0.055*	0.060**	0.084***	0.089***	0.070**
	(0.022)	(0.029)	(0.029)	(0.032)	(0.026)	(0.034)
log(*Total_assets*)	0.291***	0.334***	0.323***	0.321***	0.310***	0.328***
	(0.024)	(0.035)	(0.034)	(0.042)	(0.029)	(0.045)
Constant	4.071***	3.181***	4.558***	3.075***	3.218***	3.300***
	(0.310)	(0.214)	(0.175)	(0.274)	(0.426)	(0.276)
Observations	2,032	2,048	1,159	1,716	1,650	1,498
R^2	0.529	0.502	0.607	0.438	0.571	0.456
Δ*Division_ROA*	−0.050		−0.132		−0.258	
	(0.160)		(206)		(0.198)	
Δ*Other-division_ROA*	0.380**		0.202		(0.225)	
	(0.164)		(0.247)		(0.227)	

Notes. This table reports the results of a panel data regression of DM compensation on division and other-division ROA for the subsamples based on corporate governance indices and institutional ownership. The specification is the same as that in Table 2, column (1); *y* is *DM_compensation*. Δ*Division_ROA* and Δ*Other-division_ROA* are the difference in coefficient estimates for the subsamples. All variables are defined in detail in the appendix. The data cover the period 1992–2009. The compensation data are from ExecuComp, segment-level financial data are from the Compustat business segment files, and firm-level data are from the Compustat industrial annual files. The standard errors are robust to heteroscedasticity and clustered at the firm level.

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Acknowledgments

The authors thank department editor Amit Seru, an anonymous associate editor, two anonymous referees, José-Miguel Gaspar, Gerry Hoberg, Jayant Kale, Gordon Phillips, Chip Ryan, and Peter Swan; seminar participants at the Olin Business School, the University of Arkansas, and the University of Missouri–St. Louis; and attendees at the 2014 European Finance Association Conference and the 2014 Summer Research Conference at the Indian School of Business for helpful comments.

Appendix. Variable Definitions

- *Age*: Refers to the age of an executive in our sample.
- *Bonus*: The dollar value of bonus earned by an executive in a fiscal year.
- *Complementarity*: A firm-level measure of overlap in the final consumers of goods produced by primary and secondary divisions of a firm, where primary division is defined as the division with largest asset base.
- *Distress*: A dummy variable that takes the value 1 during a year if the median two-year stock return of all single segment firms in that division's three-digit SIC industry is less than −30%.
- *Division_capital_expenditure*: The ratio of division's capital expenditure over total assets of the division. This is estimated using variables *capx* and *at* from Compustat historical segment files as *capx/at*.
- *Division_ROA*: The ratio of division's operating profits over total assets of the division. This variable is winsorized at the 1% level to mitigate the effect of outliers. This is estimated using variables *ops* and *at* from Compustat historical segment files as *ops*/*at*.
- *Division_sales_growth*: Percentage annual change in division sales. This is estimated using the variable *sale* from Compustat historical segment files as (*sale-lag* · *sale*)/*sale*.
- *Earnings_coefficient*: The coefficient estimate obtained from linear regression of stock returns on change in ROA for all stand-alone firms in the division's three-digit SIC industry.
- *Earnings_coefficient_indicator*: A firm-level dummy variable that takes the value 1 for conglomerates with above-median value of asset-weighted average *earnings coefficient* of the conglomerate segments.
- *Earnings_volatility*: The standard deviation of operating income after depreciation of all stand-alone firms in the division's three-digit SIC industry. This is estimated using variables from Compustat fundamentals annual files as the standard deviation of *oiadp*/*at*.
- *Earnings_volatility_indicator*: A firm-level dummy variable that takes the value 1 for conglomerates with above-median value of asset-weighted average *earnings volatility* of the conglomerate segments.
- *Grant_rigidity*: Following Shue and Townsend (2017), we classify a DM-year as involving rigid grants, if the firm's CEO obtains the same number of option grants as the previous year.
- *High_complementarity*: A dummy variable that identifies firms with above-median *complementarity*.
- *High_E-index*: A dummy variable that identifies firms with above-median value of *E*-index (Bebchuk et al. 2009) in our sample.

- *High_earnings_vol*: Dummy variable that takes the value 1 for divisions in industries with above-median *Earnings_volatility*.
- *High_earnings_coeff*: Dummy variable that takes the value 1 for divisions in industries with above-median *Earnings_coefficient*.
- *High_G-index*: A dummy variable that identifies firms with above-median value of *G*-index (Gompers et al. 2003) in our sample.
- *High_Ind._MTB*: Dummy variable that takes the value 1 for divisions in industries with above-median *Ind. market-to-book*. The market-to-book ratio is estimated using variables from Compustat fundamentals annual files as $(csho \times prcc_f)/ceq$.
- *High_Institutional_ownership*: A dummy variable that identifies firm-years with above-median *Institutional_ownership* in our sample.
- *High_sales_growth*: Dummy variable that takes the value 1 for divisions with above-median *Division_sales_growth*.
- *High_Subsidy*: A dummy variable that identifies divisions with the value of subsidy (computed using the procedure outlined in Billett and Mauer 2003) above the sample median.
- *Industry_Earnings_volatility_indicator*: A firm-level dummy variable that takes the value 1 for conglomerates with above-median value of asset-weighted average earnings volatility of the conglomerate segments.
- *Ind._market-to-book*: The median industry market-to-book of all stand-alone firms in the division's three-digit SIC code industry during the year.
- *Institutional_holding*: The proportion of a firm's common stock held by the 10 largest institutional shareholders of the firm.
- *Institutional_ownership*: Total proportion of shares outstanding held by the 10 institutional investors with the largest holding of the firm's shares.
- log(*Division_assets*): Natural log of the value of total assets of the division. This is estimated using the variable *at* from Compustat historical segment files as $\log(1+at)$.
- log(*Pay_gap*): Natural log of the difference in total compensation received by the CEO and second-highest-paid C-suite executive within a firm.
- log(*Total_assets*): Natural log of the value of total assets of the conglomerate. This is estimated using the variable *at* from the Compustat fundamentals annual file as $\log(1+at)$.
- *LTIP*: The amount paid out to an executive under the firm's long-term incentive plan.
- *Other-division_capital_expenditure*: For each division of the firm we calculate the ratio of sum total of capital expenditure of all other divisions in the firm to sum total of *Total_assets* of all other divisions.
- *Other-division_sales_growth*: Percentage annual change in sum total of sales of all other divisions within the firm. This is estimated using the variable sale from Compustat historical segment files.
- *Other-division_ROA*: For each division of the firm we calculate the ratio of sum total of *Division_ROA* of all other divisions in the firm to sum total of *Total_assets* of all other divisions. This variable is winsorized at the 1% level to mitigate the effect of outliers.
- *Positive_Subsidy*: A dummy variable that identifies divisions that receive subsidies (computed using the procedure outlined in Billett and Mauer 2003).
- *Related*: A dummy variable that takes the value 1 if the number of other divisions in the same three-digit SIC code industry is greater than 1.
- *Salary*: The dollar value of base salary earned by an executive in a fiscal year.
- *Stock_grants*: The dollar value of restricted stocks granted to an executive in a fiscal year.
- *Stock_option_grants*: The aggregate dollar value of restricted stock options granted to an executive in a fiscal year as valued using Standard & Poor's Black–Scholes methodology.
- *Total_compensation*: It is the sum of annual salary, bonus, present value of stock awards, present value of stock option awards, other annual compensation, long-term incentive payouts, and other cash payouts. *Short-term_compensation* is defined as the sum of salary and bonus, while *Long-term_compensation* is the sum-total value of option grants, restricted stock grants, and other long-term incentive payouts.

Endnotes

[1] Aggarwal and Samwick (2003) also estimate DM pay for performance. We discuss their paper in greater detail in Section 2.

[2] Available at the Bureau of Economic Analysis website (http://www.bea.gov/industry/io_benchmark.htm, accessed June 2011).

[3] When we jointly estimate the effect of growth opportunities and the extent of relatedness on the DM's pay for performance, we find greater pay for other-division performance among related divisions with more growth opportunities. This is consistent with the predictions of Anctil and Dutta (1999), who argue that DMs of divisions that are investing and expanding fast may have a greater ability to affect the performance of other divisions, especially if they are related.

[4] The lower sensitivity of DM pay to the performance of her division during periods of industry distress is also consistent with the asymmetric benchmarking of CEO pay as shown in Garvey and Milbourn (2003), and also with performance measures being less informative during times of distress.

[5] We are unable to further condition this test to periods when a division's industry is in distress because of a lack of a sufficient number of observations.

[6] Han et al. (2009) analyze the role of tournament incentives and capital allocation in conglomerates and argue that when promotion decisions are based on divisional performance, career concerns may lead the DMs to shift resources from their most efficient use toward riskier activities.

[7] The summary statistics on which this claim is based are not reported in the paper for the sake of brevity. However, the same is reported in the Internet appendix.

[8] Accounting quality likely varies across firms within an industry. Moreover, a firm may know more about the true accounting quality of its divisions. However, in the absence of data on firm's internal assessment of the accounting quality of its divisions, we must rely on industry-level measures of accounting quality. We acknowledge that our proxies are at best noisy measures of the accounting quality of a division.

[9] Furthermore, to ensure that multicollinearity between *Division_ROA* and *Other-division_ROA* is not clouding our inferences, we estimate the variance inflation factor (VIF), which measures the increase in variance of estimated coefficient due to collinearity. The

VIF in our sample is 1.08, which is considered small. According to the standard rule of thumb (see O'brien 2007), a VIF of greater than 10 is considered a cause for concern. Further in our sample, the lowest eigenvalue is 0.422, and the condition number based on eigenvalues is 2.082. An eigenvalue close to 0 or a very high condition number—say, greater than 30—implies a high degree of linear dependency between the two variables.

[10] There is some controversy about the use of *Pay_gap* as a measure of tournament incentives. Masulis and Zhang (2013) argues that the compensation gap between the CEO and other C-suite executives may reflect productivity differentials, while Bebchuk et al. (2011) argues that it is a measure of the CEO's ability to extract rents.

[11] Che and Yoo (2001) show that the optimal compensation contract in such a setting entails a lower pay for individual performance and greater pay for collective performance (what they call "joint performance evaluation"). This is sustained by a credible Nash threat where a DM punishes other DMs for shirking by shirking herself, resulting in lower compensation for all DMs. Such a threat is only credible in a repeated game setting—that is, when there is a long-term relationship between divisions.

[12] In unreported tests, we do not find any significant difference in the extent of rigidity in CEO pay across firms with related and unrelated divisions.

[13] In tests reported in the Internet appendix, we examine the implication of interaction between the risk and externality hypotheses for DM pay. Specifically, we analyze whether DM pay loads more heavily on other, related-division performance if that division's performance is a more precise signal of managerial effort. Consistent with this idea, we find that DM pay is more sensitive to other, related-division ROA when the other division has low volatility relative to the DM's division. Please refer to the Internet appendix for a detailed discussion of these results.

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