

Francis, Bill; Hasan, Iftekhar; Mani, Sureshbabu; Ye, Pengfei

Working Paper

Relative peer quality and firm performance

Bank of Finland Research Discussion Papers, No. 6/2016

Provided in Cooperation with:

Bank of Finland, Helsinki

Suggested Citation: Francis, Bill; Hasan, Iftekhar; Mani, Sureshbabu; Ye, Pengfei (2016) : Relative peer quality and firm performance, Bank of Finland Research Discussion Papers, No. 6/2016, ISBN 978-952-323-101-6, Bank of Finland, Helsinki,
<https://nbn-resolving.de/urn:nbn:fi:bof-201604121080>

This Version is available at:

<https://hdl.handle.net/10419/212344>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Bill Francis - Iftekhar Hasan - Sureshbabu Mani -
Pengfei Ye

Relative Peer Quality and Firm Performance



Bank of Finland Research
Discussion Paper
6 • 2016

Relative Peer Quality and Firm Performance¹

Bill Francis
Iftekhar Hasan
Sureshbabu Mani
Pengfei Ye²

Abstract

This study examines the performance impact of the relative quality of a CEO's compensation peers (peers selected to determine a CEO's overall compensation) and bonus peers (peers selected to determine a CEO's relative-performance-based bonus). We use the fraction of peers with greater managerial ability scores (Demerjian, Lev, and McVay, 2012) than the reporting firm to measure this CEO's relative peer quality (RPQ). We find that firms with higher RPQ tend to earn superior risk-adjusted stock returns and experience higher profitability growth compared with firms that have lower RPQ. These results cannot be fully explained by a CEO's power, compensation level, intrinsic talent, nor by the board's possible motivation to use peers to signal a firm's prospect. Learning among peers and the increased incentive to work harder induced by the peer-based tournament, however, might contribute to RPQ's positive performance effect. Preliminary evidence also shows that high RPQ is not associated with increased earnings management or increased risk-taking behaviors.

Key Words: Relative Peer Quality, Firm Performance, Tournament, Optimal Contract

JEL Classification: G30

(Forthcoming in Journal of Financial Economics)

¹ We thank Bill Schwert (the editor), an anonymous referee, Tod Perry, and seminar participants at the 2013 FMA meeting and Fordham University for helpful comments and discussions.

² Bill Francis is with Lally School of Management, Rensselaer Polytechnic Institute. His email is francb@rpi.edu. His phone number is (518)-276-3908. Iftekhar Hasan is with Gabelli School of Business, Fordham University and Bank of Finland, Helsinki. His email is ihasan@fordham.edu. His phone number is (646)-312-8278. Suresh Mani is with Ernst Young. His email is sureshbmani.85@gmail.com. His phone number is (518) 495-7201. Pengfei Ye, the corresponding author, is with Pamplin College of Business, Virginia Tech. His phone number is (540) 231-2202. His email is pve@vt.edu.

1. Introduction

Peer firms are an important component of the incentive system in addressing managerial agency problems. Peers' compensation can be viewed as the incumbent CEOs' opportunity cost and therefore offers an useful estimate of the prevailing price of management talent in the executive labor market (Holmstrom and Kaplan, 2003; Bizjak, Lemmon, and Naveen, 2008; Albuquerque, De Franco, and Verdi, 2013). In addition, peers can also be used to better measure CEO performance because of their ability to filter out the common shocks in firm performance that are beyond a CEO's control (Holmstrom, 1979, 1982; Prendergast, 1999).

In this paper, we identify a new dimension of peers—their managerial ability relative to that of the firm that has chosen them as peers (we call this firm the reporting firm)—and investigate the extent to which relative peer quality affects firm performance. Relative peer quality matters because CEOs are constantly evaluated on a relative basis against their peers, either implicitly by the executive labor market for potential new employment opportunities, or explicitly by the board for performance-based bonus decisions (Lazear and Rosen, 1981; Nalebuff and Stiglitz, 1983). A group of relatively strong peers could affect firm performance in two ways. First, with a sufficiently high prize, CEOs can be motivated by these peers to increase their work efforts, thereby improving firm performance. Second, CEOs can also learn from these peers. A CEO could benefit more from following a group of peers that on average are skilled. Using a sample of S&P 1500 firms from 2006 through 2010, we find that firms with higher relative peer quality perform significantly better than those with lower relative peer quality.

In determining a CEO's compensation contract, a firm's compensation committee can adopt two types of peers: *compensation peers* and/or *bonus peers*. Compensation peers are those peer companies used for setting a CEO's overall compensation. Most compensation peers are

potential employers of the incumbent CEO (Albuquerque, et al., 2013). From this perspective, these companies' CEOs can also be viewed as the potential competitors of the reporting CEO in the executive labor market.³ On the other hand, bonus peers are used exclusively to determine performance-based awards.⁴ Most S&P 1500 firms report a distinct set of compensation peers, whereas relatively few also report a set of bonus peers.⁵

A priori, the relative quality of both types of peers could affect firm performance, albeit through different channels. The relative quality of compensation peers affects firm performance through the executive labor market competition/tournament (Fama, 1980; Lazear and Rosen, 1981; Holmstrom, 1999), whereas the effect of bonus peers operates through the internal award-setting process. A CEO facing a group of competitive compensation peers must exert more effort than otherwise in order to increase his or her chance of retaining the executive job or winning the job market tournament. A similar logic applies to bonus peers, because a CEO's performance-based rewards are partially determined by his or her peers' performance.

In addition, as mentioned previously, the relative quality of both types of peers can affect firm performance through a learning effect. Recent studies find that many firms mimic other firms' policies (see, for example, Ozoguz and Rebello, 2013; Foucault and Fresard, 2014; Leary

³ For example, Colgate Palmolive's 2006 proxy statement stated that "the comparison group is selected to represent the market for executive talent in which the company has historically competed." In its 2007 proxy statement, Dell Inc. stated that "the peer group for evaluating pay for the executive officers is based on those companies with which we compete for talents." H.J. Heinz stated in its 2007 proxy statement that "One of the primary objectives of our compensation programs is to provide target compensation at the median of the companies within the compensation peer group. The MDCC believes this practice is appropriate because...Heinz directly competes with these companies to recruit executive talent. By targeting NEO compensation to the compensation practices and levels of the Compensation Peer Group, we enhance our ability to attract and retain a highly skilled and motivated executive leadership team, which is fundamental to our growth and delivery of value to shareholders."

⁴ Relative performance based awards can be cash based (such as annual bonus and long-term incentive payout), equity plan based (such as performance shares, restricted stock, and stock options), or a combination of both. The performance metrics used for relative performance evaluation include stock returns, return on equity, earnings growth, earnings, and sales growth. See Gong, Li, and Shin (2011) for more details. This study uses bonus and awards interchangeably.

⁵ Specifically, about 63% of S&P 1500 firms report well-defined compensation peers from 2006 through 2010. Of them, about 15% also report bonus peers. Please refer to Section 3 for more details on sample construction.

and Roberts, 2014; Kaustia and Rantala, 2015). This learning effect could occur between reporting firms and their peers as well, because these peers are the reference firms by which CEOs are evaluated. Scharfstein and Stein (1990) show that when CEOs know they are evaluated relative to peers, they have strong incentives to follow what their peers do (see also Bikhchandani, Hirshleifer, and Welch, 1998). To the extent that following a peer group that is overall more skilled than otherwise is beneficial, relative peer quality could also affect firm performance through this “herding” learning channel.

Using peer data hand-collected from the SEC’s EDGAR database, for each reporting firm we construct a *relative peer quality index (RPQ)* that measures the fraction of peers (either compensation or bonus peers) that have higher managerial ability scores (Demerjian, Lev, and McVay, 2012) than the reporting CEO at the time of peer selection (beginning of the fiscal year). RPQ is always between zero and one. The overall mean RPQ for both types of peers in this study is close to 0.5, indicating that sample firms, on average, do not systematically pick relatively weak peers in terms of quality as captured by the managerial ability. A firm’s RPQ is related to a number of firm characteristics. For instance, we find that high RPQ firms have a slightly lower growth potential than low RPQ firms, suggesting that some boards could use relatively high-quality peers to motivate its CEO when the firm has low growth potential. High RPQ firms also have slightly more independent directors and higher institutional ownership concentration than low RPQ firms. We directly control for these firm characteristics in our regression analysis.

In multivariate regression analysis, we find that compensation peers’ relative quality has a positive and significant impact on firm performance. For example, in our baseline analysis, a one standard deviation increase in compensation peer-based RPQ is associated with a 1.80% increase in the Daniel, Grinblatt, Titman, and Wermers (DGTW, 1997) characteristic-adjusted

returns for the same fiscal year in which the peers are chosen, even after we control for a CEO's compensation, intrinsic talent, and the possible governance effect. In addition, a one standard deviation increase in compensation peer-based RPQ is associated with a 0.3% improvement in a firm's operating performance measured by the industry-adjusted return on assets (ROA) after we control for various firm and CEO characteristics. These results are robust to alternative definitions of RPQ and remain essentially unchanged under alternative model specifications.

The effect of bonus peers' relative quality on firm performance, however, is mixed and more often than not insignificant. It is nonetheless worth noting that the reporting of bonus peers is much less clear than that of compensation peers. Our analysis includes only firms that explicitly report bonus peers, which constitute only 15% of sample firms. Anecdotal evidence shows, however, that many firms use other companies as benchmarks in deciding their CEOs' performance-based awards, yet not explicitly report them as "bonus peers".⁶ This practice also partially explains the puzzle of why firms adopting bonus peers are much fewer than perceived (Ferri, 2009). For this reason, we are cautious in drawing conclusive remarks regarding the *actual* performance effect of bonus peers in this study and inclined to view our analysis of bonus peers as explorative.⁷

We recognize that both compensation and bonus peers are not randomly selected. For example, a board could select a group of more-skilled peers to signal a CEO's intrinsic ability.

⁶ Specifically, some firms seem to use compensation peers for both setting compensation and deciding performance-based rewards, but not reporting the use of bonus peers. For example, in Allegheny Technologies Inc.'s 2010 proxy statement, its compensation committee stated that "the committee's intention is... for total compensation for the named officers to be at approximately the midpoint of peer group compensations, if actual company performance is at the midpoint of actual peer group performance." Barnes Group Inc.'s 2007 proxy statement stated "For 2007, the compensation committee established the performance targets in December 2006 based on a review of our short-term and long-term performance compared to the (compensation) peer group." In Advance Auto Parts Inc.'s 2007 proxy statement, the company stated "We intend to set total direct compensation levels, defined as the combined value of annual and long-term compensation, based on the Company's relative performance compared to this peer group."

⁷ We look forward to continuing to work on this important topic in future once we have better data to identify those firms that use but do not explicitly report the use of bonus peers.

To address this concern, we explicitly control for CEO's intrinsic talent inferred from his or her compensation. It is also likely that a board could select a group of more-skilled peers to convey its positive expectation about a firm's future performance. This signaling mechanism can also generate a positive relation between RPQ and firm performance. We adopt three approaches to examine this alternative explanation. First, we use either a firm's past operating performance or financial analysts' forecast as a proxy for board expectation and directly control for this effect. Second, we exploit the heterogeneity in board quality. In particular, we focus on those firms that either have the busiest directors (Fich and Shivdasani, 2006), or the most captured directors (co-opted directors) (Coles, Daniel and Naveen, 2014). Presumably, these firms' directors are less likely to select peers purely based on the rational signaling motivation. We examine whether RPQ continues to be relevant among these firms and obtain confirming results. In the third approach, which is motivated by Kale, Reis, and Venkateswaran (2009), we use industry-level RPQ as an instrumental variable and perform a two-stage least-squares (2SLS) analysis. This method allows us to effectively deal with signaling concern as well as other possible endogeneity problems that cannot be resolved by the previous two approaches. Results remain consistent.

In the latter part of the paper, we examine the economic channels through which RPQ affects firm performance. Consistent with the learning hypothesis, we find that reporting firms' financial policies (measured by market leverage) and investment policies (measured by capital expenditures) are significantly influenced by their peers. This effect cannot be fully explained by peers' characteristics and is different from the industry peer effect documented by MacKay and Phillips (2005) and Leary and Roberts (2014). Furthermore, we find that reporting firms are influenced by both relatively high- and low-ability peers, suggesting that the learning effect associated with RPQ is likely achieved through imitating the "average peers," as predicted by

Scharfstein and Stein's (1990) herding theory. Their study shows that managers tend to follow what their peers do when they are evaluated relative to their peers.

The finding that firms are influenced by their peers does not necessarily rule out the incentive effect associated with peers. Management can follow their peers in areas that they are not strongest, but work harder in other areas that they have an edge. To examine the underlying incentive mechanism that links RPQ to firm performance, we distinguish two types of firms: firms whose CEOs will receive substantial compensation increase if they win the ranking-based tournament and firms whose CEOs' potential prizes from winning such a tournament are relatively small. The incentive mechanism suggests that RPQ's performance effect should be more pronounced for the first group. We use the difference between a CEO's current total compensation and the highest total compensation of his or her compensation peers as a measure of the potential prize in the labor market tournament. Consistent with our conjecture, we find that the positive effect of RPQ on firm performance is much stronger among those CEOs that have the most to gain from winning the tournament.

We also explore two possible negative effects that high RPQ could induce. First, we investigate whether high RPQ encourages CEOs to significantly increase their risk-taking level. This is motivated by the literature that shows the tournament setting could distort a CEO's incentive to take risk (Brown, Harlow, and Starks, 1996; Chevalier and Ellison, 1997). We use Brown et al.'s (1996) methodology to identify a firm's risk shifting but find that CEOs of high- and low-RPQ firms are equally likely to increase the firm risk level, regardless of whether they face high or low prizes. In other words, RPQ is not associated with increased risk-taking behavior. Second, we examine whether high RPQ motivates a CEO to increase earnings management activities. We find no results in support of this conjecture.

Finally, we examine whether the performance effect of RPQ depends on the peers' general quality level. We posit that generally high-quality peers could have two opposing effects. On one hand, they could induce a more positive learning effect. On the other, they could create a disincentive effect because it is more difficult and less likely for a CEO to beat them. As a result, the interaction between relative and general peer quality is essentially an empirical question. Our results are mixed. RPQ's effect on stock performance is unaffected by peers' general quality. Its effect on operating performance, however, is less positive when peers' general quality is very high, suggesting that for some firms, the negative disincentive effect of peers with very high general quality could more than offset their positive learning effect.

This paper contributes to both the compensation literature and the optimal incentive contract literature. Although the role of peers in pay setting has received much attention, their role in motivating management remains largely unexamined. As far as we know, this study is the first to highlight the relative quality dimension of compensation peers and show its implication for firm performance. Furthermore, most existing studies on peers' incentive effect focus mainly on hypothetical peers such as industry peers or peers with similar firm characteristics (see, for example, Abowd and Kaplan, 1999; Aggarwal and Samwick, 1999; and Albuquerque, 2009). Using actual compensation peers to highlight the potential incentive effect of the executive labor market, this study provides direct evidence supporting an important idea introduced by Fama (1980) and Lazear and Rosen (1981) and extended by Holmstrom and Kaplan (2003) that the executive job market plays an important role in addressing CEOs' agency problems. Finally, this paper also reveals an important interaction between firms and their compensation/bonus peers, contributing to the growing literature of peer effects (Foucault and Fresard, 2014; Leary and

Roberts, 2014; Kaustia and Rantala, 2015). Overall, this study provides valuable insights as how peers can be used in designing optimal incentive contracts.

The rest of the paper is organized as follows. Section 2 discusses the institutional background of the peer selection process. Section 3 describes the sample selection and the construction of the relative peer quality index. Section 4 examines the relation between RPQ and firm performance. Section 5 addresses the alternative explanations and endogeneity concern. Section 6 reports results of robustness checks. Section 7 examines channels through which RPQ affects firm performance. Section 8 concludes.

2. Institutional background

CEO compensation, including both the overall level and the performance-dependent bonus plan, is in principle the responsibility of the board of directors' compensation committee. In determining a CEO's and other senior executives' compensation, the committee reviews the firm's financial and operating performance, other firms' compensation practices, the competitiveness of the executive labor market, and its retention and motivation objectives for the CEO. The compensation committee must follow not only the guidelines agreed upon by the board but also those stipulated by the Securities and Exchange Commission and the stock exchange to which it belongs.⁸ It is quite common for a compensation committee to work on these complicated and sensitive issues with the aid of external compensation consultants (Cadman, Carter and Hillegeist, 2010; Murphy and Sandino, 2010).

⁸ According to the *Compensation Committee Guide* (Page 5, Wachtell, Lipton, Rosen, and Katz, 2013), the NYSE requires a compensation committee to "(a) review and approve goals and objectives relevant to chief executive officer ("CEO") compensation; (b) evaluate the CEO's performance in light of such goals and objectives; (c) either as a committee or together with the other independent directors determine and approve the CEO's compensation based upon such evaluation."

The committee usually adopts two types of peers in designing a CEO's compensation. The first is the compensation peer, introduced mainly to infer the competitive market price of executive talent and the compensation practices within that market. Additionally, some firms also adopt a set of peers to determine a CEO's bonus, conditional on his or her performance relative to these peers. These bonus peers could be the same as the compensation peers, or a subset of the compensation peers, or consist of firms very different from the compensation peers.

Peer selection, for both compensation and bonus peers, occurs *at the beginning of each fiscal year*. For example, a firm with its fiscal year ending in December 2008 would typically have selected its peers during the first 90 days of 2008 (Faulkender and Yang, 2010). Public disclosure of the peer selection, however, always occurs after the fiscal year ends. This timing gap between selection and disclosure considerably limits the investment value of our findings because any strategy exploiting these results must be based on peer quality information at the beginning of a fiscal year.

In principle, a CEO is not involved in setting his or her own pay, including the peer selection process. Many studies, however, including Faulkender et al. (2010, 2013), Bizjak, Lemmon, and Nguyen (2011), Gong, Li, and Shin (2011), and Morse, Nanda and Seru (2011), contend that a CEO's rent extraction consideration could affect the pay-setting process. As argued by these studies, powerful CEOs can impose their own interests on the peer choice. In this study, we address this issue by directly controlling for CEO power in our empirical analysis.

3. Sample and variable construction

3.1. Data sources and sample

Since 2006, the SEC has required all public firms to disclose in their proxy statements the peer group(s) that they use to either set managerial compensation (compensation peers) or evaluate management's relative performance (bonus peers), as long as the use of a peer group is material. Peer information can be found in the Compensation Discussion and Analysis (CD&A) section of a firm's proxy statement (DEF 14A filing).

We start our data collection by identifying all firms belonging to the S&P 1500 at the end of 2010. We retrieve these firms' proxy statements from the SEC's EDGAR database for the 2006–2010 period. We eliminate 436 firm-years either because we cannot locate their proxy statements or because their 2006 fiscal year ended prior to the SEC's mandated disclosure date of December 15, 2006. Of the remaining 7,064 firm-years whose proxy statements are available, we further exclude 161 firm-years that explicitly state that they do not use a peer group in pay setting and another 1,521 firm-years that either have a very broadly defined compensation peer group or do not explicitly state the peers' names. Finally, we require firms to have at least three peers that have complete accounting and stock price information and a managerial ability score constructed by Demerjian, Lev, and McVay (DLM) (2012). This ensures that each sample firm has a meaningful measure of relative peer quality. The final sample contains 3,694 firm-years.⁹

The reporting of bonus peers for deciding relative performance-based awards (bonus) is much less widespread. Gong et al. (2011) find that in 2006, among all S&P 1500 firms only 361 explicitly reported bonus peers. This phenomenon is also borne out by our sample. Of 3,694

⁹ The final data yield rate of our sample is about 50% ($3,694/[5 \times 1500]$)—close to the 53% ($800/1500$) reported by Bizjak et al. (2011), whose sample covers only the 2005–2006 period, and higher than 46% ($2,066/[900 \times 5]$) reported by Faulkender et al. (2013), whose sample excludes the financial services industry. Our sample is very close to Albuquerque et al. (2013), whose sample contains 2,836 firm-year observations of S&P 1500 firms for the 2006–2008 period. In an unreported robustness check, we also exclude financial firms. Our results are essentially unchanged. We further conduct a two-stage Heckman selection-bias analysis to examine whether our sampling requirements accidentally cause any systematic selection bias that can further affect our main empirical analysis. The results, not reported but available upon request, do not support any presence of selection bias.

firm-years, only 567 (15%) of them explicitly state that they use bonus peers. Our analysis of bonus peers focuses on firms that have identifiable bonus peers.

For both the reporting firms and their peer companies, we obtain their financial ratios, market value and stock returns from the Compustat and CRSP databases; their management attributes, managerial ownership, and board characteristics from RiskMetrics; their institutional ownership-related variables from the 13F files compiled by Thompson Reuters; and their executive compensation-related variables from ExecuComp.

3.2. The peers

The data collection process resulted in 84,138 distinct compensation peer-years. Among them, 65,754 peer-years can be matched with the Compustat and CRSP datasets and have information regarding their executives' managerial ability score. Among all sample firms that report bonus peers, we obtain 15,723 bonus peer-years. Of these, 9,231 peer-years can be matched with the Compustat and CRSP databases and have managerial ability score information.

Panel A of Table 1 reports the number of peers per firm. On average, a sample firm has 17.80 compensation peers, with the median being 16. Both are comparable to those reported by Faulkender et al. (2010), Bizjak et al. (2011), and Albuquerque et al. (2013). The bonus peer group has a similar size, with a mean of 16.28 and a median of 15, slightly greater than those reported by Gong et al. (2011) whose sample covers only the year 2006. Panel A also shows that with the exception of 2006, the peer group size is relatively stable throughout the sample period.

Panel B reports the degree of similarity between peer companies and their reporting firms in terms of industry, size, B/M and past performance. With regard to industry, depending on the industry classification, about half of the compensation peers are from the same industry as their

reporting firms. In particular, 56.61% (64.85%, 45.43%) of compensation peers share the same two-digit SIC code (Fama–French 30-industry classification system (1997), Hoberg and Phillips fixed industry classification (FIC 100) (2010a, 2010b)¹⁰) as their reporting firms. With regard to size, on average, 48.65% of the compensation peers belong to the same market capitalization quintile as their reporting firms. On the other hand, the percentage of compensation peers that come from the same quintiles of B/M, characteristic-adjusted returns, and industry-adjusted ROA are relatively low, revealing a large variation in B/M and performance among peers.

For bonus peers, the industry to which they belong plays a much more prominent role in peer selection. Specifically, 71.06% (75.23%, 57.66%) of bonus peers are from the same two-digit SIC (FF30, FIC100) industry classification, all significantly higher than their compensation peers. Size plays an equally important role. Specifically, 53.98% of them are from the same market cap quintile. These results are consistent with the notion that peers used to determine performance-based rewards should share common fundamentals with the reporting firms (as in Albuquerque, 2009). Finally, we find that the percentage of bonus peers from the same B/M quintile or stock return quintile is relatively higher than that of compensation peers as well. The percentage of bonus peers from the same industry-adjusted ROA quintile as that of the reporting firm, however, is slightly lower than that of compensation peers.

3.3. The relative peer quality (RPQ) index

We use the managerial ability score developed by Demerjian, Lev, and McVay (2012) to measure a firm's management quality.¹¹ Demerjian et al. (2012) use the data envelopment

¹⁰ Fixed industry classification (FIC) codes are available till year 2008. We assume that firms' FIC codes remain the same as those of 2008 for years 2009 and 2010.

¹¹ We thank Dr. Demerjian for gracefully making the managerial ability scores available online at <https://community.bus.emory.edu/personal/PDEMERJ/Pages/Download-Data.aspx>. We also use other variables such

analysis (DEA) to generate a total firm efficiency score that captures both firm- and manager-specific efficiency factors. They then regress the total firm efficiency score on various firm characteristics such as size, market share, cash availability, life cycle, operational complexity, and foreign operations to separate out the firm-specific efficiency factors from the total firm efficiency score. The resulting residual, the total firm efficiency unexplained by the firm characteristics, is attributed to managerial ability. Demerjian et al. show that this managerial ability measure is closely related to other commonly used managerial ability proxies such as manager fixed effects, price reactions to CEO turnover announcements, and subsequent performance of CEOs' new appointments. Demerjian, Lev, Lewis, and McVay (2013) further find that managerial ability score is positively associated with earnings quality.

We rank both a reporting firm and its peer companies by their executives' managerial ability score of *previous year* and assign a value of zero to the firm that has the lowest managerial ability score and the value N to the firm that has the highest, assuming a reporting firm has N peers.¹² The *relative peer quality index (RPQ)* of reporting firm i at the beginning of fiscal year t can be formally defined as follows:

$$RPQ_{i,t} = 1 - \frac{Rank_i(DLM\ Managerial\ Ability\ Score_{j,t-1}; j = 0, 1, \dots, N_{i,t})}{N_{i,t}} \quad (1)$$

$Rank_i$ returns the rank value of reporting firm i among its peers in ascending order. $N_{i,t}$ is the number of peer companies that i has for year t . Consider that firm i has 10 peers; if 8 of them have higher managerial ability scores than this firm, then firm i 's RPQ is 0.8.

as industry-adjusted firm performance, or CEO fixed effects inferred from CEO's total compensation, to construct RPQ, our results remain qualitatively similar. Please see Section 6 for more discussions on alternative RPQs.

¹² The use of the prior one year data is not crucial to our findings. Our results are robust to the use of past one to three years' managerial ability scores to construct RPQ. Please also see the discussion in Section 6.1.

RPQ reports the fraction of peers that have higher managerial ability scores than the reporting firm. By construction, it is always between zero and one. The higher the index, the more high-ability peer executives a reporting firm faces. For a firm with half of its peers having higher managerial ability scores and another half having lower ones, RPQ would be 0.5. We define such a case as the neutral position, because it indicates an impartial attitude towards peers' relative quality. Any firm with an RPQ greater than 0.5 can be qualitatively defined as having high RPQ, whereas any firm with an RPQ less than 0.5 can be defined as having low RPQ.

3.4. Summary statistics of RPQ

Panel A of Table 2 reports the summary statistics for RPQs of compensation peers and bonus peers. The results can be summarized as follows. First, the mean (median) RPQ index of the compensation peers is 0.50 (0.50), whereas that of the bonus peers is 0.51 (0.50). Both are close to 0.5, indicating that there are as many firms that choose weak peers as those that choose strong ones. In contrast with the rent extraction hypothesis of Gong et al. (2011), these results do not support the conjecture that a typical S&P 1500 firm picks weaker peers, which would predict a mean or median RPQ significantly below 0.5. Second, the RPQ of the compensation peers is relatively stable throughout the sample period. That of the bonus peers, however, is less so, ranging from 0.50 in 2008 to 0.54 in 2006.

Panel B of Table 2 reports the correlation between compensation peer-based RPQ and bonus peer-based RPQ, among those firms that explicitly report both types of peers. The coefficient of correlation is 0.92 and statistically significant, indicating that if a firm reports both types of peers, the quality of these peers tends to be similar.

3.5. RPQ and selected firm characteristics

To further understand the nature of RPQ, we divide sample firms into two groups: high- and low-RPQ firms. A firm is said to be a high- (low-) RPQ firm if its RPQ is greater than (less than or equal to) 0.5. We focus on a number of selected firm and CEO characteristics in this investigation. Panel C of Table 2 reports the results.

Motivated by Leary et al. (2014), we first examine whether firms with higher RPQs are more likely to be followers with a strong motivation to learn from other peers. To this end, we choose to examine each group's size (market capitalization, total assets), Tobin's Q (growth potential), firm performance, R&D activities, and leverage. We find that both high- and low-RPQ firms have comparable firm size. On the other hand, the mean Tobin's Q of high RPQ firms is lower than that of low RPQ ones, revealing that a board could choose relatively high-quality peers to motivate its CEO when the firm has low growth prospects. Consistent with this result, we also find that firms with high RPQ on average have lower characteristic-adjusted returns, lower industry-adjusted ROA of prior year, and lower $\Delta Adj.ROA_{t-1}$. In our following regression analysis, we control for both growth potential and prior firm performance metrics. We find no significant differences in R&D and financial leverage between high- and low-RPQ firms.

Next, we examine a number of CEO attributes such as age, managerial talent, and CEO total compensation between these two groups. We find that both groups' CEOs have comparable ages around 55 years old. In addition to the *DLM* managerial ability score, we also follow Graham, Li, and Qiu (2012) to use the procedure of Abowd, Kramarz, and Margolis (1999) (AKM) to construct each CEO's intrinsic managerial talent (*Intrinsic_Talent*).¹³ CEOs of high-

¹³ Please see Section 5.1 for more detail on how we construct AKM *CEO_Talent*. We use Demerjian, Lev, and McVay's (DLM) managerial ability score, instead of the AKM managerial talent measure to construct RPQ, mainly because the DLM measure is available for most peer companies. The AKM measure is available only for companies

RPQ firms have a slightly higher AKM *Intrinsic Talent* measure than those of low-RPQ firms. One possible explanation is that some boards select relatively stronger peers to convey a CEO's unobservable managerial talent. The result, however, is inconclusive—as both groups' DLM managerial ability scores are quite close to each other. In addition, we also find that both high- and low-RPQ firms have similar CEO compensation. In the following empirical analysis, we directly control for both CEO talent and CEO compensation.

Bizjak et al. (2011), Morse et al. (2011), and Faulkender et al. (2013) find that powerful CEOs are able to influence peer selection. We therefore examine to what extent CEO power is related to RPQ. We use the dummy *CEO_Chairperson* that indicates whether the CEO is the chairperson as a proxy for CEO power (Adams, Almeida, and Ferreira, 2005; Morse et al., 2011). We find that both high- and low-RPQ firms have comparable percentages of powerful CEOs. In addition, we also examine a number of board and ownership characteristics including board size, the percentage of independent board members, managerial ownership, and institutional ownership level and concentration. We find that high-RPQ firms tend to have more independent boards and more-concentrated institutional ownership than low-RPQ firms. High-RPQ firms also have slightly bigger boards. Finally, both groups of firms have similar management and institutional ownership. The relations between the bonus peer-based RPQ and various firm, CEO, and governance characteristics are largely similar to the results of compensation peer-based RPQs. For brevity, we do not repeat them.¹⁴ Again, in the empirical analysis that follows, we directly control for these governance-related variables.

covered by ExecuComp. Although all reporting firms are from the S&P 1500, a great number of their peer companies are not covered by ExecuComp.

¹⁴ Two exceptions are worth noting. First, firms with high bonus peer-based RPQ seem to pay slightly less to their CEOs than firms with low bonus peer-based RPQ. Second, firms with high bonus peer-based RPQ have higher institutional ownership. Once again, we control for these issues in our regressions.

4. Relative peer quality and firm performance

4.1. Relative peer quality and stock performance

To understand how relative quality of peers affects a firm's stock price performance, we examine the following pooled ordinary least squares (OLS) regression:

$$Adj.Ret_{i,t} = \beta_0 + \beta_1 RPQ_{i,t} + \delta Controls_{i,t-1} + Year \& Ind. Fixed Effects + \varepsilon_{i,t} \quad (2)$$

The dependent variable *Adj.Ret* is the DGTW (Daniel, Grinblatt, Titman, and Wermers, 1997) characteristic-adjusted annual stock return of the fiscal year *t* in which peers are used.¹⁵ The key independent variable, RPQ, is determined at the beginning of the fiscal year *t* and has been explained in Section 3.3.

Table 3 reports the results. Columns (1) through (6) focus on the RPQ of the compensation peers. The sample includes all firms that report at least three compensation peers with available DLM managerial ability score. Column (1) includes only RPQ and year and industry fixed effects. A one standard deviation increase in compensation peer-based RPQ is associated with a 2.10% (0.07×0.30) increase in a firm's annual characteristic-adjusted stock returns. In Column (2), following the literature (for example, Loh and Stulz, 2011), we add Log(Market Cap), Log(B/M), previous year's return volatility (Ret Volatility), and previous year's stock return (Ret Momentum), along with various CEO characteristics such as CEO age, tenure, whether the CEO is also the board chair, and various governance characteristics including

¹⁵ The DGTW adjustment is one of the most accepted approaches to measure long-run firm-specific returns. It accounts for the size, value, and momentum factors and controls for the cross-sectional variation of stock returns linked to these risk factors. The DGTW method subtracts from each stock return the return of a portfolio of firms matched on market capitalization, market-book ratio, and prior one-year return quintiles. Daniel et al. sorted all stocks into quintiles based on their market equity at the end of June. The breakpoints for this sort are based on NYSE firms only. Then, firms within each size quintile are further sorted into quintiles based on their industry-adjusted book-to-market ratio. The firms in each of the 25 size/BM portfolios are further sorted into quintiles based on their preceding 12-month returns (from the previous June to this May). These 125 portfolios are rebalanced at the beginning of each July. In an unreported robustness check, we also use the raw annual return or industry-adjusted annual returns as the dependent variable. The results remain qualitatively similar and are available upon request.

board size, percentage of external directors (*Indp Directors*), managerial ownership (*Mgmt Ownership*), institutional ownership (*Inst. Ownership*), and concentration of institutional ownership (*IO Concentration*) as controls to form our baseline model. Detailed definitions of these variables can be found in the Appendix. After adding these variables, the coefficient of RPQ remains significant, indicating that relative peer quality contains additional explanatory power beyond stock characteristics, CEO characteristics, and corporate governance characteristics.

In Column (3), we include two compensation-related variables: the natural logarithm of total compensation of the reporting firm CEO (*Log(Total Pay)*) and equity-based compensation as a percentage of total compensation (*Equity Pay Percent*) to control for the possible confounding compensation effect. Specifically, it could be the high compensation per se, instead of the peer quality that either attracts high-quality CEOs or encourages CEOs to work harder to keep their jobs. This conjecture, however, is not supported by Column (3). After including these pay related variables, we find that RPQ remains positive and significant. For ease of exposition, we discuss the results shown in Columns (4) through (6) in Section 5.

Columns (7) through (12) of Table 3 contain all sample firms that report at least three bonus peers with sufficient information for analysis. The RPQ used in these analyses are defined on the bonus peers as well. The model specifications are the same as those for the compensation peers. The sample size of this analysis, however, shrinks significantly because very few firms report bonus peers. Column (7) includes bonus peers' RPQ and year and industry fixed effects, whereas Column (8) represents the baseline specification that includes various firm/CEO/governance characteristics. Column (9) further adds two CEO compensation-related

variables as controls. In each specification, however, we find the relation between the bonus peers' RPQ and the characteristic-adjusted stock returns is statistically insignificant.

Before we are tempted to suggest that bonus peers could be less effective than compensation peers in terms of improving firm performance, we must consider two facts. First, on average, a CEO's (ex post) (cash) bonus accounts for approximately 20% of his or her total compensation.¹⁶ The presence of bonus in total compensation therefore is significant enough to make a CEO to pay attention to bonus peers if they exist. Second, the analysis of bonus peers includes only firms that disclose bonus peers in their proxy statements. As discussed earlier, many firms could use other companies to form benchmarks to determine relative-performance based awards, but not explicitly report them as "bonus peers" (see also footnote 5). The small sample used in this analysis thus might understate the actual effect of bonus peers. Because of this, we are inclined to view the analysis of bonus peers in this study as more explorative than conclusive.¹⁷

4.2. Relative peer quality and operating performance

If a group of relatively skilled peers can motivate a reporting firm's CEO to increase effort and therefore performance, we should further observe an empirical link between relative peer quality and an improvement in the firm's operating performance. To test this, we run the following pooled regression:

$$\Delta Adj.ROA_{i,t} = \beta_0 + \beta_1 RPQ_{i,t} + \gamma Controls_{i,t-1} + Year \& Ind. Fixed Effects + \varepsilon_{i,t} \quad (3)$$

¹⁶ This is based on the ratio of bonus to TDC1. The bonus used in this calculation is based on the items BONUS & LTIP in ExecuComp prior to 2006, and on the items BONUS & NONEQ_INCENT (Non- Equity Incentive Plan) from 2006 on. It is worth noting that the percentage of actual performance-based compensation in a CEO's total compensation can be higher because this ratio excludes other non-cash performance-based awards such as long-term incentive plan or stock awards.

¹⁷ On the other hand, compensation peers do not suffer from this data problem because all firms must report their compensation peers as long as the use of a peer group is material.

The dependent variable $\Delta Adj.ROA_t$ is the difference in reporting firm i 's industry median-adjusted ROA ($Adj.ROA$) between year t and year $t - 1$. We focus on the change in operating performance, instead of the level for two reasons. First, it parallels our previous analysis examining stock returns, which reflects changes in equity prices. Second, and more importantly, it is more in line with our research objective of testing whether exposure to a group of relatively more capable peers can motivate or help a CEO to *improve* his or her performance.

Following the literature (for example, Larcker, So and Wang, 2013), we include the natural logarithm of market capitalization, natural logarithm of total assets, previous year's stock return (*Ret Momentum*), Tobin's Q , the change in $Adj.ROA$ in the previous year, financial leverage, R&D ratio, and the natural logarithm of firm age at the end of the previous year as baseline control variables. This baseline specification also includes CEO and governance characteristics discussed in Section 4.1 to control for potential CEO/governance effects.

Results are reported in Table 4. Columns (1) through (6) focus on firms that report at least three compensation peers with DLM managerial ability score. Column (1) includes only the RPQ and year and industry fixed effects. The estimated coefficient of RPQ is 0.02, statistically significant. A one standard deviation increase in compensation peer-based RPQ is associated with a 0.60% (0.02×0.30) improvement in $Adj.ROA$. Column (2) contains our baseline regression, which includes RPQ and various financial/CEO/governance controls. The sign and significance of RPQ remain unchanged, although its magnitude decreases to 0.01. In Column (3), we add CEO's total compensation and equity pay as a percentage of total pay to the regression. The results remain unchanged. As before, for ease of exposition and clarity of the discussion, we postpone discussing results of Columns (4) through (6) until Section 5.

Columns (7) through (12) focus on firms that report bonus peers. Consistent with results of compensation peer-based RPQ, Columns (7) through (9) show a significantly positive relation between bonus peer-based RPQ and improvement in firm operating performance. For brevity, we do not repeat them in detail. In addition, please refer to the following section for the discussion of results in Columns (10) through (12).

5. Addressing alternative explanations and possible endogeneity concern¹⁸

5.1. Relative peer quality as a signal for CEO's managerial talent

The univariate analysis in Section 3.5 shows that high-RPQ firms tend to have CEOs with slightly higher intrinsic talent. Such a result could occur if the board uses peer quality to signal a CEO's intrinsic talent. This subsection thus examine whether our previous results merely reflect CEO's intrinsic talent.

In particular, we follow Graham, Li, and Qiu (2012) and Albuquerque et al. (2013) to use the Abowd, Kramarz, and Margolis (1999) approach to extract the implied CEO intrinsic talent from their market-based compensation. Unlike Bertrand and Schoar's (2003) approach that relies on CEO turnover, the AKM method exploits the group connection to identify manager fixed effects and applies to both moving and non-moving CEOs. We use the population of ExecuComp from 1993 to 2005 to estimate the out-of-sample measure of CEO fixed effects, which we denote *Intrinsic_Talent*. We restrict our estimation to this period so that the fixed-effects estimation precedes our sample period. It is worth noting that this estimation excludes any CEOs that appeared in the ExecuComp database after 2005.

We add *Intrinsic_Talent* to our baseline model of stock performance and report the results in Column (4) (for compensation peers) and Column (10) (for bonus peers) of Table 3.

¹⁸ We thank the referee for helping us significantly improve this discussion.

We also add this variable to the baseline model of operating performance and report the results in the corresponding columns of Table 4. After directly controlling for the CEO's intrinsic talent, the relation between RPQ and stock performance (or operating performance) remains unchanged. That is, to the extent that our proxy for talent is unbiased, our findings cannot be fully explained by the board's tendency to choose stronger peers for stronger CEOs.

5.2. *RPQ as a signal for future firm performance*

It is likely that a board selects relatively stronger peers at the beginning of the fiscal year when it anticipates better future performance. In other words, the board could use peer selection as a way to convey its view regarding a firm's future performance. As long as the board's anticipation is unbiased, it can induce a positive relation between RPQ and firm performance.

To address this concern, we adopt multiple approaches. First, we use either the reporting firm's past operating performance (ROA_{t-1}) or the financial analysts' forecasted ROA¹⁹ as a proxy for a board's expected firm performance and directly control for it in our analysis. In this analysis, we further include firm fixed-effects to account for the time-constant firm unobservables. The compensation peer-based RPQ remains significantly and positively associated with reporting firms' stock performance after including past operating performance ROA_{t-1} (Column (5) of Table 3) or forecasted ROA (Column (6) of Table 3). Its relation with operating performance, however, weakens slightly (significant at the 10% level) when we include the ROA_{t-1} as control (see Column (5) of Table 4), but remains strong when we use the financial analysts' forecast as a proxy for board performance anticipation (see Column (6) of

¹⁹ We calculate forecasted ROA by dividing financial analysts' forecasted EPS (obtained from I/B/E/S) by the total assets per share of the current year.

Table 4). For bonus peer-based RPQ, its relation with firm performance continue to be insignificant (see Columns (11) and (12) of Tables 3 and 4).

The second approach exploits the heterogeneity in board quality. In particular, we focus on reporting firms with captured boards, such as those with a majority of directors appointed after the CEO (co-opted directors) (Coles, Daniel and Naveen, 2014), and on reporting firms with less attentive boards, such as those with many busy directors (Fich and Shivdasani, 2006).²⁰ Presumably, such boards are less likely to select peers purely based on rational signaling motivation, as they are more likely to be affected by non-signaling factors such as increased CEOs' influences or reduced attention available for the boards that they serve. Reporting firms with these boards thus allow us to identify a possible "performance effect" of relative peer quality beyond the rational "signaling" effect.

A reporting firm is said to have a co-opted board if its ratio of co-opted directors is above the sample median. It is said a busy board if its ratio of busy directors is above the sample median.²¹ We repeat our baseline analysis for both firms with co-opted boards and firms with busy boards and report the results in Table 5. For both types of firms, we find that the coefficients of compensation peer-based RPQ are positive and significant. To the extent that selection of peers by these boards is less likely to reflect the rational signaling motivation, these results provide supplementary evidence supporting the idea that RPQ's performance effect cannot be fully explained by a board's signaling motivation.

5.3. Two-stage regression with instrumental variable

²⁰ Results remain consistent if we use other board characteristics such as board independence to partition the sample.

²¹ A director is co-opted if he or she is appointed after the CEO. A director is busy if the number of directorships he or she holds is above the sample median. Results remain unchanged if we define a busy (co-opted) board as one whose ratio of busy (co-opted) directors is in the top sample tercile.

In this section, we explicitly treat RPQ as endogenous and perform a two-stage least-squares analysis. For identification, we use the median RPQ of a two-digit SIC industry (*Median SIC2 RPQ*) as our instrumental variable. This approach is motivated by Kale, Reis, and Venkateswaran (2009), who show that the industry-level incentive is related to a firm's incentive but unrelated per se to that firm's industry-adjusted performance.

Table 6 presents the results of the 2SLS estimation. Panel A analyzes stock performance and Panel B, operating performance. In each panel, the compensation peer-based RPQ is investigated in Columns (1) and (2), and the bonus peer-based RPQ in Columns (3) and (4). Because the bonus peers' results remain insignificant, we focus here mainly on compensation peers. In each panel, Column (1) reports the results of the first-stage regression. The coefficient of *Median SIC2 RPQ* is positive and statistically significant, confirming that this instrumental variable satisfies the relevance condition. Column (2) reports the results of the second-stage regression. The instrumented compensation peer-based RPQ continues to be significantly and positively related to the DGTW characteristic-adjusted stock returns (Panel A) and to the change in operating performance (Panel B). Additional statistics further reject the null hypothesis that our model is either under-identified (Kleibergen–Paap rk LM statistic) or has a weak instrument (Cragg–Donald Wald F statistic). Because we use only one instrumental variable, our analysis does not have the over-identification problem.

6. Robustness checks

We conduct two sets of robustness checks. The first set examines whether our results are robust to alternative definitions of relative peer quality. The second examines whether our results

hold under alternative model specifications and sample selections. All results are reported in Table 7, in which Panel A (B) is on stock performance (operating performance).

6.1. Alternative measures of RPQ

The first alternative RPQ is a dummy *High_RPQ* that equals one if a firm's RPQ is greater than 0.5 and zero otherwise. Results for compensation peers using this alternative RPQ are reported in Column (1) of each panel, and results for bonus peers are reported in Column (4) of each panel. They are largely consistent with our baseline findings.

The second alternative RPQ, *RPQ_3Y*, is constructed based on the average managerial ability score of previous three years. The results using *RPQ_3Y* are reported in Column (2) of each panel for the compensation peers and in Column (5) of each panel for the bonus peers. Once again, they remain similar to our baseline results. In un-tabulated tests, we also define RPQ on two-year average managerial ability scores and find results unchanged.

The third alternative measure, *Residual RPQ*, is constructed as the residual item of a pooled regression in which we regress the original RPQ on the industry-adjusted ROA_{t-1} . This treatment allows us to effectively remove any possible confounding effect of a firm's previous performance on our tests, because RPQ seems to be related to a firm's past operating performance (see Table 2). We report the results using the residual RPQ in Columns (3) and (6) for compensation and bonus peers, respectively, in each panel of Table 7. They once again remain consistent with our baseline findings.

Finally, we also use various performance measures such as the raw *ROA*, raw *ROE*, *industry-adjusted ROA*, and *industry-adjusted ROE* of the previous year to rank peers and construct alternative RPQs. We also consider an alternative RPQ based on the actual difference

between a reporting firm's managerial ability score and its peer group's mean or median managerial ability score. Unlike the rank-based RPQ, this alternative measure highlights the magnitude of difference between a sample firm and its peers. Our results remain qualitatively unchanged under each variation.

6.2. Other robustness checks

In the second set of robustness checks, we first examine whether our results hold under alternative model specifications of Core, Holthausen, and Larcker (1999) and Albuquerque et al. (2013). These studies use unadjusted returns to measure stock performance and unadjusted ROA to measure a firm's operating performance. We follow their model specifications and repeat our analysis. The results (not reported for brevity) are consistent with our baseline findings. We also use industry-adjusted returns instead of the DGTW-adjusted returns to measure stock performance. The results remain unchanged.

We recognize that among all sample firms that report compensation peers, some report a distinct group of bonus peers, others report a group of bonus peers identical to their compensation peers, and most remaining do not report bonus peers at all. To examine whether our results are robust to firms' peer reporting policies, we also include various dummy variables indicating such firms in our analysis. The main findings remain unchanged. Finally, we confirm that our results hold after we exclude financial firms (SIC codes 6000–6999) or the 2008–09 crisis period from our sample.²²

7. Mechanisms through which RPQ affects firm performance

²² All unreported results of our robustness checks are available upon request.

This section examines possible mechanisms through which the relative quality of peers affects a firm's performance. We first examine the learning channel and then the incentive channel. We also examine whether RPQ distorts a CEO's incentive to take risk or encourages managers to practice earnings management. Finally, we discuss the role of peers' general quality in firm performance.

7.1. Evidence on the peer-related learning effect

A firm might follow what its peers do, which could further influence its performance. To test this idea, we examine the investment and financial decisions of reporting firms and their peers. We use a firm's capital expenditures scaled by total assets (CAPEX) to measure its investment policy and the market-based leverage ratio (MLEVERAGE) to measure a firm's financial policy.²³ The model specification for this test mainly follows Leary et al. (2014) and includes the following firm characteristics as controls: Log (Sales), market-to-book ratio, ROA (EBITDA/Assets), and tangibility (Net PPE/Assets), all lagged one year. Similar to Leary and Roberts (2014), we control for both the reporting firm's characteristics as well as their peers' characteristics. The key independent variable of this test is the peer-level policy variable (either CAPEX or MLEVERAGE) for the years in which they were chosen as peers. They are constructed using the average value of all peer firms' (either compensation or bonus peers) corresponding policy variables.

Results are reported in Table 8. Panel A focuses on firm investment policy and Panel B on financial policy. For each panel, Columns (1) through (5) focus on the learning effect from compensation peers and Columns (6) through (10) on the learning effect from bonus peers. Column (1) of Panel A (B) shows that the investment (financial) policies of reporting firms are

²³ Results using the change in market-based leverage are similar and are available upon request.

significantly influenced by their compensation peers' policies. Column (6) of each panel shows a similar peer effect between reporting firms and their bonus peers.

Although consistent with the learning effect, these results are subject to other interpretations. For example, the documented correlation could arise from the similarity between a reporting firm and its peers. To address this concern, we focus on those companies that are a reporting firm's previous year's peers but are not peers in the current year. Considering that these dropped peer companies do not change significantly from year $t - 1$ to t , any evidence showing that they lose their influence on a reporting firm once being removed from the peer group offers additional support for the learning effect among peers. The results, reported in Columns (2) and (7) of each panel in Table 8, confirm this conjecture. None of reporting firms' policy variables are significantly related to those dropped peers' policy variables.

About half of the compensation or bonus peers are from the same industry (see Table 1). This fact suggests that the peer effect could simply reflect the industry effect documented by Leary et al. (2014). To remove the confounding industry effect, we exclude for each reporting firm all of its peers that share the same 3-digit SIC industry classification.²⁴ The results are reported in Column (3) (for compensation peers) and Column (8) (for bonus peers) in each panel of Table 8. We find that a reporting firm's corporate policies continue to be affected by their compensation peers from different industries. The policies of bonus peers from a different industry, however, have no significant influence on their reporting firms.

Finally, we examine whether reporting firms distinguish peers with higher managerial ability scores from those with lower managerial ability scores. For each reporting firm, we identify a group of "*High-Ability Peers*" whose DLM managerial ability scores are above the

²⁴ We define industry in this analysis by SIC3 to be consistent with Leary and Roberts (2014). The results, however, remain qualitatively similar if we use SIC2 industry classification.

reporting firm's, and a group of "*Low-Ability Peers*" whose DLM managerial ability scores are below the reporting firm's. We repeat our analysis for each sub-group. Column (4) (Column (9)) of Table 8 reports the results of the high-ability compensation (bonus) peers. Column (5) (Column (10)) reports those of the low-ability compensation (bonus) peers. We find that both high- and low-ability peers have a significant influence on a reporting firm's investment and financial policy, although the high-ability peers' influences seem slightly more pronounced.²⁵

The evidence that reporting firms are influenced by both the relatively capable and the less capable peers fits Scharfstein and Stein (1990)'s herding theory best. They show that when managers know they are evaluated relative to their peers, they would follow what their peers do. This herding-together kind of learning is different from the leader-driven learning within an industry documented by Leary and Roberts (2014), probably reflecting the fact that not all same-industry firms' CEOs are viewed as viable competitors on the executive job market.²⁶ It is equally important to recognize, that the finding that firms are influenced by the less capable peers does not necessarily rule out the incentive effect associated with peers. CEOs can follow their peers in areas that they are not strongest, but work harder in other areas that they have an edge to maximize their chance of winning the job market tournament.

7.2. Evidence on the peer-related incentive effect

²⁵ We also repeat this analysis by only focusing on those peers from the different SIC3 industries. We find that both high- and low-ability compensation peers from different SIC3 industries continue to influence their reporting firms' investment and financial policies. For bonus peers, however, only high-ability peers from different SIC3 industries matter. These results are available upon request.

²⁶ Indeed, if the learning effect is a key economic force behind the *RPQ*'s performance effect, a reporting firm must be influenced by both the high- and low-ability peers. Actually, if reporting firms learn only from high-ability peers, *RPQ* should not matter. To illustrate this idea, consider two reporting firms A and B, and assume each has four compensation peers. A has one better peer, whereas B has three better peers. Their *RPQ*s are consequently 0.25 (for A) and 0.75 (for B), respectively. If both A and B learn only from the better peers, assuming better firms behave similarly, it is easy to conclude that firms A and B will enjoy similar performance through learning, regardless of their *RPQ*s.

In addition to the learning effect, relative peer quality could also affect a CEO's incentive to work harder, because it directly determines how challenging the peer-based benchmark can be. Unlike the learning channel, however, direct evidence of the incentive channel is more difficult to observe because a CEO's tendency to work hard is by nature unobservable. It is nonetheless reasonable to argue that a CEO's incentive to work hard depends on the potential size of the tournament prize. A CEO is more likely to increase effort if the potential gain of winning the tournament is high, and less so if the potential gain is low. Therefore, a testable implication of the incentive effect is whether RPQ's performance effect is more pronounced among CEOs that can enjoy a high pay increase in the case of winning the tournament.

Kale et al. (2009) study the promotion-based tournament within a firm. They find that the pay gap between senior managers (such as vice presidents) and the CEO could induce senior managers to increase their work effort. From a CEO's perspective, compensation peers are his or her job market competitors. The difference between a CEO's current compensation and the highest of his or her compensation peers' compensation can be viewed as the potential "tournament prize" if he or she wins the (executive labor market) tournament. We therefore construct the variable *Pay_Gap* to measure the potential tournament prize of firm *i* as follows:

$$Pay_Gap_{i,t} = Highest\ Peer\ Total\ Pay_{i,t} - Total\ Pay_{i,t} \quad (4)$$

Total Pay refers to a CEO's total compensation (TDC1) obtained from ExecuComp.²⁷ The higher *Pay_Gap*, the greater the compensation increase a CEO can enjoy if he or she wins.

²⁷ Prior to 2006, the TDC1 in Execucomp includes salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted, long-term incentive payouts, and all other. From 2006 on, the TDC1 in Execucomp includes salary, bonus, non-equity incentive plan compensation, grant-date fair value stock awards, grant-date fair value of option awards, deferred compensation, and other comp.

Because CEO compensation information is available only for S&P 1500 firms, peers that are not members of the S&P1500 from this analysis are excluded from this analysis.²⁸

The *Pay_Gap* measure, however, does not apply to bonus peers because these peers are more relevant for internal relative performance evaluation. The potential prize of a bonus peer-based tournament directly depends the bonus (cash or non-cash) scheme specified in the incentive contract, which typically is not directly observable. The analysis using *Pay_Gap* is thus limited to compensation peers.

We divide all sample firms into terciles based on their *Pay_Gap* and focus on those firms in the top tercile (high *Pay_Gap* group) and those in the bottom tercile (low *Pay_Gap* group). We repeat our baseline estimation for each subsample in Table 9. The results of the high *Pay_Gap* group are reported in Column (1), and those of the low *Pay_Gap* group are in Column (2). Consistent with the prediction of the incentive effect, we find that the performance effect of RPQ is more pronounced among firms with high *Pay_Gap*. For firms with low pay gap, whose CEOs would expect to receive much less even if they win the tournament, the performance effect of RPQ is significantly weakened. A Chow test further confirms that the difference in RPQ's performance effect between these two subsamples is significant at the 5% level.

7.3. Relative peer quality and risk taking

This subsection examines whether the CEOs of high-RPQ firms increase firm risk to improve their relative ranking. A large body of literature shows that a relative ranking-based incentive mechanism can distort an agent's risk-taking behavior. For example, both Brown, Harlow, and Starks (1996) and Chevalier and Ellison (1997) find that mutual fund managers tend

²⁸ Gabaix and Landier (2008) show a strong correlation between firm size and top executives' compensation. In one unreported test, we also use firm size as a proxy for the executives' total pay level. Although less precise, this variable is available for all peers used in this study. Results under this alternative pay measurement are quite similar.

to increase fund volatility in the latter part of the performance assessment period if their performance is below the median of their peers.

We follow the method of Brown et al. (1996) and use the risk adjustment ratio (RAR) to measure a firm's tendency to shift risk. We first sort all sample firms into terciles based on their RPQs and identify those in the top tercile as high-RPQ firms and those in the bottom terciles as low-RPQ firms.²⁹ For each firm, we compute its RAR as the ratio of the standard deviation of 12-month stock returns of this year to that of the previous year (that is, σ_t/σ_{t-1}). A firm having an RAR greater than one indicates that its CEO increases its risk, whereas a firm having an RAR less than one indicates otherwise.

Table 10 reports the results. We find the mean RARs of both high- and low-RPQ firms are greater than one. For firms that report compensation peers, the mean risk adjustment ratio of high-RPQ firms is 1.19, whereas that of low-RPQ firms is 1.16. The difference, however, is not statistically significant. The RPQ-induced risk taking behavior, if existing, should be most pronounced among CEOs with a high *Pay_Gap*, because this gap indicates greater tournament prizes. We thus repeat our analysis for both high and low *Pay_Gap* firms. For both subsamples, we find that the difference in RAR between firms with high and low RPQ is insignificant. For firms that report bonus peers, the difference in RARs between high- and low-RPQ firms also remain insignificant. As such, our results do not support the conjecture that firms with high RPQs are more likely to engage in risk-shifting behavior.

7.4. Relative peer quality and earnings management

²⁹ Results remain similar if we define high- (low-) RPQ firms as those in the top (bottom) half.

A relatively strong peer group could induce executives to “play the numbers game.” That is, when management faces relatively high-achieving and competitive peers, it could also have a greater incentive to play accounting games to mislead the board and/or the labor market.

To investigate whether this is the case, we construct three measures of earnings management: discretionary accruals (Jones, 1991), performance-matched discretionary accruals (Kothari, Leone, and Wasley, 2005), and the operating cash-flow based earnings management measure developed by Dechow and Dichev (2002). We follow Cohen and Zarowin (2010) to estimate *Discretionary Accruals* using Jones’ (1991) model for each two-digit SIC industry and year group. To parallel our performance analysis, we focus on the changes in these earnings management measures, although we find similar results for the levels of earnings management.

Following the literature, we control for firm size ($\text{Log}(\text{Assets})$), book-to-market ratio (B/M), performance (ROA), leverage, and firm risk ($\text{Std. Dev} (ROA)$) in our regressions. We also include CEO characteristics, board size, percentage of external director (*Indep. directors*), managerial ownership (*Mgmt. Ownership*), institutional ownership (*IO*), and the concentration of institutional ownership (*IO Concentration*) to control for CEO and governance effects.

Table 11 reports the results. Columns (1) through (3) examine the effect of the relative quality of compensation peers on three distinct earnings management measures, and Columns (4) through (6) examine that of bonus peers. In each column for each earnings management measure, we find that the coefficient of RPQ is insignificant. High relative peer quality is not associated with increased earnings management activities.

7.5. The role of peers’ general quality

In this section, we study how RPQ interacts with peers' general quality. A high RPQ does not necessarily imply that a firm's peers are the best in an absolute sense. Rather, it conveys that the peers are relatively stronger than their reporting firms. This fact poses an interesting question: Does the effect of relative peer quality vary with peers' general quality? Consider two firms that have same RPQs, wherein one firm's peers have greater managerial ability scores than the other. The first CEO could benefit more from learning from his or her peers than the second CEO can. The CEO of the first firm could feel less incentivized as well, however, because it is more difficult to beat his or her peers compared with the second CEO. That is, CEOs could feel punished for having peers consisting of the most successful firms. The interaction between relative peer quality and general peer quality is therefore an empirical question.

To measure the general quality of each firm's peers, for each year and for each peer group we first obtain the median managerial ability score of this group as a proxy for its overall group-level peer quality. We then sort all firms into quintiles based on this proxy and define a new dummy, *High_GPQ*, that equals one if a firm belongs to the top quintile and zero otherwise.

We interact RPQ with *High_GPQ* and report the results in Table 12, in which Panel A focuses on stock performance and Panel B on operating performance. Results in Panel A show that the interaction between RPQ and *High_GPQ*, although negative is statistically insignificant, suggesting that for firms whose peers are of high general quality and for those whose peers are of low general quality, relative peer quality influences stock performance in a similar manner.

Results in Panel B, on the other hand, indicate that *High_GPQ* has an overall negative marginal effect on operating performance improvement. The estimated coefficient of the interaction item between *High_GPQ* and RPQ is negative and significant, indicating that the

positive effect of RPQ on operating profitability could be weakened if the selected peers are too superior, probably the result of the disincentive effect.

8. Conclusion

Peer-based benchmarking is widely used in the corporate world to determine firm executives' compensation level and/or performance-based bonus. A properly structured peer group is extremely important in maintaining the effectiveness of peer-based incentive contracts. In this study, we show that the choice of peers can have a significant effect on firm performance. A group of relatively strong peers can either induce a CEO to increase his or her work effort or expose him or her to better managerial decisions, either of which can further improve firm performance.

We collect compensation and bonus peer groups of S&P 1500 firms for the 2006–2010 period and show that at least for the compensation peers, a high RPQ tends to help a firm earn superior risk-adjusted stock returns and experience higher profitability growth than a low RPQ. These results are mostly unaffected after we control for governance quality, CEO power, CEO compensation, and CEO intrinsic talent. Evidence also shows that learning and incentive mechanisms associated with peers seem to link relative peer quality to firm performance.

This paper contributes to the optimal incentive contract literature by highlighting the importance of relative quality between a peer group and a reporting firm. The right “quality gap” between a firm and its peers can introduce a positive force into a CEO's incentive contract and motivate him or her to increase effort that is in shareholders' best interests.

Appendix. Variable descriptions

Variable	Description
Relative Peer Quality Measures	
<i>DLM score-based RPQ_t</i> (or <i>RPQ_t</i>)	Relative peer quality index of a reporting firm, determined at the beginning of the fiscal year <i>t</i> , based on its and its peers' managerial ability scores developed by Demerjian, Lev, and McVay (2012). In particular, it is defined as follows: $RPQ_{i,t} = 1 - \frac{Rank_i(DLM\ Managerial\ Ability\ Score_{j,t-1}; j = 0,1,\dots,N_{i,t})}{N_{i,t}}$
<i>RPQ_3Y</i>	Relative peer quality index of a reporting firm, determined at the beginning of the fiscal year <i>t</i> , based on its and its peers' average <i>DLM managerial ability score</i> over previous three years.
<i>High_RPQ_t</i>	A dummy that equals one if the RPQ is greater than 0.5 and zero otherwise.
<i>Residual RPQ</i>	The residual item of the following regression model: $RPQ_{i,t} = \alpha + \beta Adj.ROA_{i,t-1}$.
Firm Performance	
<i>Adj.Ret_t</i>	DGTW characteristic-adjusted yearly stock return for fiscal year <i>t</i> .
$\Delta Adj.ROA_t$	Change in the two-digit SIC industry median adjusted ROA between fiscal year <i>t</i> and <i>t</i> – 1. ROA is the ratio of EBITDA to total assets at the end of fiscal year <i>t</i> – 1.
Firm Characteristic Controls	
<i>Log(Market Cap_{t-1})</i>	Natural logarithm of the market value of outstanding common shares at the end of fiscal year <i>t</i> – 1.
<i>Log(B/M)_{t-1}</i>	Natural logarithm of the book to market value of equity at the end of fiscal year <i>t</i> – 1.
<i>Ret. Volatility_{t-1}</i>	Natural logarithm of the daily idiosyncratic volatility for the fiscal year <i>t</i> – 1.
<i>Ret Momentum_{t-1}</i>	Market adjusted annual returns for the fiscal year <i>t</i> – 1.
<i>Assets_{t-1}</i>	Book value of total assets at the end of fiscal year <i>t</i> – 1.
<i>Tobin's Q_{t-1}</i>	Ratio of sum of market value, liquidation value of the firm's outstanding preferred stock, and debt to total assets at the end of fiscal year <i>t</i> – 1.
<i>Leverage_{t-1}</i>	Ratio of current and long-term debt to total assets (book value) at the end of fiscal year <i>t</i> – 1.
<i>R&D Ratio_{t-1}</i>	Ratio of R&D expense to sales at the end of fiscal year <i>t</i> – 1. We assume firms with missing values for R&D expenses in the COMPUSTAT to have zero R&D expenses.
<i>Firm Age_{t-1}</i>	The number of years since a firm has been listed in the Compustat at the end of year <i>t</i> – 1.
<i>Std. Dev. ROA_{t-1}</i>	Standard deviation of ROA for 4 years prior to the beginning of fiscal year <i>t</i> .
CEO Attributes	
<i>CEO Age_{t-1}</i>	The age of a firm's CEO, based on the ExecuComp information at the end of fiscal year <i>t</i> – 1.
<i>CEO Tenure_{t-1}</i>	The number of years a CEO stays with a firm since being hired at the end of fiscal year <i>t</i> – 1.
<i>CEO_Chairperson_{t-1}</i>	A dummy that takes the value one if the CEO is also the chairperson of the board at the end of fiscal year <i>t</i> – 1, zero otherwise.
<i>Intrinsic_Talent</i>	The CEO compensation fixed effect based on the method of Graham, Li, and Qiu (2012) that uses the procedure of Abowd, Kramerz, and Margolis (1999).
<i>DLM Managerial Ability Score_{t-1}</i>	Demerjian, Lev and McVay (2012) managerial ability score at the end of fiscal year <i>t</i> – 1.
Governance Characteristics	
<i>Board Size_{t-1}</i>	Number of directors on the company's board at the end of fiscal year <i>t</i> – 1.
<i>Indep. Directors_{t-1} (%)</i>	Percentage of independent directors on the company's board at the end of fiscal year <i>t</i> – 1.
<i>Busy Board</i>	A dummy that equals one if the ratio of busy directors is above the sample median, zero otherwise.
<i>Co-opted Board</i>	A dummy that equals one if the ratio of directors appointed after CEO is above the sample median, zero otherwise.
<i>Mgmt. Ownership_{t-1} (%)</i>	Percentage of common shares outstanding held by the company's insiders at the end of fiscal year <i>t</i> – 1.
<i>Inst. Ownership_{t-1} (%)</i>	Percentage of common shares outstanding held by the institutional investors at the end of fiscal year <i>t</i> – 1.
<i>IO Concentration_{t-1}</i>	The Herfindahl index of institutional ownership at the end of fiscal year <i>t</i> – 1.
Executive Compensation	

<i>Total Pay_t</i>	CEO total compensation (TDC1 in ExecuComp) at the end of fiscal year <i>t</i> .
<i>Equity Pay Percent_t</i>	The percentage of equity-based compensation of total pay at the end of fiscal year <i>t</i> .
<i>Pay_Gap_t</i>	The difference between the highest peer CEO's total pay and the reporting firm CEO's total pay at the end of fiscal year <i>t</i> .
Instrumental Variable	
<i>Median SIC2 RPQ_t</i>	The median RPQ for firms in the same two-digit SIC industry.
Firm Policy Variables	
<i>CAPEX_t</i>	Ratio of capital expenditures to total assets at end of fiscal year <i>t</i> .
<i>MLEVERAGE_t</i>	Ratio of current liabilities and long-term debt to market value of total assets at the end of fiscal year <i>t</i> . Market value of total assets is calculated as per Leary and Roberts (2014).
<i>RAR_t</i>	Risk adjustment ratio for fiscal year <i>t</i> , defined as the ratio of the standard deviation of 12-month stock returns of this year to that of the previous year (that is, σ_t/σ_{t-1}).

References

- Abowd, J., Kaplan, D., 1999. Executive compensation: six questions that need answering. *Journal of Economic Perspectives* 13, 145-168.
- Abowd, J., Kramarz, F., Margolis, D., 1999. High wage workers and high wage firms. *Econometrica* 67, 251-333.
- Adams, R., Almeida, H., Ferreira, D., 2005. Powerful CEOs and their impact on corporate performance. *Review of Financial Studies* 18, 1403-1432.
- Aggarwal, R., Samwick, A., 1999. Executive compensation, strategic competition and relative performance evaluation: theory and evidence. *Journal of Finance* 54, 1999-2043.
- Albuquerque, M., 2009. Peer firms in relative performance evaluation. *Journal of Accounting and Economics* 48, 69-89.
- Albuquerque, M., De Franco, G., Verdi, R., 2013. Peer choice in CEO compensation. *Journal of Financial Economics* 108, 160-181.
- Bertrand, M., Schoar, A., 2003. Managing with style: the effect of managers on firm policies. *Quarterly Journal of Economics* 118, 1169-1208.
- Bikhchandani, S., Hirshleifer, D., Welch, I., 1998. Learning from the behavior of others: conformity, fads, and informational cascades. *Journal of Economic Perspectives* 12, 151-170.
- Bizjak, J., Lemmon, M., Naveen, L., 2008. Does the use of peer groups contribute to higher pay and less efficient compensation? *Journal of Financial Economics* 90, 152-168.
- Bizjak, J., Lemmon, M., Nguyen, T., 2011. Are all CEOs above average? An empirical analysis of compensation peer groups and pay design. *Journal of Financial Economics* 100, 538-555.
- Brown, K., Harlow, W., Starks, L., 1996. Of tournaments and temptations: an analysis of managerial incentives in the mutual fund industry. *Journal of Finance* 51, 85-110.
- Cadman, B., Carter, M., Hillegeist, S., 2010. The Incentives of compensation consultants and CEO pay. *Journal of Accounting and Economics* 49, 263-280.
- Chevalier, J., Ellison, G., 1997. Risk taking by mutual funds as a response to incentives. *Journal of Political Economy* 105, 1167-1200.
- Cohen, D., Zarowin, P., 2010. Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics* 50, 2-19.
- Coles, J., Daniel, N., Naveen, L., 2014. Co-opted boards. *Review of Financial Studies* 27, 1751-1796.

Core, J., Holthausen, R., Larcker, D., 1999. Corporate governance, chief executive officer compensation, and firm performance. *Journal of Financial Economics* 51, 371-406.

Daniel, K., Grinblatt, M., Titman, S., Wermers, R., 1997. Measuring mutual fund performance with characteristic-based benchmarks. *Journal of Finance* 52, 1035-1058.

Dechow, P., Dichev, I, 2002. The quality of accruals and earnings: the role of accrual estimation errors. *The Accounting Review* 77, 35-59.

Demerjian, P., Lev, B., McVay, S., 2012. Quantifying managerial ability: a new measure and validity tests. *Management Science* 58, 1229-1248.

Demerjian, P., Lev, B., Lewis, M., McVay, S., 2013. Managerial ability and earnings quality. *Accounting Review* 88, 463-498.

Fama, E., 1980. Agency problems and the theory of the firm. *Journal of Political Economy* 88, 288-307.

Fama, E., French, K., 1997. Industry costs of equity. *Journal of Financial Economics* 43, 153–193.

Faulkender, M., Yang, J., 2010. Inside the black box: the role and composition of compensation peer groups. *Journal of Financial Economics* 96, 257-270.

Faulkender, M., Yang, J., 2013. Is disclosure an effective cleansing mechanism? The dynamics of compensation peer benchmarking. *Review of Financial Studies* 26, 806-839.

Ferri, F. 2009. Discussion of explicit relative performance evaluation in performance-vested equity grants. *Review of Accounting Studies* 14, 307–313.

Fich, E., Shivdasani, A., 2006. Are busy boards effective monitors? *Journal of Finance* 61, 689-724.

Foucault, T., Fresard, L., 2014. Learning from peers' stock prices and corporate investment. *Journal of Financial Economics* 111, 554-577.

Gabaix, X., Landier, A., 2008. Why has CEO pay increased so much? *Quarterly Journal of Economics* 123, 49-100.

Gong, G., Li, L., Shin, J., 2011. Relative performance evaluation and related peer groups in executive compensation contracts. *Accounting Review* 86, 1007-1043.

Graham, J., Li, S., Qiu, J., 2012. Managerial attributes and executive compensation. *Review of Financial Studies* 25, 144-186.

Hoberg, G., Phillips, G., 2010a. Product market synergies and competition in mergers and acquisitions: a text-based analysis. *Review of Financial Studies* 23, 3773-3811.

Hoberg, G., Phillips, G., 2010b. Text-based network industries and endogenous product differentiation. NBER Working Paper No. 15991.

Holmstrom, B., 1979. Moral hazard and observability. *Bell Journal of Economics* 10, 74-91.

Holmstrom, B., 1982. Moral hazard in teams. *Bell Journal of Economics* 13, 324-340.

Holmstrom, B., 1999. Managerial incentive problems—A dynamic perspective. *Review of Economic Studies* 66, 169-182.

Holmstrom, B., Kaplan, S., 2003. The state of U.S. corporate governance: what's right and what's wrong? *Journal of Applied Corporate Finance* 15, 8-20.

Jones, J., 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29, 193-228.

Kale, J., Reis, E., Venkateswaran, A., 2009. Rank-order tournaments and incentive alignment: the effect on firm performance. *Journal of Finance* 64, 1479-1511.

Kaustia, M., Rantala, V., 2015. Social learning and corporate peer effects. *Journal of Financial Economics* 117, 653-669.

Kothari, S., Leone, A., Wasley, C., 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39, 163-197.

Larcker, D., So, E., Wang, C., 2013. Boardroom centrality and firm performance. *Journal of Accounting and Economics* 55, 225-250.

Lazear, E., Rosen, R., 1981. Rank-order tournaments as optimum labor contracts. *Journal of Political Economy* 89, 841-864.

Leary, M., Roberts, M., 2014. Do peer firms affect corporate financial policy? *Journal of Finance* 69, 139-178.

Loh, R., Stulz, R., 2011. When are analyst recommendation changes influential? *Review of Financial Studies* 24, 593-627.

MacKay, P., Phillips, G., 2005. How does industry affect firm financial structure? *Review of Financial Studies* 18, 1433-1466.

Morse, A., Nanda, V., Seru, A., 2011. Are incentive contracts rigged by powerful CEOs? *Journal of Finance* 67, 1779-1821.

- Murphy, K., Sandino, T., 2010. Executive pay and "independent" compensation consultants. *Journal of Accounting and Economics* 49, 247-262.
- Nalebuff, B., Stiglitz, J., 1983. Prizes and incentives: towards a general theory of compensation and competition. *Bell Journal of Economics* 14, 21-43.
- Ozoguz, A., Rebello, M., 2013. Information, competition, and investment sensitivity to peer stock prices. Unpublished working paper. University of Texas, Dallas.
- Prendergast, C., 1999. The provision of incentives in firms. *Journal of Economic Literature* 37, 7-63.
- Scharfstein, D., Stein, J., 1990. Herd behavior and investment, *American Economic Review* 80, 465-479.
- Wachtell, Lipton, Rosen, and Katz, 2013. *Compensation Committee Guide*. Downloadable at <http://www.wlrk.com/files/2013/CompensationCommitteeGuide.pdf>.

Table 1
Describing Peers

Panel A provides the number of compensation peers and bonus peers per sample reporting firm. Panel B reports the percentage of peers that are from the same characteristic groups as the sample reporting firms. In particular, *Same SIC2* refers to the percentage of peers that have the same two-digit standard industry classification as the reporting firms. *Same FF Industry* refers to the percentage of peers that have the same Fama–French 30-industry classification as the reporting firms. *Same FIC100* is the percentage of peers that have the same Hoberg–Phillips 100 fixed industry classification as the reporting firms. *Same Market Cap Quintile* is the percentage of peers that are from the same market capitalization quintile as the reporting firms. *Same B/M Quintile* is the percentage of peers that are from the same B/M ratio quintile as the reporting firms. *Same Adj. Ret Quintile* is the percentage of peers that are from the same DGTW characteristics adjusted returns quintile as the reporting firms. *Same Adj. ROA Quintile* is the percentage of peers that are from the same SIC2 industry median adjusted ROA quintile as the reporting firms.

Panel A: Number of Peers Per Sample Firm

	N	Mean	Std. Dev.	10 th	Median	90 th
Compensation Peers						
2006	482	17.19	9.40	9.00	15.00	27.00
2007	727	17.94	9.73	10.00	16.00	28.00
2008	792	17.93	9.40	10.00	16.00	28.00
2009	841	18.01	9.60	10.00	16.00	28.00
2010	852	17.71	7.94	11.00	16.00	26.00
All	3,694	17.80	9.20	10.00	16.00	27.00
Bonus Peers						
2006	70	15.33	7.28	8.00	14.00	29.50
2007	98	15.99	8.46	8.00	14.00	29.00
2008	118	16.42	8.02	8.00	15.00	28.00
2009	133	16.72	8.05	8.00	15.00	28.00
2010	148	16.41	7.82	9.00	15.00	27.00
All	567	16.28	7.95	8.00	15.00	28.00

Panel B: Peer Origin (%)

	Mean	Std. Dev.	10 th	Median	90 th
% of Compensation Peers that Have the Same Characteristics as the Reporting Firms					
Same SIC2	56.61	34.51	7.69	57.14	100.00
Same FF Industry	64.85	33.57	12.50	73.68	100.00
Same FIC100	45.43	35.27	0.00	40.00	100.00
Same Market Cap Quintile	48.65	28.25	15.79	42.86	95.00
Same B/M Quintile	29.22	18.37	7.41	27.27	54.55
Same Adj. Ret Quintile	28.24	19.31	7.69	25.00	53.85
Same Adj. ROA Quintile	38.76	25.26	10.00	33.33	78.57
% of Bonus Peers that Have the Same Characteristics as the Reporting Firms					
Same SIC2	71.06	33.22	15.79	86.96	100.00
Same FF Industry	75.23	32.87	15.38	94.44	100.00
Same FIC100	57.66	35.33	4.26	64.71	100.00
Same Market Cap Quintile	53.98	29.19	16.67	50.00	100.00
Same B/M Quintile	31.62	19.17	8.33	30.43	59.09
Same Adj. Ret Quintile	41.61	27.16	10.00	36.36	85.71
Same Adj. ROA Quintile	32.52	22.35	8.33	27.27	63.16

Table 2
Describing the Relative Peer Quality Index (RPQ)

Panel A reports the summary statistics of the relative peer quality index of the compensation peers and bonus peers. Panel B reports the correlation between the compensation peer-based RPQ and the bonus peer-based RPQ for those reporting firms that report both peer groups. Panel C reports summary statistics of various characteristics for S&P 1500 firms that report compensation peers or bonus peers. *High (Low) RPQ* represents a subsample of reporting firms whose RPQ is greater than (less than or equal to) 0.5. Please refer to the Appendix for the detailed definitions of these variables. All variables are winsorized at the 1st and 99th percentiles. Results under *Compensation Peers* focus on the compensation peer-based RPQ and include all sample firms that report compensation peers. Results under the *Bonus Peers* focus on the bonus peer-based RPQ and include all firms that report bonus peers. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. RPQ Summary

	N	Mean	Std. Dev.	10 th	Median	90 th	t-Stat. (H0:RPQ = 0.5)
Compensation Peer-Based RPQ							
2006	482	0.51	0.30	0.10	0.50	0.93	0.63
2007	727	0.50	0.30	0.10	0.50	0.92	0.24
2008	792	0.51	0.31	0.08	0.53	0.92	1.00
2009	841	0.50	0.30	0.09	0.50	0.92	-0.16
2010	852	0.50	0.30	0.08	0.50	0.92	0.02
All	3,694	0.50	0.30	0.09	0.50	0.92	0.73
Bonus Peer-Based RPQ							
2006	70	0.54	0.32	0.09	0.54	0.97	0.99
2007	98	0.52	0.31	0.09	0.50	0.96	0.66
2008	118	0.50	0.32	0.06	0.52	0.92	0.01
2009	133	0.50	0.29	0.10	0.50	0.89	0.03
2010	148	0.50	0.29	0.10	0.50	0.90	0.14
All	567	0.51	0.30	0.09	0.50	0.92	0.74

Panel B. Correlation between the Compensation Peer-Based RPQ and the Bonus Peer-Based RPQ

	Compensation Peer-Based RPQ	Bonus Peer-Based RPQ
Compensation Peer RPQ	1.00	
Bonus Peer RPQ	0.92***	1.00

Panel C. Relative Peer Quality and Selected Firm Characteristics

Compensation Peers									
Variable	(1). High-RPQ Firms				(2). Low-RPQ Firms				(1) – (2)
	N	Mean	Med.	StdDev	N	Mean	Med.	StdDev	Mean Diff.
Market Cap (\$B) _{t-1}	1,734	9.16	1.88	23.33	1,854	9.06	2.24	20.49	0.11
Assets _{t-1}	1,734	8.38	1.88	21.01	1,855	7.89	1.88	22.18	0.49
Tobin's Q _{t-1}	1,686	1.36	1.14	0.86	1,793	1.65	1.34	1.11	-0.29***
Adj. Ret _{t-1} (%)	1,694	6.11	-0.26	37.35	1,808	8.36	2.94	36.92	-2.26*
Adj. ROA _{t-1} (%)	1,734	6.09	3.65	11.07	1,855	10.00	6.86	11.83	-3.91***
ΔAdj. ROA _{t-1} (%)	1,734	-0.88	-0.11	5.40	1,854	0.08	0.19	5.68	-0.96**
R&D Ratio _{t-1}	1,734	0.05	0.01	0.08	1,855	0.04	0.00	0.07	0.00
Leverage _{t-1}	1,726	0.20	0.19	0.16	1,853	0.19	0.17	0.16	0.01
CEO Age _{t-1}	1,647	55.04	55.00	6.48	1,792	55.17	55.00	6.87	-0.13
Intrinsic_Talent _{t-1}	1,357	0.48	0.48	0.91	1,444	0.45	0.43	0.91	0.03*
DLM Managerial Ability _{t-1}	1,734	0.03	0.03	0.09	1,855	0.03	0.03	0.11	-0.01
CEO Total Pay _{t-1} (\$M)	1,676	5.64	3.82	5.68	1,815	5.87	4.03	5.79	-0.23
CEO Equity Pay _{t-1} (%)	1,612	47.37	50.72	25.02	1,750	47.02	51.59	25.76	0.35
CEO_Chairperson _{t-1} (%)	1,520	51.45	100.00	50.00	1,639	52.65	100.00	49.94	-1.21
Board Size _{t-1}	1,520	9.34	9.00	2.07	1,639	9.17	9.00	2.11	0.17**
Indep. Directors _{t-1} (%)	1,520	77.42	80.00	12.13	1,639	75.92	77.78	12.32	1.50***
Mgmt Ownership _{t-1} (%)	1,520	3.79	1.32	7.40	1,634	4.01	1.32	7.71	-0.22
Inst. Ownership _{t-1} (%)	1,733	84.02	84.69	17.31	1,855	83.68	84.67	18.52	0.33
IO Concentration _{t-1} (%)	1,733	4.75	4.14	3.54	1,855	4.50	3.88	2.78	0.25**
Bonus Peers									
Variable	(1). High RPQ Firms				(2). Low RPQ Firms				(1)-(2)
	N	Mean	Med.	StdDev	N	Mean	Med.	StdDev	Mean Diff.
Market Cap (\$B) _{t-1}	266	16.21	3.32	32.33	287	16.76	5.16	28.34	-0.55
Assets _{t-1}	266	16.42	4.37	35.82	287	17.58	4.99	36.78	-1.16
Tobin's Q _{t-1}	256	1.22	1.04	0.69	272	1.40	1.22	0.70	-0.18***
Adj. Ret _{t-1} (%)	263	7.08	2.30	34.21	284	8.34	4.68	32.67	-1.26
Adj. ROA _{t-1} (%)	266	6.36	3.27	12.44	287	9.54	6.66	11.05	-3.18***
ΔAdj. ROA _{t-1} (%)	266	-1.14	-0.17	6.46	287	-0.36	0.12	5.91	0.78
R&D Ratio _{t-1}	266	0.03	0.00	0.06	287	0.03	0.00	0.06	0.00
Leverage _{t-1}	266	0.23	0.22	0.15	287	0.22	0.20	0.14	0.01
CEO Age _{t-1}	252	55.10	55.00	5.75	284	55.57	56.00	5.88	-0.47
Intrinsic_Talent _{t-1}	222	0.58	0.54	1.00	244	0.54	0.50	0.95	0.04**
DLM Managerial Ability _{t-1}	266	0.01	0.01	0.11	287	0.01	0.01	0.12	-0.01
CEO Total Pay _{t-1} (\$M)	260	7.03	5.39	5.75	287	7.95	6.15	6.32	-0.92**
CEO Equity Pay _{t-1} (%)	253	50.44	56.41	23.35	280	51.48	55.92	21.94	-1.04
CEO_Chairperson _{t-1} (%)	249	59.04	100.00	49.28	270	65.56	100.00	47.61	-6.52
Board Size _{t-1}	249	9.83	10.00	2.06	270	9.99	10.00	2.20	-0.17
Indep. Directors _{t-1} (%)	249	80.48	84.62	11.60	270	80.13	83.33	11.41	0.35
Mgmt Ownership _{t-1} (%)	249	1.74	0.61	3.54	270	2.32	0.73	5.51	-0.58
Inst. Ownership _{t-1} (%)	266	84.43	82.86	15.01	287	80.10	79.94	16.03	4.33***
IO Concentration _{t-1} (%)	266	4.27	3.81	2.42	287	4.10	3.59	2.15	0.17

Table 3
Relative Peer Quality and Stock Performance

This table reports the pooled OLS regression results between DLM score-based RPQ and firm stock returns. The sample period is from 2006 to 2010. The dependent variable *Adj.Ret* is the *DGTW* characteristics adjusted yearly return during the fiscal year for which peers are used. The key independent variable *RPQ* is the relative peer quality index determined at the beginning of the fiscal year. Results under the *Compensation Peers* focus on the compensation peer-based RPQ and include all sample firms that report the compensation peers. Results under the *Bonus Peers* focus on the bonus peer-based RPQ and include all firms that report bonus peers. Please refer to the Appendix for the detailed definitions of control variables. All variables are winsorized at the 1st and 99th percentiles. *t*-Statistics in parentheses are computed using the robust standard errors clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: <i>Adj.Ret_{it}</i>												
	Compensation Peers						Bonus Peers					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	-0.02 (-1.30)	0.69** (2.32)	1.02*** (3.64)	0.62** (1.99)	6.77*** (7.02)	6.83*** (7.01)	0.03 (1.07)	0.10 (0.11)	0.14 (0.21)	-0.59 (-0.86)	7.15** (2.35)	6.89** (2.22)
<i>RPQ_{it}</i>	0.07*** (3.27)	0.06** (2.27)	0.05** (2.20)	0.05** (2.06)	0.13** (2.29)	0.12** (2.17)	0.04 (0.87)	-0.11 (-1.51)	-0.09 (-1.58)	-0.07 (-1.14)	0.08 (0.80)	0.06 (0.70)
Log(Market Cap) _{<i>t-1</i>}		-0.03*** (-2.98)	-0.05*** (-4.54)	-0.04*** (-3.59)	-0.58*** (-14.46)	-0.58*** (-13.75)		-0.01 (-0.53)	-0.05** (-2.29)	-0.04* (-1.74)	-0.58*** (-4.38)	-0.57*** (-4.46)
Log(B/M) _{<i>t-1</i>}		-0.03 (-1.58)	-0.04*** (-2.83)	-0.03* (-1.90)	-0.00 (-0.06)	-0.00 (-0.03)		0.07** (2.19)	0.08** (2.32)	0.10*** (2.73)	0.13 (1.61)	0.13 (1.49)
Ret Volatility _{<i>t-1</i>}		0.13*** (3.63)	0.09*** (3.17)	0.06** (2.15)	-0.14*** (-3.42)	-0.14*** (-3.36)		-0.03 (-0.39)	-0.05 (-0.74)	-0.02 (-0.22)	0.02 (0.22)	0.02 (0.18)
Ret Momentum _{<i>t-1</i>}		-0.11*** (-6.32)	-0.13*** (-7.10)	-0.12*** (-5.75)	-0.07** (-2.25)	-0.06** (-2.07)		-0.13*** (-2.62)	-0.12*** (-2.70)	-0.11** (-2.59)	0.02 (0.35)	0.02 (0.24)
Log(CEO Age) _{<i>t-1</i>}		0.01 (0.22)	0.02 (0.35)	0.06 (0.95)	0.27 (1.32)	0.26 (1.27)		-0.08 (-0.38)	0.01 (0.07)	0.22 (1.27)	0.20 (0.30)	0.23 (0.34)
Log(CEO Tenure) _{<i>t-1</i>}		-0.00 (-0.02)	-0.00 (-0.04)	0.00 (0.42)	0.00 (0.01)	0.00 (0.07)		-0.02 (-0.51)	-0.02 (-0.58)	-0.02 (-0.54)	-0.03 (-0.54)	-0.04 (-0.57)
CEO_Chairperson _{<i>t-1</i>}		-0.02 (-1.13)	-0.02 (-1.62)	-0.04** (-2.51)	-0.05** (-1.98)	-0.05* (-1.93)		-0.01 (-0.36)	-0.03 (-0.91)	-0.04 (-1.15)	-0.01 (-0.11)	-0.01 (-0.16)
Log(Board Size) _{<i>t-1</i>}		0.07 (1.59)	-0.01 (-0.32)	-0.00 (-0.05)	0.07 (0.74)	0.07 (0.68)		0.09 (1.01)	0.08 (0.88)	0.05 (0.52)	0.33 (1.57)	0.33 (1.49)
Indp Directors _{<i>t-1</i>}		0.01 (0.18)	-0.03 (-0.47)	-0.01 (-0.11)	0.06 (0.49)	0.05 (0.40)		0.17 (1.34)	0.17 (1.13)	0.20 (1.37)	0.41* (1.69)	0.44 (1.59)
Mgmt Ownership _{<i>t-1</i>}		0.16 (1.43)	0.08 (0.84)	-0.02 (-0.17)	0.44 (1.39)	0.44 (1.30)		0.65* (1.66)	0.75** (1.98)	0.61* (1.75)	0.44 (0.41)	0.43 (0.39)
Inst. Ownership _{<i>t-1</i>}		-0.05 (-0.88)	-0.06 (-1.10)	-0.05 (-0.86)	-0.05 (-0.39)	-0.04 (-0.36)		0.15 (1.41)	0.12 (1.08)	0.04 (0.34)	0.26 (0.77)	0.27 (0.79)
IO Concentration _{<i>t-1</i>}		-0.78*** (-3.20)	-0.75** (-2.28)	-0.31 (-0.91)	-0.18 (-0.26)	-0.16 (-0.23)		-1.07** (-2.55)	-1.04** (-2.09)	-0.97 (-1.15)	-4.44** (-2.40)	-4.61** (-2.36)
Log(Total Pay) _{<i>t</i>}			0.11*** (6.66)	0.10*** (5.37)	0.11*** (5.06)	0.10*** (4.99)			0.10*** (3.35)	0.09*** (2.72)	0.10 (1.63)	0.10 (1.63)
Equity Pay Percent _{<i>t</i>}			-0.13*** (-4.51)	-0.12*** (-4.14)	-0.05 (-1.18)	-0.05 (-1.11)			-0.05 (-0.72)	-0.11 (-1.32)	0.03 (0.24)	0.03 (0.29)
Intrinsic_Talent _{<i>t-1</i>}				0.02** (2.21)	-0.03 (-0.57)	-0.03 (-0.57)				-0.03 (-1.38)	-0.12 (-1.07)	-0.11 (-0.98)

ROA _{<i>t-1</i>}					-0.04 (-0.17)						0.09 (0.22)	
Analysts Forecast						-0.03 (-0.07)						-0.24 (-0.34)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No
Firm F.E.	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
<i>N</i>	3,694	2,894	2,890	2,340	2,340	2,320	567	476	476	400	400	400
<i>R</i> ²	0.04	0.08	0.10	0.10	0.54	0.54	0.08	0.16	0.17	0.20	0.55	0.55

Table 4

Relative Peer Quality and Operating Performance Improvement

This table reports the pooled OLS regression results between DLM score-based RPQ and operating performance improvement. The sample period is from 2006 to 2010. The dependent variable $\Delta Adj.ROA$ refers to the change in the two-digit SIC industry median adjusted ROA between fiscal year t and $t - 1$. RPQ is the relative peer quality index of a reporting firm determined at the beginning of year t . Results under *Compensation Peers* focus on the compensation peer-based RPQ and include all sample firms that report compensation peers. Results under *Bonus Peers* focus on the bonus peer-based RPQ and include all firms that report bonus peers. Please refer to the Appendix for the detailed definitions of control variables. All variables are winsorized at the 1st and 99th percentiles. t -Statistics in parentheses are computed using the robust standard errors clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: $\Delta Adj.ROA_t$												
	Compensation Peers						Bonus Peers					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	-0.01*** (-5.74)	0.04 (0.83)	0.04 (0.83)	0.07 (1.32)	0.12 (0.58)	0.01 (0.06)	-0.00 (-0.02)	0.15 (0.71)	0.14 (0.69)	0.29 (1.49)	0.25 (1.02)	0.62 (0.73)
RPQ_t	0.02*** (6.83)	0.01*** (3.65)	0.01*** (3.76)	0.01*** (4.05)	0.01* (1.72)	0.01*** (3.01)	0.03*** (3.36)	0.03** (2.14)	0.03** (2.02)	0.03 (1.55)	0.01 (1.28)	0.02 (0.83)
Log(Market Cap) _{t-1}		-0.01** (-2.07)	-0.01 (-1.55)	-0.01*** (-2.85)	-0.05*** (-4.43)	-0.04*** (-3.78)		-0.04 (-1.59)	-0.03 (-1.40)	-0.06*** (-2.73)	-0.10** (-2.51)	-0.09** (-2.18)
Ret Momentum _{t-1}		0.02*** (4.95)	0.02*** (4.88)	0.02*** (5.63)	0.03*** (5.42)	0.02*** (3.20)		0.02 (1.64)	0.02 (1.46)	0.03** (2.57)	0.03 (1.51)	0.01 (0.46)
Log(Assets) _{t-1}		0.01** (2.08)	0.01 (1.63)	0.01** (2.42)	0.05*** (3.55)	0.05*** (3.27)		0.03 (1.45)	0.03 (1.13)	0.05** (2.48)	0.03 (0.59)	0.02 (0.36)
Log(Tobin's Q) _{t-1}		0.01 (1.63)	0.01 (1.35)	0.01** (2.45)	0.04*** (3.00)	0.06*** (4.07)		0.05* (1.90)	0.05* (1.68)	0.07*** (2.65)	0.14*** (2.64)	0.16*** (2.87)
Δ Adj.ROA _{t-1}		-0.28*** (-6.93)	-0.28*** (-7.04)	-0.27*** (-7.82)	-0.35*** (-8.71)	-0.33*** (-7.86)		-0.38*** (-5.60)	-0.38*** (-5.46)	-0.37*** (-5.15)	-0.43*** (-5.42)	-0.43*** (-5.40)
Leverage _{t-1}		0.01 (1.06)	0.01 (1.35)	0.01 (1.28)	0.04 (1.05)	0.02 (0.61)		0.01 (0.38)	0.02 (0.56)	0.01 (0.27)	0.21 (1.33)	0.20 (1.28)
R&D Ratio _{t-1}		-0.00 (-0.07)	-0.00 (-0.06)	0.06*** (2.82)	0.32** (2.29)	0.22* (1.67)		0.07 (0.88)	0.09 (1.07)	0.23** (2.38)	0.92 (1.24)	0.71 (0.97)
Log(Firm Age) _{t-1}		-0.00 (-0.36)	-0.00 (-0.82)	-0.00 (-0.37)	0.03 (0.92)	0.06 (1.51)		0.00 (0.65)	0.00 (0.26)	0.01 (1.01)	0.24* (1.96)	0.25** (2.17)
Log(CEO Age) _{t-1}		-0.00 (-0.04)	-0.00 (-0.39)	0.00 (0.64)	0.01 (0.32)	0.01 (0.42)		0.02 (0.48)	0.01 (0.44)	0.03 (0.76)	-0.15 (-0.77)	-0.09 (-0.51)
Log(CEO Tenure) _{t-1}		0.00*** (2.90)	0.00*** (2.85)	0.00 (1.51)	0.00 (0.46)	0.00 (0.33)		0.01 (1.45)	0.00 (1.18)	0.00 (0.16)	0.01 (0.39)	0.00 (0.00)
CEO_Chairperson _{t-1}		0.00 (0.03)	-0.00 (-0.31)	-0.00* (-1.79)	-0.01 (-1.47)	-0.01 (-1.51)		-0.00 (-0.41)	-0.01 (-0.73)	-0.00 (-0.49)	-0.00 (-0.14)	-0.01 (-0.44)
Log(Board Size) _{t-1}		0.00 (0.36)	0.00 (0.05)	0.00 (0.07)	0.01 (0.65)	0.01 (0.61)		0.02 (1.04)	0.02 (0.72)	0.02 (0.96)	0.01 (0.23)	-0.00 (-0.03)
IndpDirectors _{t-1}		0.00 (0.63)	0.01 (1.01)	0.01 (0.98)	0.00 (0.25)	0.00 (0.18)		0.02 (0.79)	0.04 (1.17)	0.01 (0.38)	0.02 (0.27)	0.04 (0.55)
Mgmt Ownership _{t-1}		0.01 (0.67)	0.00 (0.11)	-0.01 (-0.54)	0.04 (0.93)	0.04 (0.96)		0.02 (0.25)	0.05 (0.58)	0.03 (0.46)	-0.02 (-0.09)	-0.15 (-0.58)

Inst. Ownership _{t-1}	-0.00 (-0.00)	0.00 (0.34)	0.00 (0.13)	-0.03 (-1.31)	-0.03* (-1.66)		-0.02 (-0.92)	-0.03 (-1.07)	-0.04* (-1.75)	-0.04 (-0.58)	-0.03 (-0.41)
IO Concentration _{t-1}	-0.09 (-1.43)	-0.09 (-1.35)	0.05 (1.51)	0.08 (0.78)	-0.04 (-0.39)		-0.00 (-0.03)	0.02 (0.19)	0.10 (0.72)	0.46 (0.83)	0.16 (0.27)
Log(Total Pay) _t		0.00 (1.17)	0.01*** (4.32)	0.02*** (4.25)	0.02*** (4.34)			0.01 (1.10)	0.01 (1.22)	0.01 (0.51)	0.01 (0.45)
Equity Pay Percent _t		-0.03*** (-6.92)	-0.03*** (-6.44)	-0.03*** (-3.37)	-0.03*** (-3.30)			-0.05** (-2.06)	-0.03 (-1.32)	-0.02 (-0.44)	-0.01 (-0.23)
Intrinsic_Talent _{t-1}			-0.00 (-0.33)	-0.01 (-0.72)	-0.01 (-0.80)				-0.00 (-0.40)	-0.05** (-2.18)	-0.04* (-1.88)
ROA _{t-1}				-0.26*** (-7.09)						-0.62*** (-7.33)	
Analysts Forecast					-0.47*** (-5.27)						-0.65*** (-2.99)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No
Firm F.E.	No	No	No	No	Yes	Yes	No	No	No	Yes	Yes
N	3,694	3,061	3,057	2,486	2,486	2,465	567	491	491	416	412
R ²	0.04	0.14	0.15	0.17	0.38	0.37	0.06	0.21	0.22	0.25	0.45

Table 5
Firms with Busy or Co-opted Boards

This table reports the pooled OLS regression results between DLM score-based RPQ and firm performance in terms of stock returns (Panel A) and operating performance improvement (Panel B) for firms with larger numbers of busy directors or larger numbers of co-opted directors. The sample period is from 2006 to 2010. A firm is said to have a busy board if its ratio of busy directors is above the sample median (or in the top sample tercile). A busy director holds more directorships than sample median. A board is co-opted if the ratio of directors appointed after the CEO is above the sample median (or in the top sample tercile). Results under *Compensation Peers* focus on the compensation peer-based RPQ and include all sample firms that report the compensation peers. Results under *Bonus Peers* focus on the bonus peer-based RPQ and include all firms that report bonus peers. Please refer to the Appendix in the revised version for the definitions of all variables. All variables are winsorized at the 1st and 99th percentiles. *t*-Statistics in parentheses are based on the robust standard errors clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Stock Performance

	Dependent Variable: <i>Adj.Ret_t</i>			
	Compensation Peers		Bonus Peers	
	Firms with Busy Board (1)	Firms with Co-opted Board (2)	Firms with Busy Board (3)	Firms with Co-opted Board (4)
Constant	0.36 (1.01)	0.74* (1.90)	-1.26 (-1.36)	-0.33 (-0.28)
<i>RPQ_t</i>	0.07** (2.28)	0.08** (2.24)	-0.04 (-0.51)	-0.12 (-1.16)
Log(Market Cap) _{t-1}	-0.01 (-1.27)	-0.01 (-0.53)	-0.01 (-0.54)	-0.02 (-0.47)
Log(B/M) _{t-1}	-0.01 (-0.43)	-0.04** (-2.14)	0.03 (0.91)	0.09 (1.44)
Ret Volatility _{t-1}	0.09** (2.51)	0.10*** (2.60)	-0.00 (-0.04)	-0.07 (-0.63)
Ret Momentum _{t-1}	-0.13*** (-5.47)	-0.13*** (-4.58)	-0.09* (-1.66)	-0.05 (-0.69)
Log(CEO Age) _{t-1}	0.02 (0.27)	-0.05 (-0.56)	0.29 (1.42)	0.11 (0.44)
Log(CEO Tenure) _{t-1}	0.01 (0.98)	-0.02 (-0.86)	-0.04 (-0.94)	0.09 (1.25)
CEO_Chairperson _{t-1}	-0.04* (-1.83)	-0.00 (-0.20)	-0.02 (-0.31)	-0.09 (-1.42)
Log(Board Size) _{t-1}	0.00 (0.06)	-0.00 (-0.00)	0.11 (0.94)	0.06 (0.37)
Indp Directors _{t-1}	0.09 (1.02)	-0.00 (-0.02)	0.24 (1.03)	-0.31 (-1.22)
Mgmt Ownership _{t-1}	-0.07 (-0.38)	0.19 (1.45)	-1.53 (-0.97)	-1.07 (-0.77)
Inst. Ownership _{t-1}	-0.00 (-0.04)	-0.11 (-1.44)	0.11 (0.52)	0.11 (0.45)
IO Concentration _{t-1}	-0.66 (-1.43)	-0.50 (-0.92)	-2.06** (-2.41)	-0.83 (-0.97)
Year F.E.	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes
<i>N</i>	1,447	1,447	238	238
<i>R</i> ²	0.08	0.10	0.16	0.34

Table 5 – Continued

Panel B: Operating Performance Improvement

	Dependent Variable: $\Delta Adj.ROA_t$			
	Compensation Peers		Bonus Peers	
	Firms with Busy Board	Firms with Co-opted Board	Firms with Busy Board	Firms with Co-opted Board
	(1)	(2)	(3)	(4)
Constant	0.01 (0.15)	-0.01 (-0.17)	0.01 (0.04)	0.49 (1.24)
RPQ_t	0.01*** (3.29)	0.01*** (3.28)	0.03** (2.44)	0.04* (1.88)
Log(Assets) _{t-1}	0.01** (2.10)	-0.01 (-1.33)	0.05** (2.40)	-0.07 (-1.60)
Log(Market Cap) _{t-1}	-0.01* (-1.85)	0.02*** (3.89)	-0.05** (-2.40)	0.01 (0.71)
Log(Tobin's Q) _{t-1}	0.01 (1.38)	0.01 (1.27)	0.07*** (3.36)	0.07* (1.71)
$\Delta Adj.ROA_{t-1}$	-0.28*** (-8.89)	0.01 (1.09)	-0.33*** (-3.66)	0.10** (2.23)
Momentum	0.03*** (6.03)	-0.26*** (-5.79)	0.04*** (2.65)	-0.39*** (-5.23)
Leverage _{t-1}	0.01 (0.70)	0.02 (1.35)	-0.03 (-0.89)	0.04 (0.75)
R&D Ratio _{t-1}	0.10*** (4.34)	0.10*** (3.78)	0.23** (2.59)	0.23 (1.43)
Log(Firm Age) _{t-1}	-0.00 (-0.03)	-0.00 (-0.38)	0.01 (1.08)	-0.00 (-0.24)
Log(CEO Age) _{t-1}	0.01 (0.84)	0.00 (0.45)	0.09*** (2.66)	-0.04 (-0.64)
Log(CEO Tenure) _{t-1}	0.00 (0.98)	0.00 (0.50)	-0.00 (-0.29)	0.03*** (2.72)
CEO_Chairperson _{t-1}	-0.00 (-0.45)	0.00 (0.17)	0.01 (0.55)	-0.02 (-1.00)
Log(Board Size) _{t-1}	-0.01 (-0.94)	0.01 (0.61)	-0.01 (-0.48)	0.02 (0.46)
IndpDirectors _{t-1}	0.01 (0.72)	0.01 (1.19)	0.01 (0.29)	0.02 (0.40)
Mgmt Ownership _{t-1}	-0.01 (-0.27)	0.04** (2.26)	-0.23 (-0.70)	-0.06 (-0.29)
Inst. Ownership _{t-1}	-0.00 (-0.46)	-0.00 (-0.47)	-0.02 (-0.56)	-0.03 (-0.61)
IO Concentration _{t-1}	-0.01 (-0.16)	0.06 (0.96)	0.04 (0.26)	0.16 (0.59)
Year F.E.	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes
N	1,530	1,530	246	246
R ²	0.20	0.16	0.28	0.33

Table 6
Addressing the Endogeneity: 2SLS Regressions

This table reports the 2SLS regression results between RPQ and DGTW characteristics adjusted returns (Panel A) and operating profitability improvement (Panel B). The sample period is from 2006 to 2010. The key independent variable *RPQ* is the relative peer quality index of a reporting firm determined at the beginning of year *t*. The instrumental variable *Median SIC2RPQ* is the median RPQ of all firms in the same SIC2 industry. Results under *Compensation Peers* focus on the compensation peer-based RPQ and include all sample firms that report compensation peers. Results under *Bonus Peers* focus on the bonus peer-based RPQ and include all firms that report bonus peers. Please refer to the Appendix for the detailed definitions of other control variables. All variables are winsorized at the 1st and 99th percentiles. *t*-Statistics in parentheses are computed using the robust standard errors clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Stock Performance				
	Compensation Peers		Bonus Peers	
	(1)	(2)	(3)	(4)
	RPQ	Adj.Ret _{<i>t</i>}	RPQ	Adj.Ret _{<i>t</i>}
Ind. Median RPQ	0.53*** (9.71)		0.65*** (6.58)	
Fitted RPQ		0.15*** (3.26)		0.10 (0.53)
Log(Market Cap) _{<i>t-1</i>}	0.01 (0.76)	-0.02*** (-2.75)	0.01 (0.62)	-0.01 (-0.84)
Log(B/M) _{<i>t-1</i>}	0.09*** (5.75)	-0.07*** (-3.44)	0.11*** (3.17)	0.04 (1.03)
Ret Volatility _{<i>t-1</i>}	0.06** (2.06)	0.05* (1.68)	0.06 (0.95)	-0.06 (-1.01)
Ret Momentum _{<i>t-1</i>}	0.02 (1.12)	-0.12*** (-5.98)	0.02 (0.68)	-0.11*** (-2.71)
Log(CEO Age) _{<i>t-1</i>}	0.02 (0.29)	0.03 (0.49)	0.04 (0.22)	0.00 (0.01)
Log(CEO Tenure) _{<i>t-1</i>}	-0.01 (-0.88)	0.01 (0.58)	-0.03 (-1.56)	-0.00 (-0.10)
CEO_Chairperson _{<i>t-1</i>}	-0.01 (-0.37)	-0.01 (-0.49)	-0.05 (-1.26)	-0.01 (-0.38)
Log(Board Size) _{<i>t-1</i>}	0.09** (2.05)	-0.01 (-0.29)	0.02 (0.19)	0.07 (0.86)
Independent Directors _{<i>t-1</i>}	0.06 (0.85)	-0.01 (-0.17)	-0.10 (-0.60)	0.19 (1.40)
Mgmt Ownership _{<i>t-1</i>}	-0.02 (-0.13)	0.12 (0.96)	-0.41 (-1.10)	0.70 (1.61)
Inst. Ownership _{<i>t-1</i>}	0.08 (1.23)	-0.06 (-1.00)	0.12 (0.80)	0.13 (1.11)
IO Concentration _{<i>t-1</i>}	0.87* (1.88)	-1.09** (-2.51)	0.17 (0.28)	-1.11** (-2.26)
Constant	0.12 (0.32)	0.07 (0.23)	0.21 (0.24)	-0.43 (-0.61)
Year F.E.	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes
<i>N</i>	2,894	2,894	476	476
<i>R</i> ²	0.14	N/A	0.38	N/A
<i>Under Identification Test</i>				
Kleibergen–Paap rk LM statistic		59.76***		15.88***
<i>Weak Identification Test</i>				
Cragg–Donald Wald F statistic		63.00***		61.08***

Table 6 - Continued

Panel B. Operating Performance Improvement				
	Compensation Peers		Bonus Peers	
	(1)	(2)	(3)	(4)
	RPQ	Δ Adj.ROA _t	RPQ	Δ Adj.ROA _t
Ind. Median RPQ	0.50*** (9.55)		0.65*** (6.71)	
Fitted RPQ		0.01** (2.04)		0.02 (0.68)
Log(Market Cap) _{t-1}	-0.17*** (-5.22)	-0.01*** (-2.67)	-0.17** (-2.01)	-0.05*** (-3.05)
Ret Momentum _{t-1}	0.04*** (3.07)	0.02*** (6.83)	0.03 (0.80)	0.03*** (2.65)
Log(Assets) _{t-1}	0.17*** (5.24)	0.01*** (2.60)	0.18** (2.23)	0.04*** (2.96)
Log(Tobin's Q) _{t-1}	0.06* (1.72)	0.01*** (2.77)	0.05 (0.55)	0.06*** (3.28)
Δ Adj.ROA _{t-1}	-0.42*** (-4.70)	-0.27*** (-8.77)	-0.18 (-1.11)	-0.36*** (-5.80)
Leverage _{t-1}	-0.12 (-1.57)	0.01 (0.76)	-0.16 (-0.98)	-0.01 (-0.23)
R&D Ratio _{t-1}	0.26 (1.56)	0.08*** (4.57)	-0.64 (-1.48)	0.15* (1.88)
Log(Firm Age) _{t-1}	-0.04** (-2.24)	0.00 (0.01)	-0.09** (-2.39)	0.00 (0.76)
Log(CEO Age) _{t-1}	0.05 (0.59)	0.00 (0.32)	0.01 (0.03)	0.02 (0.53)
Log(CEO Tenure) _{t-1}	-0.01 (-0.93)	0.00** (2.11)	-0.04* (-1.88)	0.00 (0.61)
CEO_Chairperson _{t-1}	-0.01 (-0.40)	0.00 (0.10)	-0.04 (-1.13)	-0.00 (-0.12)
Log(Board Size) _{t-1}	0.09* (1.90)	0.01 (1.22)	-0.02 (-0.16)	0.02 (1.27)
IndpDirectors _{t-1}	0.03 (0.46)	0.01 (1.02)	0.03 (0.22)	0.01 (0.65)
Mgmt Ownership _{t-1}	0.01 (0.07)	0.02 (1.41)	-0.34 (-0.93)	0.02 (0.27)
Inst. Ownership _{t-1}	0.03 (0.56)	0.00 (0.19)	0.14 (1.05)	-0.02 (-1.08)
IO Concentration _{t-1}	0.46 (1.05)	0.02 (0.59)	0.10 (0.18)	0.02 (0.13)
Constant	1.24*** (2.85)	0.01 (0.17)	1.50 (1.57)	0.23* (1.65)
Year F.E.	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes
N	3,061	3,061	491	491
R ²	0.16	N/A	0.40	N/A
<i>Under Identification Test</i>				
Kleibergen-Paap rk LM statistic		58.07***		18.04***
<i>Weak Identification Test</i>				
Cragg-Donald Wald F statistic		48.92***		45.57***

Table 7

Robustness Tests: Alternative RPQs

This table reports the pooled OLS regression results on the effect of various alternative RPQs on stock returns (Panel A) and operating performance improvement (Panel B). The sample period is from 2006 to 2010. The dummy *High RPQ* equals one if a firm's RPQ is greater than 0.5, and zero otherwise. *RPQ_3Y* is the relative peer quality index based on the average DML managerial ability scores of previous three years. *Residual RPQ* is the residual item of the following regression model: $RPQ_{i,t} = \alpha + \beta AdjROA_{i,t-1}$. Results under *Compensation Peers* focus on the compensation peer-based RPQ and include all sample firms that report the compensation peers. Results under *Bonus Peers* focus on the bonus peer-based RPQ and include all firms that report bonus peers. Please refer to the Appendix for the detailed definitions of control variables. All variables are winsorized at the 1st and 99th percentiles. *t*-Statistics in parentheses are computed using the robust standard errors clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Stock Performance

	Dependent Variable: $Adj.Ret_t$					
	Compensation Peers			Bonus Peers		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.40 (1.57)	0.39 (1.53)	0.43* (1.67)	-0.31 (-0.49)	-0.32 (-0.50)	-0.36 (-0.55)
<i>High RPQ_t</i>	0.03* (2.32)			0.01 (0.20)		
<i>RPQ_3Y_t</i>		0.05** (2.15)			-0.10 (-1.63)	
<i>Residual RPQ_t</i>			0.05** (2.10)			-0.10 (-1.61)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	2,894	2,894	2,894	476	476	476
<i>R</i> ²	0.07	0.07	0.07	0.15	0.15	0.07

Panel B. Operating Performance Improvement

	Dependent Variable: $\Delta Adj.ROA_t$					
	Compensation Peers			Bonus Peers		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.04 (1.02)	0.04 (1.05)	0.05 (1.17)	0.23 (1.53)	0.20 (1.33)	0.23 (1.53)
<i>High RPQ_t</i>	0.01*** (2.78)			0.01* (1.86)		
<i>RPQ_3Y_t</i>		0.01*** (4.54)			0.03*** (3.48)	
<i>Residual RPQ_t</i>			0.01** (1.99)			0.02** (2.25)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	3,061	3,061	3,061	491	491	491
<i>R</i> ²	0.16	0.16	0.16	0.22	0.23	0.23

Table 8

Evidence on the Learning Channel

This table reports the OLS regression results for the potential peer-related learning effect. The sample period is from 2006 to 2010. The dependent variable *CAPEX* in Panel A is the ratio of capital expenditures to total assets during the fiscal year for which peers are used. The dependent variable *MLEVERAGE* in Panel B is the ratio of total debt to market value of total assets during the fiscal year for which peers are used. *Peer Averages* denotes variables constructed as the average of all peer firms used by reporting firms. *Firm Characteristics* denotes reporting firms' characteristics. Results under *Compensation Peers* are based on the peer averages computed using compensation peers and include all sample firms that report compensation peers. Results under *Bonus Peers* are based on the peer averages computed using bonus peers and include all firms that report bonus peers. Results under *All Peers* include all peer firms. Results under *Dropped Peers* include those firms that are dropped from the peer group in year t but are in the peer group in year $t - 1$. Results under *Non-SIC3 Peers* include only those peers from a different SIC3 industry. Results under *High (Low) Ability Peers* include those peers whose DLM managerial ability scores are higher (lower) than that of the reporting firm. Please refer to the Appendix for the detailed definitions of other control variables. All variables are winsorized at the 1st and 99th percentiles. t -Statistics in parentheses are computed using the robust standard errors clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Capital Expenditures

	Dependent Variable: $CAPEX_t$									
	Compensation Peers					Bonus Peers				
	All Peers	Dropped Peers	Non-SIC3 Peers	High Ability Peers	Low Ability Peers	All Peers	Dropped Peers	Non-SIC3 Peers	High Ability Peers	Low Ability Peers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	0.21*** (3.44)	0.43 (1.58)	0.20*** (3.15)	0.21*** (3.04)	0.21*** (3.29)	0.06 (0.27)	0.02 (0.03)	0.16 (0.69)	0.25 (0.92)	0.13 (0.52)
Peer Averages										
$CAPEX_t$	0.16** (2.21)	0.01 (0.20)	0.05* (1.84)	0.14** (2.01)	0.08** (2.45)	0.42** (2.02)	-0.12 (-0.72)	-0.01 (-0.18)	0.12 (0.82)	0.09 (1.28)
$\text{Log}(\text{Sales})_{t-1}$	-0.00 (-0.66)	-0.00 (-0.64)	-0.00 (-0.10)	-0.00 (-0.63)	-0.00 (-1.02)	0.01 (0.56)	0.01 (0.51)	-0.00 (-0.12)	-0.01 (-0.85)	0.00 (0.29)
$\text{Market-to-Book}_{t-1}$	0.01 (1.56)	0.00 (0.10)	0.01 (1.47)	0.00 (1.16)	0.00 (0.11)	0.04** (2.51)	0.00 (0.21)	0.02 (1.19)	0.03** (2.42)	0.01 (0.42)
ROA_{t-1}	-0.03 (-0.49)	-0.02 (-0.29)	-0.06 (-1.18)	-0.03 (-1.05)	0.03 (0.73)	-0.07 (-0.45)	0.14 (0.64)	-0.15 (-1.25)	-0.20** (-2.30)	0.20 (1.39)
Tangibility_{t-1}	-0.04 (-0.72)	0.01 (0.39)	0.02 (0.38)	-0.04 (-1.02)	-0.03 (-1.14)	0.02 (0.13)	0.04 (0.65)	0.19* (1.72)	-0.04 (-0.44)	0.06 (0.70)
Firm Characteristics										
$\text{Log}(\text{Sales})_{t-1}$	-0.01 (-1.43)	-0.03 (-1.18)	-0.02* (-1.94)	-0.01 (-1.18)	-0.01 (-1.28)	-0.01 (-0.33)	0.00 (0.05)	-0.01 (-0.28)	0.00 (0.03)	-0.01 (-0.25)
$\text{Market-to-Book}_{t-1}$	0.00 (0.83)	0.00 (0.34)	0.00 (1.26)	0.00 (1.55)	0.00 (1.52)	-0.02* (-1.71)	0.03 (0.57)	0.00 (0.09)	-0.01 (-0.97)	-0.01 (-0.65)
ROA_{t-1}	0.07** (1.98)	0.04 (0.28)	0.06 (1.57)	0.06 (1.58)	0.05 (1.41)	0.16 (1.29)	-0.09 (-0.40)	0.11 (1.10)	0.20 (1.54)	0.05 (0.41)
Tangibility_{t-1}	-0.18*** (-3.07)	-0.33* (-1.74)	-0.18*** (-2.77)	-0.20*** (-3.04)	-0.14** (-2.18)	-0.11 (-0.74)	-0.04 (-0.31)	-0.26 (-1.35)	-0.20 (-1.08)	-0.07 (-0.34)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,392	1,047	3,037	3,146	3,134	524	98	431	485	486
R^2	0.92	0.95	0.92	0.92	0.93	0.95	0.99	0.95	0.95	0.96

Table 8 – Continued

Panel B: Market Leverage

Dependent Variable: $MLEVERAGE_t$										
	Compensation Peers					Bonus Peers				
	All Peers	Dropped Peers	Non-SIC3 Peers	High-Ability Peers	Low-Ability Peers	All Peers	Dropped Peers	Non-SIC3 Peers	High-Ability Peers	Low-Ability Peers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	0.15 (1.33)	-0.02 (-0.05)	0.11 (0.85)	0.12 (1.12)	0.17 (1.42)	0.25 (0.65)	0.87 (0.50)	0.02 (0.04)	0.42 (1.11)	0.01 (0.03)
Peer Averages										
$MLEVERAGE_t$	0.35*** (8.37)	0.03 (0.79)	0.18*** (4.65)	0.20*** (5.99)	0.13*** (4.61)	0.48*** (3.90)	-0.05 (-0.45)	0.21 (1.63)	0.25** (2.33)	0.26*** (3.40)
Log(Sales)_{t-1}	-0.00 (-0.02)	0.00 (0.18)	-0.00 (-0.04)	0.00 (0.51)	-0.01* (-1.83)	-0.02 (-0.72)	0.01 (0.29)	-0.01 (-0.25)	-0.03 (-1.16)	-0.01 (-0.62)
$\text{Market-to-Book}_{t-1}$	0.01** (2.26)	0.01 (1.09)	0.01 (1.52)	0.01** (2.18)	0.01 (1.04)	0.03 (1.03)	-0.04 (-0.49)	0.02 (0.82)	0.01 (0.45)	0.03 (0.97)
ROA_{t-1}	0.04 (0.51)	0.00 (0.02)	0.04 (0.49)	0.02 (0.37)	0.09 (1.53)	0.21 (1.00)	0.15 (0.23)	0.14 (0.71)	-0.12 (-0.59)	0.18 (0.91)
Tangibility_{t-1}	-0.18** (-2.30)	-0.01 (-0.18)	-0.06 (-1.14)	-0.01 (-0.16)	-0.05 (-1.12)	-0.11 (-0.36)	-0.06 (-0.46)	0.02 (0.08)	0.17 (1.37)	-0.16 (-1.12)
Firm Characteristics										
Log(Sales)_{t-1}	-0.00 (-0.15)	0.03 (0.48)	0.00 (0.19)	-0.00 (-0.19)	0.01 (0.50)	0.01 (0.17)	-0.05 (-0.28)	0.02 (0.38)	-0.01 (-0.22)	0.03 (0.57)
$\text{Market-to-Book}_{t-1}$	-0.01** (-2.26)	-0.02 (-1.28)	-0.01** (-2.30)	-0.01** (-2.48)	-0.01 (-1.49)	-0.03 (-1.52)	-0.12 (-0.81)	-0.04** (-2.17)	-0.03 (-1.22)	-0.03 (-1.07)
ROA_{t-1}	-0.06 (-0.90)	-0.01 (-0.03)	-0.04 (-0.49)	-0.02 (-0.29)	-0.12 (-1.60)	-0.01 (-0.05)	0.09 (0.19)	-0.07 (-0.50)	0.15 (0.83)	-0.09 (-0.69)
Tangibility_{t-1}	0.09 (1.14)	0.00 (0.01)	0.11 (1.31)	0.07 (0.86)	0.08 (0.95)	0.14 (0.71)	-0.18 (-0.30)	0.29 (1.39)	0.01 (0.06)	0.17 (0.86)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3335	1027	2976	3089	3074	521	98	428	482	483
R^2	0.87	0.92	0.86	0.87	0.86	0.88	0.97	0.87	0.87	0.88

Table 9

Evidence on the Incentive Channel

This table reports the OLS regression results between RPQ and firm performance. The sample period is from 2006 to 2010. Panel A focuses on stock performance and Panel B on operating performance improvement. *Pay_Gap* measures the difference between the highest CEO total compensation of all compensation peers and the current CEO compensation of the reporting firm. *High (Low) Pay_Gap* represents the subsample of firms with *Pay_Gap* in the top (bottom) tercile of all sample firms that report the compensation peers during the fiscal year. All sample firms that report compensation peers are used in this analysis. Baseline control variables are omitted for brevity. Please refer to the Appendix for the detailed definitions of control variables. All variables are winsorized at the 1st and 99th percentiles. *t*-Statistics in parentheses are computed using the robust standard errors clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Stock Performance

	Dependent Variable: $Adj.Ret_t$	
	<i>High Pay_Gap Firms</i>	<i>Low Pay_Gap Firms</i>
	(1)	(2)
Constant	-0.80*	0.37
	(-1.81)	(0.75)
<i>RPQ_t</i>	0.07**	0.03
	(2.14)	(0.65)
Baseline Controls	Yes	Yes
Year F.E.	Yes	Yes
Industry F.E.	Yes	Yes
<i>N</i>	964	962
<i>R</i> ²	0.11	0.10

Panel B. Operating Performance Improvement

	Dependent Variable: $\Delta Adj.ROA_t$	
	<i>High Pay_Gap Firms</i>	<i>Low Pay_Gap Firms</i>
	(1)	(2)
Constant	-0.13*	0.06
	(-1.68)	(0.60)
<i>RPQ_t</i>	0.01*	0.01
	(1.86)	(1.36)
Baseline Controls	Yes	Yes
Year F.E.	Yes	Yes
Industry F.E.	Yes	Yes
<i>N</i>	1,022	1018
<i>R</i> ²	0.16	0.21

Table 10
Relative Peer Quality and Risk Shifting

This table reports the *risk adjustment ratio* (RAR) of reporting firms. The risk adjustment ratio is the standard deviation of 12-month returns during which peers are used normalized by the standard deviation of 12-month returns of the previous year. A reporting firm is said to be low (high) RPQ if its RPQ is in the bottom (top) tercile among all sample firms. *Pay_Gap* measures the difference between the highest CEO total compensation of all compensation peers and the reporting firm's CEO compensation. *High (Low) Pay_Gap Firms* include all reporting firms with top (bottom) tercile *Pay_Gap*. Results under the *Compensation Peers* focus on the compensation peer-based RPQ and include all sample firms that report compensation peers. Results under *Bonus Peers* focus on the bonus peer-based RPQ and include all firms that report bonus peers. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Compensation Peers						Bonus Peers	
	<i>All Firms</i>		<i>High Pay_Gap Firms</i>		<i>Low Pay_Gap Firms</i>		<i>All Firms</i>	
	<i>N</i>	Mean	<i>N</i>	Mean	<i>N</i>	Mean	<i>N</i>	Mean
High RPQ (H)	1,232	1.19	412	1.23	410	1.20	189	1.20
Low RPQ (L)	1,212	1.16	412	1.20	410	1.14	187	1.11
H – L		0.03		0.03		0.06		0.09
<i>t</i> -Statistic		1.24		0.71		1.41		1.45

Table 11
Relative Peer Quality and Earnings Management

This table reports the OLS regression results between RPQ and potential earnings management activities. The sample period is from 2006 to 2010. We use three earnings management measures: *Discretionary Accruals* (Jones, 1991), *ROA Matched Discretionary Accruals* (Kothari, Leone, and Wasley, 2005), and the *Cash Flow Based* earning management measure of Dechow and Dichev (2002). We focus on the changes in these earnings management measures as dependent variables. Results under *Compensation Peers* focus on the compensation peer-based RPQ and include all sample firms that report compensation peers. Results under *Bonus Peers* focus on the bonus peer-based RPQ and include all firms that report bonus peers. Please refer to the Appendix for the detailed definitions of other control variables. All variables are winsorized at the 1st and 99th percentiles. *t*-Statistics in parentheses are computed using the robust standard errors clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Compensation Peers			Bonus Peers		
	Δ Disc. Accruals _{<i>t</i>}	Δ ROA-Matched Disc. Accruals _{<i>t</i>}	Δ Cash Flows Based _{<i>t</i>}	Δ Disc. Accruals _{<i>t</i>}	Δ ROA-Matched Disc. Accruals _{<i>t</i>}	Δ Cash Flows Based _{<i>t</i>}
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-1.50 (-1.04)	-0.73 (-0.50)	0.01 (0.12)	-3.26 (-0.92)	0.08 (0.02)	0.20* (1.66)
RPQ	-0.09 (-0.64)	-0.05 (-0.32)	-0.01 (-1.21)	-1.04** (-2.52)	0.26 (0.54)	-0.01 (-0.58)
Log(Assets) _{<i>t-1</i>}	0.00 (0.10)	0.03 (0.96)	0.00* (1.90)	0.22** (2.09)	0.15 (1.32)	0.01* (1.85)
BM Ratio _{<i>t-1</i>}	-0.31*** (-3.24)	0.02 (0.20)	-0.07*** (-10.84)	-0.65** (-2.12)	0.19 (0.74)	-0.08*** (-5.60)
ROA _{<i>t-1</i>}	-2.13*** (-3.50)	-0.24 (-0.39)	0.39*** (10.15)	-4.39** (-2.29)	0.79 (0.34)	0.18** (2.22)
Leverage _{<i>t-1</i>}	-0.42* (-1.79)	-0.04 (-0.17)	-0.02** (-2.10)	-0.28 (-0.32)	1.40 (1.48)	-0.07*** (-2.73)
Std. Dev. (ROA) _{<i>t-1</i>}	-0.22 (-0.05)	3.05 (0.69)	-0.33 (-1.55)	0.50 (0.07)	-0.31 (-0.05)	0.16 (0.43)
Log(CEO Age) _{<i>t-1</i>}	0.22 (0.68)	0.00 (0.01)	0.02 (1.63)	0.91 (1.02)	0.01 (0.01)	-0.03 (-0.96)
Log(CEO Tenure) _{<i>t-1</i>}	0.08 (1.29)	-0.05 (-0.82)	0.00 (0.06)	0.30 (1.39)	-0.25 (-1.06)	0.00 (0.09)
CEO_Chairperson _{<i>t-1</i>}	-0.23** (-2.51)	0.10 (0.97)	0.00 (0.99)	-0.59* (-1.83)	-0.23 (-0.82)	0.01 (1.39)
Log(Board Size) _{<i>t-1</i>}	-0.25 (-1.25)	0.04 (0.19)	-0.01 (-1.12)	-0.61 (-1.08)	-0.14 (-0.24)	-0.02 (-1.03)
Indep. Directors _{<i>t-1</i>}	0.15 (0.39)	0.08 (0.26)	-0.02* (-1.87)	-1.80 (-1.53)	-0.08 (-0.06)	0.04 (1.22)
Mgmt. Ownership _{<i>t-1</i>}	-0.91 (-1.29)	-0.52 (-0.77)	0.05*** (3.01)	-2.00 (-1.04)	-0.11 (-0.09)	0.17*** (2.89)
IO _{<i>t-1</i>}	0.37 (1.44)	0.33 (1.14)	-0.00 (-0.30)	0.70 (0.77)	-1.14 (-1.37)	-0.02 (-0.71)
IO Concentration _{<i>t-1</i>}	-0.78 (-0.43)	4.69** (2.16)	-0.17** (-2.26)	0.43 (0.12)	-2.04 (-0.61)	0.02 (0.13)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	2,880	2,674	2,821	476	434	463
<i>R</i> ²	0.11	0.01	0.48	0.21	0.03	0.46

Table 12
The Role of General Peer Quality

This table investigates the potential interaction between peers' relative quality and general quality. Panel A focuses on stock performance and Panel B on operating performance improvement. The dummy variable *High_GPQ* equals one if the median managerial ability score of a reporting firm's peers is in the top quintile among all sample reporting firms, and zero otherwise. Baseline controls are omitted for brevity. Results under *Compensation Peers* focus on the compensation peer-based RPQ and include all sample firms that report compensation peers. Results under *Bonus Peers* focus on the bonus peer-based RPQ and include all firms that report bonus peers. Please refer to the Appendix for the detailed definitions of all other control variables. All variables are winsorized at the 1st and 99th percentiles. *t*-Statistics in parentheses are computed using the robust standard errors clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Stock Performance

	Dependent Variable: $Adj.Ret_t$	
	Compensation Peers	Bonus Peers
	(1)	(2)
Constant	0.40 (1.56)	-0.29 (-0.45)
RPQ_t	0.06** (2.49)	-0.10 (-1.60)
$RPQ_t \times High_GPQ$	-0.02 (-0.47)	-0.01 (-0.12)
Baseline Controls	Yes	Yes
Year F.E.	Yes	Yes
Industry F.E.	Yes	Yes
<i>N</i>	2,894	476
<i>R</i> ²	0.07	0.15

Panel B. Operating Performance Improvement

	Dependent Variable: $\Delta Adj.ROA_t$	
	Compensation Peers	Bonus Peers
	(1)	(2)
Constant	0.04 (0.84)	0.19 (1.20)
RPQ_t	0.01*** (4.90)	0.05*** (4.36)
$RPQ_t \times High_GPQ$	-0.01*** (-3.01)	-0.05*** (-3.71)
Baseline Controls	Yes	Yes
Year F.E.	Yes	Yes
Industry F.E.	Yes	Yes
<i>N</i>	3,061	491
<i>R</i> ²	0.16	0.26

Bank of Finland Research Discussion Papers 2016

ISSN 1456-6184, online

- 1/2016 Aino Silvo
The interaction of monetary and macroprudential policies in economic stabilisation
ISBN 978-952-323-088-0, online
- 2/2016 Rune Stenbacka – Tuomas Takalo
Switching costs and financial stability
ISBN 978-952-323-094-1, online
- 3/2016 Mikael Juselius – Mathias Drehmann
Leverage dynamics and the burden of debt
ISBN 978-952-323-098-9, online
- 4/2016 Mikael Juselius – Elod Takats
The age-structure – inflation puzzle
ISBN 978-952-323-099-6, online
- 5/2016 Bill B. Francis – Iftekhar Hasan – Xian Sun – Qiang Wu
CEO Political Preference and Corporate Tax Sheltering
ISBN 978-952-323-100-9, online
- 6/2016 Bill Francis – Iftekhar Hasan – Sureshbabu Mani – Pengfei Ye
Relative Peer Quality and Firm Performance
ISBN 978-952-323-101-6, online

