RESEARCH NOTES AND COMMENTARIES

CREATING INCENTIVES FOR INNOVATION? THE RELATIONSHIP BETWEEN PAY DISPERSION IN R&D GROUPS AND FIRM INNOVATION PERFORMANCE

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Innovation is a critical organizational outcome for its potential to generate competitive advantage. While the contribution of knowledge workers to the generation of innovation is widely recognized, little is known about how organizational incentive mechanisms stimulate or inhibit these workers' behaviors that promote innovation. This study examines the relationship between pay dispersion in R&D groups and firm innovation using employee-level compensation data in US high-technology firms. The results show that (1) pay dispersion in R&D groups is negatively related to firm innovation and (2) this negative relationship is alleviated in firms with greater financial slack. This study contributes to the innovation literature by illuminating the implications of organizational incentive systems for successful innovation. Copyright © 2013 John Wiley & Sons, Ltd.

INTRODUCTION

Innovation has long been recognized as a crucial component of competitive strategy (Banbury and Mitchell, 1995; Danneels, 2002). Particularly in high-technology industries, where technologies evolve quickly, firms invest heavily in research and development (R&D) to promote technological advantages (Balkin, Markman, and Gomez-Mejia, 2000). Coupled with a strict intellectual property protection regime, inventing new ideas and patenting them is a compelling strategic direction for many of these firms because patent rights allow

them to establish entry barriers and generate rents (Joshi and Nerkar, 2011).

While strategic management research has examined the mechanism of innovation from various theoretical angles (Ahuja, Lampert, and Tandon, 2008), researchers are increasingly interested in the role of human capital management. This line of research views innovation as a result of knowledge management processes. That is, firms generate innovations by managing their knowledge resources, including knowledge possessed by individual employees, knowledge embedded in employee networks (e.g., knowledge shared by employee groups), and knowledge compiled in knowledge management systems (e.g., databases, manuals). Effective development and utilization of these knowledge resources enhances firms' innovation performance (Subramaniam and Youndt, 2005). To date, much of this research has examined

the development of firm knowledge resources with a primary focus on hiring and developing high quality knowledge workers (e.g., Rothaermel and Hess, 2007). Less is known, however, about the utilization of these workers for generating innovation. This is an important omission because obtaining high quality knowledge workers does not automatically guarantee innovation. To capitalize on these workers' knowledge, firms need to establish incentive mechanisms that encourage them to act in a way that promotes innovation (Gupta, Tesluk, and Taylor, 2007).

This study attempts to address this void by examining the impact of employee-level compensation on innovation. Specifically, it focuses on the relationship between pay dispersion among R&D employees and innovation. Pay dispersion, which is defined as the degree to which pay is differentiated among employees within organizations, is recognized as a key decision area in organizational human capital management for its effects on the quality of organizational workforces and motivation (Gerhart and Rynes, 2003). In this study, we argue that, in the R&D context, these effects of pay dispersion have important consequences for employee behaviors that are relevant to both the development and utilization of firm knowledge resources.

This study contributes to the innovation literature by illuminating the implications of organizational incentive systems for successful innovation. Our findings also contribute to the compensation literature by highlighting the role of the R&D context in understanding the effect of pay dispersion. Collectively, our article bridges the strategic management and human capital management literatures. Recognizing the importance of human capital management for strategy formulation and implementation, scholars and practitioners claim that senior human resource managers should be involved in the strategic management process (Ulrich and Filler, 2011). Our study supports this claim by showing that firm pursuit of innovation is augmented or constrained by organizational incentive systems.

THEORETICAL FRAMEWORK AND HYPOTHESES

Pay dispersion controversy

The performance effect of pay dispersion is a disputed topic because theories offer conflicting predictions. One stream of research highlights the positive effects of large pay dispersion on firm performance. In principle, pay dispersion reflects firms' interest in rewarding employees' individual performance (Gerhart and Rynes, 2003), and the link between pay and performance motivates employees to achieve better performance (Vroom, 1964). Employees also consider pay to be fair when it appropriately reflects individual contributions, and maintaining a sense of fairness is essential to ensuring work effort (Adams, 1965). Pay dispersion also improves the quality of firm workforces by sorting out unproductive workers (Lazear, 2000). With large pay dispersion, productive employees remain with a firm where they consider themselves to be well paid, while unproductive employees quit because they consider themselves to be underpaid. Collectively, large pay dispersion is expected to improve firm performance by enhancing workforce quality and soliciting greater work effort from the workforce.

The other stream of research emphasizes the negative effects of large pay dispersion on firm performance. When pay differentials are too large, lower paid employees consider their pay to be inequitable and react negatively, for example, by withholding effort. Employees may also view their firm's pay distribution as a zero-sum game and choose not to help colleagues (Pfeffer and Langton, 1993). Large pay dispersion also increases turnover (Bloom and Michel, 2002) although empirical support is currently limited at the management level. While a loss of human capital caused by employee turnover is offset by new hires' better quality human capital as claimed by the sorting argument, employee turnover also erodes employee networks and trust (Dess and Shaw, 2001). Collectively, large pay dispersion is thought to harm firm performance by hurting the quality of employee relationships and evoking dysfunctional employee behaviors.

The literature points to two approaches to reconcile this theoretical conflict. One approach is the consideration of contexts. The contingency model (Gomez-Mejia and Balkin, 1992) argues that the effects of compensation systems on firm performance vary according to work and organizational contexts. This model posits two primary mechanisms through which contexts alter the effects of compensation systems. First, these contexts change the meaning of a certain event to employees (Johns, 2006). Employee reactions to

a compensation system will differ across contexts, and the difference in employee reactions makes a difference to firm performance. Second, because desirable employee behaviors differ according to organizational contexts such as business strategy, even if a compensation system stimulates the same employee behavior across firms, the effect of the behavior on firm performance differs depending on the degree to which the behavior is aligned with organizational contexts (Gomez-Mejia and Balkin, 1992).

The second approach decomposes the effect of pay dispersion into separate components (Mahy, Rycx, and Volral, 2011; Trevor, Reilly, and Gerhart, 2012). Trevor *et al.* (2012) argue that pay dispersion consists of *dispersion that is explained by performance* (DEP) and *dispersion that is unexplained by performance* (DUP). Using the North American National Hockey League's data, the authors reveal that DEP is positively associated with team performance, while DUP is not. Thus, pay dispersion positively impacts organizational performance only to the extent that it reflects individual performance. Furthermore, these authors argue that pay dispersion's positive performance effect due to improved player quality (i.e., the sorting effect) will be parceled out and statistically represented by the relationship between team pay levels and team performance because improved player quality will be associated with increased team pay levels.

In the following section, we integrate these two approaches to elaborate the effect of pay dispersion among R&D employees on innovation. In so doing, our theory relies more heavily on the first approach (i.e., the contingency approach). While the distinction between DEP and DUP offers an important insight, we contend that the clarity of these two types of pay dispersion also depends on work and organizational contexts. In this sense, the contingency approach offers an overarching framework to predict the effect of pay dispersion on innovation.

The effects of pay dispersion in the R&D context

Pay dispersion influences the development of firm knowledge resources both positively and negatively. As posited by the sorting argument, large pay dispersion increases the sum of individual employees' knowledge retained in firms by attracting and retaining high quality R&D workers. Particularly, large pay dispersion enables firms to offer higher pay and acquire star researchers who potentially introduce novel ideas (Rothaermel and Hess, 2007). However, as Trevor *et al.* (2012) argue, this positive effect will be manifested by the relationship between R&D employees' pay levels and innovation. Improved quality of R&D employees will lead to an increase in employee pay levels, yielding a positive relationship between R&D employees' pay levels and innovation.

Other than the effect on the volume of knowledge held by individual R&D employees, we contend that large pay dispersion has a negative impact on the development of knowledge in employee networks and firm knowledge management systems. Facing large pay dispersion, employees may be reluctant to share knowledge with others or contribute to firm knowledge management systems with a concern that doing so might reduce their knowledge advantages and eventually result in decreases in their pay relative to that of their colleagues. Furthermore, constant changes in firm membership due to higher turnover may impede the development of knowledge embedded in employee networks within firms because it becomes more difficult for firms to maintain shared understandings and values among their employees (Dess and Shaw, 2001).

Pay dispersion also influences employee motivation to utilize firm knowledge resources for generating innovation both positively and negatively. In theory, pay dispersion that reflects individual contributions to innovation should motivate employees to work effectively for the generation of innovation. We note, however, that establishing pay dispersion that accurately reflects individual performance (or establishing *dispersion that is explained by performance*, or DEP, in Trevor *et al.*, 2012) is not always straightforward. In professional sports contexts, such as the case in Trevor *et al.* (2012), measuring individual contributions is less contentious because a number of objective individual-level performance metrics are available. In contrast, measuring R&D employees' individual contributions involves serious difficulty. Firms may focus on achieved innovation (i.e., the number of patents assigned to employees); however, reliance on such an outcome measure is subject to contamination because only a fraction of R&D projects result in patents and success often depends on a number of factors that are out of employees'

control (Ahuja *et al.*, 2008).[1] Alternatively, firms may consider R&D employees' workplace behaviors to measure individual performance; however, dictating desirable behaviors would also be difficult given the nonstandardized nature of R&D work. With the difficulty in determining individual-level contributions, realized pay dispersion is hardly seen as reflecting individual performance (i.e., DEP) by organizational members. Consequently, the positive motivational effect of pay differentiation is unlikely in the R&D context.

On the contrary, large pay differentials increase the competitive tension among employees and will discourage employee collaboration and cooperation (Pfeffer and Langton, 1993). This is highly detrimental to innovation because the generation of new ideas often involves collaboration among employees (Collins and Smith, 2006). Although large pay dispersion allows firms to attract star researchers, large pay differentials between star and nonstar researchers will discourage the latter group's commitment by leading them to feel that their contributions are not adequately valued. Lack of commitment from nonstar researchers prevents the firm from capitalizing on star researchers' knowledge for the generation of innovation (Rothaermel and Hess, 2007).

Overall these examinations suggest that, given certain R&D employee pay levels, negative effects of large pay dispersion on the development and utilization of firm knowledge resources dominate over the potential positive effects. We predict that large pay dispersion is negatively associated with firm innovation.

Hypothesis 1: After controlling for pay levels, pay dispersion among R&D employees is negatively associated with innovation.

The moderating effects of firm factors

Pay dispersion is concerned with a firm's decision about the distribution of its compensation budget among its employees. Based on this notion, we have posited that pay dispersion stimulates employee reactions that aim to secure income from their firm's compensation budget. Individuals are known to be loss averse in the sense that they react more strongly to potential losses than to potential gains (Kahneman and Tversky, 1979).

Building on this loss aversion argument, we posit that employee reactions to pay dispersion will vary depending on their expectations about their firm's future compensation budget. When employees expect that their firm's compensation budget will shrink, they also anticipate a pay decrease in the future (= a loss situation). Under this circumstance, competitive tensions among employees due to large pay dispersion will become even stronger. To secure their current income, they may become more self-serving and less interested in sharing knowledge with others. In contrast, when employees expect that their firm's compensation budget will expand, they expect a pay increase in the future (= a gain situation), and these employees may become less sensitive to large pay dispersion. In sum, we expect that the negative employees' behavior evoked by large pay dispersion will be greater when they suspect a future shrinkage of the firm's compensation budget but will be smaller when they expect its future expansion.

We propose two firm factors that influence employees' expectations about their firm's future compensation budget: growth opportunities and financial slack. Firms undertake unique sets of investments and projects to achieve growth (Penrose, 1995), and employees form expectations regarding their firm's future performance. When employees believe that their firm has greater growth opportunities, then they are more optimistic about their firm's future performance. Because better-performing firms generally have better ability to pay (Gerhart and Milkovich, 1990), employees are likely to anticipate that their firm's compensation budget will expand. In contrast, when employees believe that their firm has limited growth opportunities, they project limited improvement in firm performance and lower chances of future compensation budget expansion.

Financial slack refers to firm financial resources that are not committed to any specific activities (Greve, 2003). While financial slack is known to influence directly innovation performance by affecting a firm's propensity to undertake risky R&D projects (Nohria and Gulati, 1996), it also influences the quality of employment relationships. A firm with large financial slack is more likely to invest in the relationship with its stakeholders, such as employees (Waddock and Graves, 1997), and the investment in employee relationships will include better compensation (Wang, He, and Mahoney, 2009). When the firm retains

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[1] We thank an anonymous reviewer for pointing out this.

large financial slack, its employees are likely to anticipate an expansion of compensation budget in the future. Contrarily, when the firm has small financial slack, its employees expect that the size of the compensation budget will remain the same size in the future, or even shrink to finance other firm activities.[2]

Based on these arguments, we propose that in firms with higher growth opportunities and larger financial slack, the negative impact of pay dispersion on innovation will be alleviated because employees react to pay dispersion less negatively.

> *Hypothesis 2a: Firm growth opportunities moderate the relationship between pay dispersion among R&D employees and innovation. The negative effect of pay dispersion on innovation will be weaker in firms with higher growth opportunities.*

> *Hypothesis 2b: Firm financial slack moderates the relationship between pay dispersion among R&D employees and innovation. The negative effect of pay dispersion on innovation will be weaker in firms with larger financial slack.*

METHODS

Sample and data

We gained access to employee compensation data collected by a consulting firm as part of an annual compensation benchmarking survey administered to high-technology (mainly information technology) firms in the US from 1997 to 2002. Although the survey included the information of employees in various functional areas, we focused on nonmanagerial employees in R&D groups (e.g., research scientists, development engineers). We restricted our sample to publicly traded firms and collected firm-level information from Standard & Poor's Compustat. The firms and employees included in the annual survey varied from year

to year. For the measure of innovation, we collected patent data from the U.S. Patent and Trademark Office website. The final sample consists of an unbalanced panel data of 428 firm-year observations, including 736,520 records of individual compensation information.

Variables

Dependent variable

In accordance with previous studies, we measured *firm innovation* as the annual number of successful patent applications by a firm (Ahuja and Katila, 2001). In the high-technology industry, patenting inventions is not only prevalent (Hall, Jaffe, and Trajtenberg, 2002), but also recognized as a critical performance outcome (Balkin *et al.*, 2000). Given the fact that R&D employees are major workforces for generating new inventions, patent counts serve as an important performance indicator for R&D groups. Scholars also recognize that patent counts are a good proxy for innovation as this measure correlates well with other innovation indices, such as the number of new products (Achilladelis, Schwarzkopf, and Cines, 1987).

Independent variable

Our analysis focused on the horizontal dimension of pay dispersion (i.e., pay differentials among the employees within the same job level). The central premise of this study is that pay comparisons stimulate certain employee behaviors. Several scholars argue that horizontal pay dispersion evokes stronger employee reactions than vertical pay dispersion (i.e., pay differentials across different job levels) because pay differentiation is more relevant when it is framed in reference to colleagues holding similar positions (Shaw, Gupta, and Delery, 2002). Consistent with previous studies (e.g., Fredrickson, Davis-Blake, and Sanders, 2010), we used the coefficient of variation (i.e., the standard deviation divided by the mean, CV) of the total pay as the measure of *pay dispersion*. The total pay is the sum of the base pay and the short- and long-term incentives. The monetary value of stock-based compensation was calculated using the Black-Scholes model. The database categorized R&D employee positions into five job levels. We first calculated the CV for each of the five job levels. We then averaged these CVs across

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[2] Too large financial slack may be detrimental to firm innovation performance as it often leads to an increase in bad R&D projects (Nohria and Gulati, 1996). However, employees' expectations about future compensation budget are unlikely to diminish with too large financial slack, and therefore we hypothesize that the moderating effect of financial slack on the relationship between pay dispersion and innovation performance takes a linear form.

the five job levels to represent the pay dispersion of the R&D group in a firm ($\alpha = 0.94$). We scaled this pay dispersion measure by dividing it by 100.

Moderators

To measure the *growth opportunities* of a firm, we used the market-to-book ratio (Fredrickson *et al.*, 2010), which was calculated as the ratio of a firm's market value to its book value. Because a firm's share price reflects the stock market's evaluation of the firm's future returns, higher market-to-book ratios indicate that investors expect higher firm growth. We measured the *financial slack* of a firm by dividing current assets by current liabilities (Wang *et al.*, 2009). Higher financial slack indicates that the firm has greater financial resources.

Control variables

Our model included a set of control variables. First, we controlled for pay levels, as Hypothesis 1 predicts the effect of pay dispersion on innovation after controlling for pay levels. To measure each firm's *pay levels*, we first standardized the average total pay for each of the five job levels and then computed the average of the five standardized variables ($\alpha = 0.96$, Brown, Sturman, and Simmering, 2003). Second, we controlled for *firm size* by using the natural logarithm of the firm's total number of employees. Third, we controlled for *R&D expenditures* because R&D investment enhances innovation performance by improving a firm's ability to absorb external knowledge (Cohen and Levinthal, 1990). We scaled R&D expenditures by dividing them by the firm's sales. Fourth, we included a firm's *financial performance*, as measured by the return on assets (ROA) in the model, because it may influence a firm's motivation to innovate (Cyert and March, 1963). Fifth, we controlled for a firm's *prior innovation performance* because firms with high prior innovation performance are more likely to develop new innovations. We measured the number of patents that were successfully granted to a firm in the past five years (Argote, 1999). We scaled this number by dividing it by 1,000. Sixth, we controlled for *environmental uncertainty* to account for the effect that the volatility of an industry's competitive context may have on a firm's innovation performance. Following Cannella, Park, and Lee (2008), we first

regressed annual two-digit NAICS industry sales from the previous five years on time. We then divided the standard deviation of the regression coefficient by the industry-average sales over the five-year period and used the result as the measure of environmental uncertainty. We also included *industry* dummies based on the first two digits of the NAICS code. Finally, we controlled for year effects by including *year* dummies.

Model

Our dependent variable, the number of successful patent applications, is a count variable. Although Poisson regression is appropriate for modeling count data, our data were overdispersed, thus violating a basic assumption of the Poisson estimator that variance of the count variable equals its conditional mean. Therefore, we used a negative binomial regression model, which is a generalized form of Poisson regression that incorporates individual, unobserved effects into the conditional mean (Hausman, Hall, and Griliches, 1984). Based on the results from the Hausman test, we employed the fixed-effects model. We also ran the random-effects model and found the results were consistent. We took a one-year lag for the dependent and control variables. Pay dispersion and moderators were mean-centered to reduce the nonessential multicollinearity problem (Cohen *et al.*, 2003).

RESULTS

Table 1 summarizes the descriptive statistics, including the means, standard deviations, and correlations of the variables. Consistent with Trevor *et al.* (2012), pay dispersion and pay levels are positively correlated ($r = 0.390$, $p < 0.001$). Table 2 presents the results of our negative binominal regression analysis. Although we included variables in a hierarchical order, we present the results that included pay dispersion but not pay levels (in Model 2) to show how the effect of pay dispersion differs between when pay levels are controlled for and when they are not. Because our analysis assumes a nonlinear relationship between the independent and dependent variables, the assessment of their statistical associations and their significance must examine their marginal effects (see Wiersema and Bowen, 2009 for details). Following the procedure outlined by Wiersema and Bowen (2009),

we examined the distributions of our independent variables' marginal effects and corresponding z-statistics in our sample. The results of this examination are essentially consistent with the interpretation drawn from the results presented in Table 2. Although we report our independent variables' distribution of marginal effects and z-statistics when they are necessary for hypothesis testing, our explanation refers to the results in Table 2 for the ease of interpretation.

Hypothesis 1 stated that pay dispersion is negatively associated with innovation after controlling for pay levels. The results of Model 3 show that pay dispersion is negatively associated with firm innovation performance ($\beta = -0.945$). Its marginal effect ranges from -0.253 to -0.086, and all corresponding z-statistics are equal to or above 1.96. Thus, Hypothesis 1 is supported. The effect of pay dispersion is negative and significant even without controlling for pay levels as shown in Model 2; however, the coefficient of pay dispersion becomes larger after we controlled for pay levels (β increased from -0.725 in Model 2 to -0.945 in Model 3). In exchange, the coefficient of pay levels becomes larger when we included both pay levels and pay dispersion (β increased from 0.052 in Model 1 to 0.101 in Model 3). We interpret that this is because the effect of pay dispersion on innovation in Model 2 ($\beta = -0.725$) is decomposed into the positive and negative portions. Once we controlled for pay level in Model 3, the positive portion is parceled out and merged into the effect of pay levels on innovation. After removing the positive portion, the negative effect has remained.

Models 4 and 5 examined the effects of interaction terms. In Model 4, the interaction term between pay dispersion and the growth opportunities was introduced. However, its effect was negative and insignificant ($\beta = -0.048$). Thus, Hypothesis 2a is not supported. In Model 5, we included the interaction term between pay dispersion and financial slack. The coefficient of the interaction term is positive and significant ($\beta = 0.900$). Its marginal effect ranges from 0.048 to 0.222. The vast majority (90%) of corresponding z-statistics are equal to or above 1.96, with a median value of 2.13. Its effect remains significant in the full model (Model 6). These results support Hypothesis 2b. In firms with higher financial slack, the negative effect of pay dispersion on innovation becomes weaker.

DISCUSSION

While previous research has recognized that the compensation of senior managers influences R&D investments and their consequences (Hoskisson, Hitt, and Hill, 1991), little is known about the implications of employee compensation for innovation. Employees, particularly R&D employees, play a critical role in generating innovations (Collins and Smith, 2006). As a key component of organizational incentive structures, compensation designs are expected to influence the functioning of these employees (Gupta *et al.*, 2007). Consistent with this argument, our analysis supports that pay dispersion in R&D groups has an important consequence for firm effort to generate innovation. More particularly, in the R&D context, large pay differentials among employees create disincentives that preclude innovation.

This article also highlights the role of context in understanding the effects of pay dispersion. Recent evidence suggests that the effect varies depending on work and organizational contexts (Shaw *et al.*, 2002). In support of this argument, our results demonstrate that the negative effects of pay dispersion dominate over the positive effects in the R&D context. We also find that generous firm financial slack alleviates the negative effects of pay dispersion. These findings provide researchers and firm decision-makers with a more nuanced perspective toward the mechanisms through which pay dispersion influences organizational outcomes.

We focus our theory and analysis on nonmanagerial employee compensation because human capital management research usually focuses on nonmanagerial employees. To enrich our understanding, we also tested our theory using middle-level managers' pay information in R&D groups. The direct effect of pay dispersion is not significant although the sign of coefficient is negative ($\beta = -0.444$ and $p > 0.05$, without including interaction terms). However, both of the interaction terms are positive and significant ($\beta = 0.098$ and $p < 0.05$ for the interaction between pay dispersion and the growth opportunities, and $\beta = 0.853$ and $p < 0.001$ for the interaction between pay dispersion and financial slack, both in a full model). Thus, reactions to pay dispersion differ between managers and nonmanagerial employees. Future research should explore the mechanisms that generate these differences by considering factors such as the level of interactions with other

Table 1.   Means, standard deviations, and correlations[a]

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9
1 Firm innovation performance	215.493	433.765									
2 Firm size	2.791	1.609	0.409								
3 R&D expenditures	0.139	0.166	−0.106	−0.291							
4 Financial performance	0.015	0.208	0.103	0.064	−0.287						
5 Prior innovation performance	2.833	5.338	0.670	0.533	−0.125	0.042					
6 Industry environmental uncertainty	0.025	0.019	−0.182	−0.220	0.046	−0.171	−0.166				
7 Growth opportunities[b]	4.183	4.510	0.135	0.117	−0.289	0.286	0.058	−0.117			
8 Financial slack[b]	2.256	1.161	−0.180	−0.588	0.300	−0.065	−0.250	0.200	−0.143		
9 Pay levels	0.030	0.784	0.070	−0.118	0.203	0.002	−0.058	−0.011	0.095	0.211	
10 Pay dispersion[b]	17.737	11.504	−0.010	−0.108	0.261	−0.294	0.018	0.012	−0.017	0.168	0.390

[a] $N = 428$. Correlations greater than $|0.095|$ are significant at $p < 0.05$.
[b] Means and standard deviations of pay dispersion, growth opportunities, and financial slack before these variables are mean-centered in our regression analysis.

organizational members, ease of mobility, and frequency of accessing firm financial information (i.e., measures that reflect growth opportunities and financial slack).[3]

Beyond pay dispersion, other aspects of compensation, such as pay mix or pay administration, might also have an influence on innovation. Future research is encouraged to delve into the implications of these aspects. For instance, Wang *et al.* (2009) showed that stock-based compensation complements firm effort to develop firm-specific knowledge. If so, an emphasis on stock-based compensation may promote innovation. Furthermore, innovation research distinguishes between exploratory and exploitative innovations (March, 1991). Because of the difference in the nature of these two types of innovations (i.e., radical or incremental), compensation systems that support them may be different. In addition, although researchers agree that patent rights have a strong potential to generate sustainable competitive advantages, such inventions bring in profits only when they are successfully commercialized. Future research needs to include compensation for other employee groups that play key roles in commercializing inventions (e.g., marketing) to understand better the implications of employee compensation systems for firm performance. Arguably, the form of innovation will vary across industries, and the employee groups that make key contributions to innovation and its commercialization may vary accordingly. Empirical studies need to select relevant innovation measures and employee groups.

Our study has at least two limitations. First, our pay data are drawn from compensation surveys conducted by a consulting firm and thus are not randomly sampled. However, given the difficulty of accessing employee compensation information, partnering with compensation consulting firms is considered a legitimate approach (Gerhart and Rynes, 2003). Second, although our theory attributes the negative effects of pay dispersion on innovation to decreased collaboration, our empirical analysis does not directly test this mechanism. Likewise, our empirical analysis does not test the impacts of growth opportunities and financial slack on the ways employees frame and react to pay dispersion. Future research should examine the psychological processes related to pay dispersion. Such research needs to delve into the implications of pay dispersion at different units of analysis (i.e., individual, team, and firm [Gupta *et al.*, 2007]).

In conclusion, the design of employee compensation systems is an important strategic decision as it influences the success of a firm's effort to promote innovation. Firm decision-makers need to recognize the implications of compensation systems for successful formulation and implementation of organizational strategies.

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[3] We thank an anonymous reviewer for suggesting that we undertake this analysis.

Table 2.   Fixed-effect negative binomial regression of pay dispersion on firm innovation[a]

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	-0.623^{*}	$-0.531^{\dagger}$	$-0.592^{\dagger}$	0.022	-0.458	-0.446
	(0.317)	(0.316)	(0.321)	(0.297)	(0.323)	(0.321)
Firm size	0.066	0.075	0.089	0.055	0.061	0.052
	(0.056)	(0.056)	(0.057)	(0.058)	(0.057)	(0.058)
R&D expenditures	-0.160	-0.164	-0.244	-0.346	-0.679	-0.695
	(0.610)	(0.55)	(0.574)	(0.513)	(0.665)	(0.640)
Financial performance	$0.458^{\dagger}$	0.405	0.337	0.292	0.279	0.231
	(0.264)	(0.264)	(0.267)	(0.290)	(0.247)	(0.248)
Prior innovation performance	0.030^{*}	0.032^{**}	0.033^{**}	0.020	0.045^{***}	0.044^{***}
	(0.013)	(0.012)	(0.012)	(0.014)	(0.012)	(0.012)
Industry environmental uncertainty	1.906	1.946	2.053	-0.266	1.908	1.794
	(1.702)	(1.686)	(1.691)	(2.090)	(1.663)	(1.668)
Growth opportunities	$0.010^{\dagger}$	0.009	$0.010^{\dagger}$	0.010	$0.011^{\dagger}$	0.013^{*}
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
Financial slack	0.125^{**}	0.126^{**}	0.126^{**}	$0.084^{\dagger}$	0.127^{**}	0.129^{**}
	(0.046)	(0.046)	(0.046)	(0.048)	(0.046)	(0.045)
Pay levels	0.052	—	$0.101^{\dagger}$	0.024	$0.091^{\dagger}$	$0.092^{\dagger}$
	(0.051)	—	(0.054)	(0.059)	(0.054)	(0.054)
Pay dispersion	—	-0.725^{*}	-0.945^{*}	0.157	-0.922^{*}	-0.916^{*}
	—	(0.361)	(0.380)	(0.393)	(0.395)	(0.392)
Pay dispersion $\times$ growth opportunities	—	—	—	-0.048	—	0.077
	—	—	—	(0.082)	—	(0.073)
Pay dispersion $\times$ financial slack	—	—	—	—	0.900^{**}	1.011^{**}
	—	—	—	—	(0.311)	(0.318)
Wald χ^2	421.36^{***}	432.37^{***}	432.37^{***}	328.06^{***}	454.19^{***}	454.22^{***}
Log likelihood	-1442.52	-1439.20	-1439.20	-1483.38	-1434.72	-1434.18

[a] N = 428. Standard errors are reported in parentheses.

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$; $^{\dagger}p < 0.10$. (Two-tailed test). Industry and year dummies are included but not reported.

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