Corporate governance antecedents of top management pay dispersion that undermines firm performance

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Abstract

Using social comparison and social network theory, I sought to examine the corporate governance antecedents of top management team (TMT) horizontal pay dispersion that may be interpreted as unjustifiable reasons of pay dispersion and therefore undermine firm performance. I therefore examined compensation data from firms appearing on the S&P500 from 2008 to 2013 and ran panel regressions. I substantiated existing research by finding that horizontal TMT pay dispersion is harmful for firm performance. This is consistent with social comparison theory, which predicts that dispersed pay will cause a decrease in cohesion and collaboration among team members, resulting in reduced performance. Moreover, a larger board size and having a female CEO, compared to a male CEO was associated with higher levels of TMT pay dispersion, whereas, a higher number of average board interlocks was associated with reduced levels of TMT pay dispersion. This paper adds to the existing literature, as it is one of the first studies to explicitly examine the corporate governance mechanisms that affect TMT pay dispersion. The board and CEO have a direct effect on setting compensation and I hope these findings can remedy the continuance of ineffective compensation practices which lead to unjustified pay dispersion among executives and in turn harm firm performance.

Acknowledgements

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Contribution of authors

Dr. Peter Jaskiewicz's research assistants collected the initial data in 2013-2014. The original dataset was intended for a study on firm ownership and top management team pay dispersion in S&P 500 firms. A subset of variables regarding firm, compensation and top management team characteristics was chosen, and formed the foundation of my thesis dataset.

Pfeffer and Langton's (1993) paper on the negative effects of pay dispersion on university faculty member satisfaction, productivity and collaboration is what some scholars (Shaw, 2014; Shaw & Gupta, 2007) consider to be *the* paper that ensued a great debate regarding whether compressed or dispersed pay was best for individual and/or organizational performance. *Horizontal* pay dispersion is defined as the spread or variation in pay among employees within the same job or organizational hierarchy, whereas *vertical* pay dispersion is concerned with the variation of pay across employees in different organizational hierarchies (Shaw, Gupta, & Delery, 2002). I will focus on the former type of pay dispersion. Over two decades have passed since the aforementioned landmark paper was published, and it seems as though the theoretical dilemma concerning the allocation of rewards in organizations remains unanswered.

Although I will discuss this theoretical dilemma in more detail in the following paragraphs, it is important to note that research on pay dispersion remains a highly relevant topic considering that pay dispersion has consequences on organizational performance (Fredrickson, Davis-Blake & Sanders, 2010; Hambrick & Siegel, 1997; Jaskiewicz et al., 2017; Lee et al. 2008, Siegel & Hambrick, 2005; Shaw et al., 2002), team performance (Bloom, 1999; Jane et al., 2009; Tevor et al., 2012), and also has consequences on employee attitudes (Trevor & Wazeter, 2006). Considering the important consequences of pay dispersion, it is surprising that few researchers have considered its antecedents (Fredrickson et al., 2010; Jaskiewicz et al., 2017). A highly relevant context to examine the antecedents of *horizontal* pay dispersion would be the top management team (TMT) because they are responsible for implementing corporate strategy and therefore have a direct effect on firm performance. In addition, executives within the TMT, excluding the CEO, are members of the same organizational rank, and tend to have many similar characteristics, thus making them likely referents for one another (Fredrickson et al., 2010).

Thus, the use of Festinger's (1954) social comparison theory – which states that human beings have a high need to compare themselves to physically and/or socially similar individuals – would be highly applicable at the TMT level. In addition, it is plausible to assume that considering the high interdependence between top managers (Hambrick, 1995), an unfavorable social comparison, such as ones due to unjustifiable antecedents of pay dispersion, would have detrimental consequences on interactions between TMT members, undermining not only their collaborative efforts and teamwork but also their organizational decisions.

As previously mentioned, the theoretical debate regarding whether pay dispersion is either good or bad remains unresolved. Those who argue that pay dispersion is good for individual and organizational performance use economic tournament theory. The central premise is that as the prize increases in value, effort and competition will increase, resulting in a sorting effect whereby high performers stay within the organization, and poor performers leave (Lazear, 1989; Lazear & Rosen, 1981; Shaw, 2014). Indeed, some researchers have found there to be a positive relationship between executive pay dispersion and firm performance (Becker & Huselid, 1992; Lee et al., 2008; Main et al., 1993). It is worthwhile noting that the aforementioned research regarding the positive effects of pay dispersion on performance has either examined highly individualistic settings, such as race car drivers (Becker & Huselid, 1992) or vertical pay dispersion (Lee et al., 2008; Main et al., 1993) rather than horizontal pay dispersion. Thus, it seems according to tournament theory, *vertical* pay dispersion is good for individual and organizational performance. Conversely, researchers who use social comparison theory argue that *horizontal* pay dispersion is bad for organizational performance because it undermines collaboration and will therefore negatively affect decision-making (Beaumont & Harris, 2003; Fredrickson et al., 2010). This is consistent with researchers who found TMT pay dispersion to

be associated with lower levels of firm performance (Bloom & Michel, 2002; Fredrickson et al., 2010; Jaskiewicz et al., 2017). However, recent research demonstrates that the relationship between pay dispersion and its consequences isn't as simple as theories predict. Rather, as demonstrated by Shaw and colleagues (2002) and Siegel and Hambrick (2005), the consequences of pay dispersion are dependent on important contingencies, such as context (i.e. high-technology firm/high employee interdependence), as well as whether pay differences are due to legitimate reasons (i.e., individual incentive program) vs. illegitimate reasons (i.e., gender). In line with social comparison theory, non-justifiable relative to justifiable sources of pay dispersion will erode collaboration and thereby hurt decisions and firm performance.

It is therefore important to examine the non-justifiable reasons for pay dispersion, while controlling for justifiable reasons given the scarcity of research that exists, and the potential negative impact on firm performance. To clarify, Shaw and colleagues (2002) classify justifiable reasons for pay dispersion as factors that can be attributable to performance, such as the presence of pay for individual performance incentives. Conversely, non-justifiable reasons include what Shaw and colleagues (2002) consider "dysfunctional procedures", such as political or power-driven determinants.

Political and power-driven determinants of pay dispersion are an outcome of firm governance. Surprisingly enough, to the best of my knowledge, past researchers have not examined the effect of corporate governance mechanisms, such as board size, board interlocks or the gender of the CEO on pay dispersion. If some governance characteristics increase pay dispersion beyond justifiable levels, they could harm the firm and its performance. In contrast, if they reduce unjustifiably high pay dispersion, they could add value to the firm and contribute to its performance. I therefore attempt to add to the existing literature by answering the following

research questions: 1) is TMT pay dispersion associated with lower firm performance? And 2) what corporate governance mechanisms influence horizontal TMT pay dispersion?

Past researchers have found that larger board size is associated with a greater number of goals (Ethiraj & Levinthal, 2009), which may lead to the pursuit of conflicting strategic goals resulting in higher pay discrepancies. Moreover, past research on board characteristics and financial outcomes has focused upon whether the board of directors is characterized as homogenous or heterogeneous (Carter et al., 2010; Marimuthu, 2008; Torchia et al., 2011). Building upon social network theory (Granovetter, 1985), I suggest that the ability of organizations to learn best practices from one another should help them reduce unjustifiably high pay dispersion. Board interlocks are one mechanism through which organizations learn from one other. Indeed, past researchers have demonstrated that board interlocks have an impact on the diffusion of organizational processes that are connected through a network (Bizjak, Lemmon & Whitby, 2009; Davis, 1991). As such, I posit that board interlocks should be a valuable tool to reduce pay dispersion. Finally, organizational governance and culture that are described as being biased and male-centric are part of the reason why there is a limited number of women in senior-management positions (Eagly & Carli, 2007; Diehl & Dzubinski, 2016; McEldowney et al., 2009). Women tend to be excluded from internal networks (Ragins et al., 1998), and are consequently considered as "out-group" members. Thus, borrowing from legitimacy research (Miller, Le Breton-Miller, & Lester, 2013; Suchman, 1995), I argue that the few female CEOs will strive for legitimacy (i.e. become part of the in-group) and therefore may exhibit greater conformity to existing organizational norms. By conforming to traditional organizational norms, this may inadvertently encourage the maintenance of ineffective practices, such as relatively high pay dispersion among TMT members – even if peer companies reduce pay dispersion.

Consequently, having a female CEO compared to a male CEO may be associated with an acceptance of prevalent TMT pay dispersion.

I empirically examine the effect of corporate governance mechanisms on TMT pay dispersion, and the subsequent effect pay dispersion has on firm performance by using a sample of the S&P 500 firms. The data spans a six-year period from 2008 to 2013, and therefore, due to the longitudinal structure of the data, I use panel regressions rather than ordinary least squared regressions. Moreover, in addition to examining the aforementioned relationships, I control for common firm, team, and compensation characteristics, which may provide justifiable reasons for TMT pay dispersion.

My thesis adds to the existing literature in several ways. First, and perhaps most importantly, I attempt to answer Shaw's (2014) research call to examine the mechanisms underlying differing pay structures. I find that larger board size, and having a female CEO are related to higher levels of TMT pay dispersion, while a larger number of board interlocks is related to a reduction in TMT pay dispersion. These results demonstrate the importance of corporate governance mechanisms, specifically board and CEO characteristics that contribute to levels of TMT pay dispersion. Second, I examine the importance of board interlocks in a new context. More specifically, the negative relationship between average board interlocks and TMT pay dispersion demonstrates the ability of organizations to learn best practices via the organizational networks of board members. Perhaps the organizational networks of board members is one way in which focal firms can overcome the ineffective corporate governance mechanisms that tend to lead to higher pay dispersion. Third, I substantiate past research regarding the harmful effect of TMT pay dispersion on firm performance, supporting research on social comparison theory.

The rest of the paper is structured as follows: In section one, I review the existing literature on how corporate governance mechanisms such as board size, board interlocks and the gender of the CEO can influence TMT pay dispersion, and how such pay dispersion undermines firm performance. In section two, the sample and methodology are described, while in section three, results and tables are revealed. Finally, in section four, I conclude with limitations and discussion.

I. Literature Review and Hypotheses

TMT pay dispersion and firm performance

The top management team is responsible for implementing corporate strategy and ensuring that organizational goals are achieved. As Hambrick (1995) points out, a *well functioning* team increases the probability that executives will implement strategies successfully. By following the methodology of Jaskiewicz and colleagues (2017), as well as Fredrickson and colleagues (2010), I examine the four highest paid members of the TMT, excluding the CEO, because doing so allows the examination of horizontal pay dispersion. Interestingly, members of the TMT have been characterized as being high performers, achievement-oriented and concerned with how their pay compares to their co-workers (Finkelstein & Hambrick, 1989; Fredrickson et al., 2010). In addition, considering that non-CEO TMT members tend to be very similar, social comparison theory (Festinger, 1954) would predict that such executives are likely to compare themselves to one another because of such similarities. If there is high pay dispersion among executives, executives may feel undervalued and dissatisfied, as predicted by Adams (1963) equity theory. Indeed, this is consistent with past researchers who found that wage inequality within a University setting, was associated with lower faculty satisfaction, lower research productivity, and a lower likelihood that faculty members would collaborate with one another

(Pfeffer & Langton, 1993). Considering that a University setting is characterized as having a high potential for collaboration among professors engaging in research (Pfeffer & Langton, 1993), the aforementioned research findings should also apply to TMT members who must also collaborate with co-workers in order to complete tasks (Hambrick, 1995). Thus, if executives perceive high pay dispersion as inequitable, this is likely to result in reduced cohesion, as well as reduced collaboration (Fredrickson et al., 2010), which would subsequently have a negative effect on firm performance. Indeed, this is consistent with past researchers who found a negative relationship between horizontal TMT pay dispersion and firm performance (Fredrickson et al., 2010; Jaskiewicz et al., 2017). Moreover, Carpenter and Sanders (2002) found that when there is a lack of internal alignment regarding pay structures, there is a lack of integration among TMT members and firm performance suffers as a result.

Conversely, from a tournament theory perspective, researchers argue that high pay dispersion actually causes an increase in competitiveness and motivates individuals to increase their performance (Lazear & Rosen, 1981). This is consistent with Lazear (1989) who argued that under a highly competitive environment, executives are actually willing to undermine their co-workers in order to "win the tournament". Thus, if a highly competitive environment caused by high pay dispersion causes executives to undermine one another, firm performance would suffer because this would impede their ability to work successfully with one another to implement corporate strategy. I therefore believe that social comparison theory, which argues that high pay dispersion is bad for firm performance, enables us to better understand the negative effects of TMT pay dispersion on firm performance in a top management context, compared to tournament theory.

Moreover, another important factor that may contribute to the way executives perceive their social comparisons as favorable or unfavorable is whether the dispersion is justifiable vs. non-justifiable. Interestingly, Fredrickson and colleagues (2010) examined this idea by composing two dispersion scores: expected vs excess. Expected dispersion was operationalized as the predicted level of TMT pay dispersion from their regression model which included justifiable factors of pay dispersion (i.e. tenure, stock options, etc.), whereas excess dispersion was calculated as the difference between actual and expected pay dispersion levels (Fredrickson et al., 2010). The researchers found that while the relationship between expected dispersion and firm performance was not significant, the relationship between *excess* dispersion and firm performance was *significantly negative*. These results further validate the idea that excess dispersion, or dispersion not attributable to legitimate factors may lead to decreased cohesion and collaboration among TMT members causing firm performance to suffer. Building upon recent studies on horizontal TMT pay dispersion, my baseline hypothesis is that pay dispersion will have detrimental effects on firm performance, in line with social comparison theory. Said differently:

Hypothesis 1: There will be a negative relationship between TMT pay dispersion and firm performance.

Assuming that TMT pay dispersion is bad for firm performance, it becomes necessary to answer the question regarding what corporate governance mechanisms continue to contribute to high levels of pay dispersion among TMT members.

Corporate governance antecedents to TMT pay dispersion

It is imperative to examine the characteristics of the board, as well as of the CEO because they are the ones who have the power to determine how rewards are allocated (Hillman &

Dalziel, 2003; Westphal & Zajac, 1995), and thus have a direct effect on pay dispersion. Moreover, as previously stated, Shaw and colleagues (2002) argue that non-justifiable reasons of pay dispersion are often due to political and power-driven determinants and can be especially harmful to performance. It is worthwhile noting that such determinants are often an outcome of firm governance. Consequently, the governance mechanisms examined in this paper may be especially harmful for firm performance if they exacerbate TMT pay dispersion.

The Impact of Board size on TMT Pay Dispersion

Finkelstein, Hambrick and Cannella (2009) state that board characteristics have the ability to affect the fundamental decisions they make regarding strategy, spending, and executive compensation, just to name a few. Of particular relevance to this paper is how board size can adversely affect firm performance, but more importantly, how board size adversely affects decision-making regarding executive compensation. Past researchers (Hiner, 1967; Johnson, Hoskisson, & Hitt, 1993; Zahra & Pearce II, 1989) have argued that when boards are too large they may have a negative effect on firm performance because it takes longer to reach a decision due to differences of opinion and the presence of cliques. Indeed, Yermack (1996) empirically examined large U.S. firms and found that those with smaller boards, compared to those with large boards, had better financial performance. Such findings are consistent with past literature on group size that indicates a larger group size is associated with difficulty to achieve consensus and increased conflict (Finkelstein et al., 2009; O'Reilly, Caldwell, & Barnett, 1989; Shaw, 1981). Considering the aforementioned negative effects of larger board size on firm performance, it then becomes imperative to consider how increases in goal and interpersonal conflict and a decreased ability to achieve consensus can affect decisions regarding executive compensation. If a larger board size is associated with an increase in goals that TMTs should

pursue, it is plausible to assume that TMT members, in turn, will be paid differently. Differences in pay, by definition, will lead to higher pay dispersion. To the author's knowledge past researchers have not explicitly examined the link between board size, pay dispersion and the mechanisms involved, I therefore turn to research on organizational goals.

The top management team is responsible for executing corporate strategy and achieving organizational goals. Given that larger board size is associated with differences in opinion, it is plausible that a larger board size will also be associated with a greater number of organizational goals. As Ethiraj and Levinthal (2009) point out, the issues regarding multiple performance goals are directly linked to issues regarding individual performance and compensation. Ethiraj and Levinthal (2009) found that multiple goals, especially multiple goals that were weakly correlated, are associated with decreased firm performance, and this relationship is worsened when there is a higher degree of team interdependence. The authors argue that the negative relationship between multiple goals and firm performance occurs when managers/agents "freeze" because they are not able to cognitively choose which goals to pursue (Ethiraj & Levinthal, 2009). Relating such results to the relationship between board size and TMT pay dispersion, Jaskiewicz and colleagues (2017) argue that the pursuit of separate goals is a significant driver of pay dispersion because executives will receive rewards based on their pursuit of individual sub-unit goals. Said differently, the fragmentation caused by multiple goals will lead top managers to be compensated differently, thus resulting in high pay dispersion. Additionally, it is reasonable to assume that such goal fragmentation and resulting high pay dispersion is what contributes to decreased cohesion and trust among executives, and results in decreased firm performance as well. This is consistent with Jaskiewicz and colleagues (2017) who found that one governance mechanism, family ownership, which is associated with the pursuit of multiple organizational

goals, fosters higher pay dispersion. I argue that another corporate governance mechanism, larger board size, is also associated with greater TMT pay dispersion. I therefore predict the following:

> *Hypothesis 2: There will be a positive relationship between board size and TMT pay dispersion, such that boards with more members will be associated with higher TMT pay dispersion.*

The Impact of Board Interlocks on TMT Pay Dispersion

The board provides the CEO with advice on array of matters, including setting executive compensation (Cannella et al., 2008). If boards have experience on other corporate boards this should enhance the decision-making capability of board members, as well as enhance their expertise. Of particular relevance is a construct known as interlocking boards, operationalized as the extent to which directors are connected to their peers through multiple directorships (Boyd, 1990). As Davis (1991) argues, a particular weakness of agency theory is that it does not consider the broader social context in which the agent operates. Fortunately, social network theory states that actors are embedded in a social context and do not act in isolation of this context (Granovetter, 1985). Said differently, as board members sit on multiple boards, corporate linkages are created, and the resulting social network will influence the way in which board members act. Past researchers have focused on how such corporate linkages are created (see Pfeffer & Salancik, 1978), however I focus on the *consequences* of such corporate linkages. A growing number of researchers have found that corporate linkages are associated with information sharing among firms. More specifically, board interlocks have been associated with the spread of the poison pill (Davis, 1991), a decrease in the gender pay gap of German firms (Oehmichen, Sarry, and Wolff, 2014), and the ability to change board-level decision making processes (Westphal, Seidal & Stewart, 2001). The aforementioned results demonstrate how

board interlocks influence the spread of organizational practices between firms that are connected within the same social network. I therefore focus on how corporate linkages have the ability to reduce pay dispersion and argue that it is due to greater information sharing among firms and a change in board member cognition.

Carpenter and Westphal (2001) conducted a study on 600 medium and large-sized firms on the Forbes 1000 index to determine how the corporate linkages of board members influence their strategic decision-making ability. Board members are faced with making difficult strategic decisions (Finkelstein et al., 2009) and often rely on their pre-existing knowledge or implicit theories that they have created (Carpenter & Westphal, 2001). The authors therefore take a sociocognitive perspective to argue that if board members are connected to other boards, and thus other individuals, they have the ability to learn vicariously, and develop richer knowledge schemas, thus better enabling them to implement their focal firm's strategy (Carpenter & Westphal, 2001). Said differently, the social contact created by corporate linkages provides board members with better expertise and greater insight to make informed decisions. Interestingly, the authors found that directors on multiple boards make greater contributions to strategic decision-making in their focal firm. Carpenter and Westphal (2001) concluded that the results support the social network theory regarding the fact that individuals are influenced by the social context in which they are embedded. Consequently, social network ties "permit economies of monitoring and advising across firms" (Carpenter & Westphal, 2001; p.654). If multiple directorships enable board members to learn and improve strategy, they should also influence the spread of more effective compensation practices.

Past researchers have actually argued that due to our need to engage in social comparisons, board members may borrow compensation practices from other firms in the same

industry when developing a compensation policy for their focal firm (O'Reilly, Main & Crystal, 1988). To empirically test the spread of policies among firms tied by social networks, Westphal and colleagues (2001) conducted longitudinal research on fortune 500 firms. The authors found that firms that were connected through social network ties demonstrated greater imitation of policies at the focal firm, including policies regarding business strategy, acquisitions and executive compensation (Westphal et al., 2001). Thus, considering past researchers have confirmed the spread of more effective compensation policies among connected firms, I examine if the spread of such compensation policies can also reduce pay dispersion, because more effective compensation policies should reduce un-justified pay variation among TMT members.

Consistent with this argument, Oehmichen and colleagues (2014) argued that corporate linkages could reduce the gender pay gap among TMT executives, because board members are able to gain knowledge from dissimilar individuals, which reduces their reliance on stereotypes and prejudices when setting executive compensation. Indeed, the authors found that in German firms, a greater number of average board interlocks was associated with a decrease in the gender pay gap. In a similar vein, Westphal and Milton (2000) demonstrated that board members with a minority status who have experience on other boards (i.e. board interlocks) are able to avoid out-group biases. The researchers argue that minority directors have the ability to make "valuable contributions to board decision making by providing unique perspectives on strategic issues that challenge conventional wisdom […] and by prompting divergent thinking" (Westphal & Milton, 2000; p. 389) by leveraging their social capital. This is consistent with Shropshire's (2010) argument that minority directors' ability to transfer knowledge increases with their experience as an interlocking director. Applying the aforementioned results to this research, it is clear that when board members are exposed to different-minded individuals this can lead to fairer

decisions regarding compensation practices (i.e. less pay dispersion) due to board members relying less on pre-existing stereotypes. Consequently, social network theory allows us to explain how information and practices are spread among firms, but also how network ties enable directors to make more informed corporate governance decisions. To the author's knowledge social network researchers have not yet examined how board interlocks can affect TMT pay dispersion. I therefore develop the following hypothesis:

> *Hypothesis 3: There will be a negative relationship between average board interlocks and TMT pay dispersion, such that boards with a greater number of interlocks will be associated with lower TMT pay dispersion.*

The Impact of Female CEOs on TMT Pay Dispersion

Another integral aspect of the board's job is choosing an appropriate CEO for the company (Zajac & Westphal, 1996). When choosing the CEO, it is important that the CEO demonstrates characteristics and values that are consistent with organizational culture, norms and values. Once the CEO is chosen, they too have a say in setting the other TMT members' compensation (Fredrickson et al., 2010), and thus, they too have a direct effect on TMT pay dispersion. I therefore examine how CEO gender differences may affect TMT pay dispersion considering research that indicates gender differences in career trajectories for men and women are attributable to macro and meso-level organizational mechanisms (Diehl & Dzubinski, 2016; Fitzsimmons, Callan & Paulsen, 2014); mechanisms which are attributable to corporate governance systems and cultures.

As of 2017, 44.7% of women worked in S&P 500 companies, whereas only 5.2% of women held CEO positions (Catalyst, 2018). Some researchers have argued that there are fewer female CEOs compared to male CEOs because women face more challenges due traditional

corporate governance systems and masculine organizational cultures (Eagly & Carli, 2007; Diehl & Dzubinski, 2016; Fitzsimmons et al., 2014). Others, however, have argued that females occupy fewer leadership roles because they underperform compared to their male co-workers (Fortune, 2016; Koley, 2012). Female CEOs may perform differently from their male counterparts because they lack legitimacy in masculine organizational cultures; legitimacy that would be needed to address topics pertaining to organizational norms and practices.

Applied to the context of this study, it therefore becomes imperative to understand whether barriers that women relative to men face influence how female CEOs make decisions regarding executive compensation. I first consider the organizational system barriers faced by women, followed by the organizational pressures for legitimacy that may lead female CEO's to be less likely to address high pay dispersion issues.

Considering the large disparity between the presence of female CEOs (5%) compared to male CEOs (95%) on the S&P500, many scholars have researched the societal, personal, and organizational antecedents to explain such differences. This section focuses on better understanding the *organizational* antecedents regarding why there are so few women in the c-suite, in an attempt to understand how such organizational systems affect women's leadership style and subsequent decision-making regarding compensation. For instance, past researchers have argued that the limited number of women at the top is attributable to organizational system and corporate governance practices that foster un-acceptance, discrimination and biasness which all stem from pre-conceived stereotypes (Eagly & Carli, 2007; Diehl & Dzubinski, 2016; McEldowney et al., 2009). Interestingly, Diehl and Dzubinski (2016) conducted interviews to classify such barriers into micro, meso and macro level barriers faced by women. Of particularly relevance to this study are the macro-level mechinisms, which include gender stereotypes,

gender unconsciousness, perceptions that leadership is associated with masculinity, and scrutiny from co-workers (Diehl and Dzubinski, 2016). Moreover meso-level barriers, such as exclusion from informal networks and organizational cultures characterized by overwhelmingly male cultures and norms further prohibit women to gain leadership positions (Diehl and Dzubinski, 2016). This is consistent with past research that indicated 52% of female executives face male stereotyping, and 49% are excluded from informal networks (Ragins et al., 1998). It therefore seems that organizational systems have been biased against women, and thus presumably, those women who do make it to the c-suite must go through many tournaments. As tournament theory would predict, only those women who are just as able as men, and who exhibit exceptional performance will win the prize and thus the financial incentives (Eriksson, 1999, Fredrickson et al., 2010; Rosen, 1986). In this case, the prize is that of a CEO position. The question then becomes what strategies do women choose to help them win the tournaments they must face.

Ragins, Townsend, and Mattis (1998), surveyed women executives on Fortune's 1000 index in order to determine which strategies they used most to advance their careers. The second strategy used most often by female executives was to develop a management style that men are comfortable with (Ragins et al., 1998). The stereotypical notions of women's management style are that they are more cooperative and collaborative compared to men, who are competitive and authoritative (Dezso & Ross, 2012; Howden, 1994). Thus, it is plausible that females who are interested in wining the tournament and rising to the top of the corporate ladder and staying there must develop a more "masculine" leadership style that men are more accustomed to. This is consisted with longitudinal research conducted by Zajac and Westphal (1996) who found that boards are more likely to choose future CEO's that have characteristics that are more similar to their own demographic profile. As Shropshire (2010) argues, it is important for minorities to

highlight commonalities between themselves and the majority in order to reduce out-group biases that majority member's hold. Thus, potentially one commonality that female executives highlight is their "masculine" leadership style.

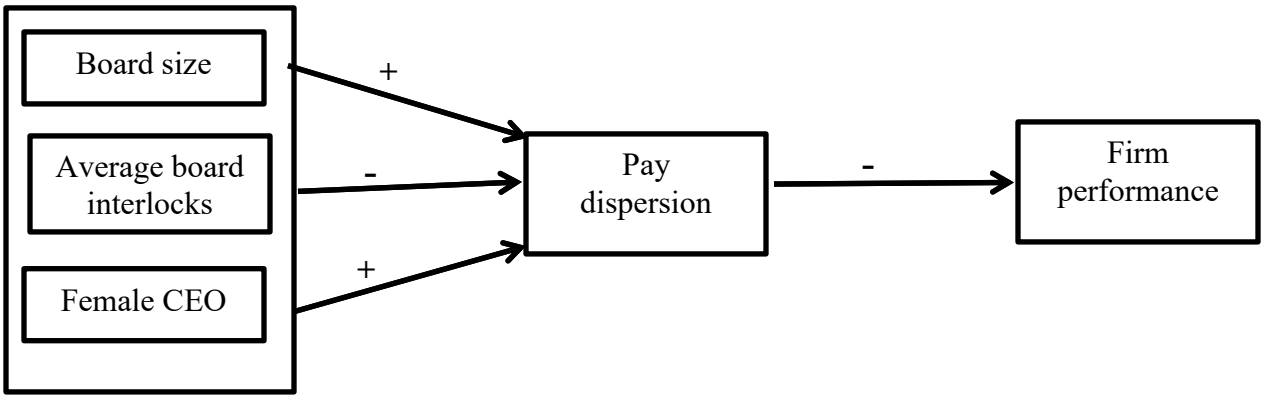
A second and related way in which female CEO's may attempt to become part of the "in-group" and thus may be less likely to address high pay dispersion, can be understood from a legitimacy perceptive. Past researchers have argued that imitating and conforming to other firm organizational practices is a way of securing legitimacy (Ashforth & Gibbs 1990; Deephouse & Suchman 2008; Miller, Le Breton-Miller, & Lester, 2013). Conformity is defined as doing what the majority of other firms are doing (Deephouse, 1999; Suchman, 1995). Interestingly, Miller and colleagues (2013) examined the role of corporate governance structures, more specifically, the role of family ownership, on strategic conformity. Their central premise was that the owners of firms have a great influence on the level of organizational conformity. The authors found that family firms, compared to non-family firms demonstrate a greater degree of strategic conformity, and argue that this is potentially due to family firms needing greater legitimacy because family involvement is often viewed suspiciously by outside stakeholders (Bertrand & Schoar, 2006). As Miller and colleagues (2013) argue, form a human agency perspective, agents' must have an incentive to seek legitimacy for their organizations, to gain trustworthiness and access to resources. I therefore argue that female CEO's should have a high motivation to seek legitimacy because as previously mentioned they are traditionally considered part of the out-group. In addition, consider research that indicates that when female CEO appointments are announced, stock prices of those companies declined by an average of 2.5% (Fortune, 2016). Thus, as a way to garner legitimacy, female CEOs may also engage in greater strategic conformity, but more importantly, may exhibit greater conformity to organizational norms. Consequently, female

CEOs would be less likely to make changes to such organizational norms. Indeed, this is consistent with findings by Ragins and colleagues (1998) who found that one of the barriers that women face is the "queen bee effect", whereby women at the top are failing to help other women. Presumably this is because female CEOs may lack the legitimacy required to address high pay dispersion issues, which are part of the traditional corporate governance structures. Accordingly, I predict the following:

> *Hypothesis 4: There will be a positive relationship between female CEO and TMT pay dispersion, such that having a female CEO, compared to a male CEO, will be associated with higher TMT pay dispersion.*

Figure 1. Empirical model.

Corporate governance mechanisms



II. Methodology

Sample

Firms within Standard and Poor's (S&P) 500 Index from 2008 to 2013 provided the basis for the sample. The majority of the data was retrieved from S&P ExecuComp, as well as from Boardex. These datasets provide details of executive compensation (i.e. total compensation,

bonus, value of stock awards etc.), firm characteristics (i.e. firm size, firm age, firm assets, etc.) and information regarding executive characteristics, such as gender and age (Bertrand & Hallock, 2001). Missing entries and control variables were completed using the following sources: LinkedIn, Notable Names Database (NNDB), Google searchers, Center for Research in Security Prices (CRSP), COMPUSTAT and company proxy statements submitted to the U.S. Securities and Exchange Commission via the Electronic Data Gathering Analysis and Retrieval (EDGAR). Because I lagged the control variables, I have one year less of data. The final sample is an unbalanced panel with 1,717 observations from 420 firms for the model predicting return on assets (2009-2013) and 1,647 observations from 399 firms in the main effects models predicting top management pay dispersion (2009-2013).

Dependent Variables

To test the first hypothesis, regarding the negative effect of top management pay dispersion on firm performance, I use *return on assets* (ROA), operationalized as net income divided by total assets, as the dependent variable. The use of ROA is one of the most common measures of firm performance when studying the effect of TMT pay dispersion (Fredrickson, Blake & Sanders, 2010; Jaskiewicz et al., 2017). It is important to note that ROA had some outliers, I therefore winsorized the variable at the 1st and 99th percentiles.

Top management team (TMT) pay dispersion is the dependent variable for the remaining hypotheses 2 through 5. I operationalized TMT pay dispersion using the four highest paid executives who are not the CEO, because past researchers have argued that CEO compensation has different theoretical antecedents (Finkelstein & Boyd, 1998) and because the CEO has a higher rank than all other TMT members. TMT pay dispersion is calculated as the coefficient of variation of total compensation for the top four highest paid TMT members other than the CEO

(Carpenter & Sanders, 2004; Fredrickson et al., 2010; Jaskiewicz et al., 2017). Total compensation includes: salary, bonus, stock awards, option awards, non-equity incentive plan, pension plan change and other components. The term "other components" includes: perquisites and other personal benefits, termination or change-in-control payments, contributions to defined contribution plans (e.g. 401K plans), life insurance premiums, gross-ups and other tax reimbursements, and discounted share purchases (Wharton Research Data Services, n.d.).

Independent Variables

With regards to the first hypothesis, *TMT pay dispersion* is the independent variable. I use a non-lagged version of TMT pay dispersion because ROA is reported at the end of each year; while most TMT pay components in a given year are usually set at the beginning of the year (Aboody and Kasznik, 2000; Jaskiewicz et al., 2017).

Board size was operationalized as the total number of board members. Board size was outlier driven, and therefore was winsorized at the 1st and 99th percentiles, following Guest (2009) and Coles, Daniel and Naveen (2008).

Moreover, I followed Oehmichen, Sarry and Wolff's (2014) operationalization of *average board interlocks*, which is the average number of additional board seats that all members of the focal board hold in other corporations.

In addition, a *female CEO* dummy variable was created, whereby 1 indicates the presence of a female CEO, and 0 indicates the presence of a male CEO.

Control Variables

The fixed effects analyses controlled for each firm and year (2008 to 2013). The latter is important to control for the impact that economic change might have on the dependent variables (*ROA* or *TMT pay dispersion*) while the former is relevant to control for any firm-specific events

(e.g., scandals).[1] All control variables are lagged one year to reduce the threat of reverse causality (Jaskiewicz et al., 2017). The control variables can be segmented into three broad categories: 1) firm-level characteristics, 2) TMT-compensation characteristics, and 3) TMT characteristics.

Firm-level characteristics. *Firm size* is operationalized as the logarithm of total assets. I include firm size in the ROA regression in order to control for the effects of economies of scale (Jaskiewicz et al., 2017). Moreover, I include firm size in the TMT pay dispersion regression because firm size is associated with a larger variety of jobs and can thus be associated with greater TMT pay dispersion (Fredrickson et al., 2010). Next, *firm age* represents the logarithm of the number of years since the firm was founded. I include firm age in the ROA regression because firms that are not in the same stage of their life-cycle may experience differences in firm performance (Jaskiewicz et al., 2017). Firm age was also included in the TMT pay dispersion regressions because it is plausible to assume that due to differences in life stage cycles and associated performance differences, firms in later stages may be able to pay managers more competitively compared to firms in earlier stages of the life-cycle. Moreover, *market-to-book* (*MTB*) *ratio*, which is a measure of company growth, is operationalized as the logarithm of debt and equity divided by total assets (Fredrickson et al., 2010; Jaskiewicz et al., 2017). It is necessary to control for *MTB ratio* because firms that experience high growth may have higher levels of TMT compensation in order to retain talent, compared to firms with lower growth (Fredrickson et al., 2010), thus resulting in higher TMT pay dispersion. Furthermore, *R&D intensity* and *advertising intensity* are used as controls in the performance regressions because both affect a firm's investments and consequently, a firm's performance (Jaskiewicz et al., 2017;

[1] More information regarding the aforementioned fixed effects can be found in the section entitled method of analysis.

Lee et al., 2008). R&D and advertising intensity are important to include in the TMT pay dispersion regression because firms with high R&D and advertising intensity require high levels of TMT member interdependence to work effectively; high levels of TMT pay dispersion would undermine this (Fredrickson et al., 2010). *R&D intensity* was calculated as the logarithm of R&D expenses divided by capital, while *advertising intensity* was calculated as the logarithm of advertising expenses divided by capital (Jaskiewicz et al., 2017). Lastly, a dummy variable for *CEO duality* was created, whereby 1 indicates that the CEO is also the chair of the board (David, Kochar & Levitas, 1998). CEO duality was included in the ROA regression because it may reflect CEO ability to engage in opportunistic actions, which may negatively affect firm performance (Lee et al., 2008). It is also included in the TMT pay dispersion regressions because CEO duality provides the CEO with greater power to influence TMT member compensation (Fredrickson et al., 2010; Jaskiewicz et al., 2017).

Compensatory characteristics. For the ROA regression, I use industry TMT pay dispersion as a control for industry-specific norms regarding TMT pay dispersion and the effects of TMT pay dispersion on return on assets (Fredrickson et al., 2010; Jaskiewicz et al., 2017). *Industry pay dispersion* was operationalized as the average TMT pay dispersion of other companies (i.e. excluding the focal firm) within the same two-digit Standard Industrial Classification (SIC) code (Fredrickson et al., 2010). However, due to high dangers of multi-collinearity, *industry dummy variables based on 2-digit SIC codes* were used rather than industry pay dispersion for the TMT pay dispersion regression models in order to control for industry effects. There were a total of eight 2-digit SIC industries represented in the data, and thus a total of seven dummies were included in the models. Moreover, in both the ROA and TMT pay dispersion regressions I controlled for *the mean TMT compensation*, calculated as the log

transformation of average compensation among TMT members (Fredrickson et al., 2010). It is important to control for average TMT compensation because higher levels of executive pay have been associated with higher levels of firm performance, as well as with higher TMT pay dispersion (Carpenter & Sanders, 2004; Fredrickson et al., 2010; Jaskiewicz et al., 2017).

TMT-level characteristics. The last category of controls takes into account the effect that individual TMT member characteristics may have on TMT pay dispersion. First, I control for *age dispersion*, calculated as the coefficient of variation in age for TMT members (Jaskiewicz et al., 2017). It is important to control for age dispersion because past researchers have found TMT age to be a significant predictor of total compensation (Bertrand & Hallock, 2001; Elkinawy & Stater, 2011). Moreover, *tenure dispersion* is controlled for, calculated as the coefficient of variation in tenure for TMT members (Jaskiewicz et al., 2017). Fredrickson and colleagues (2010) found dispersion of organizational tenure to be a significant predictor of TMT pay dispersion, which may be reflective of the greater power tenured TMT members have for negotiating better salaries (Jaskiewicz et al. 2017).

Method of Analysis

Considering that the data was longitudinal (i.e. 2008-2013) and included multiple firm observations, I used panel data regression analyses. For all the regression analyses I employed the XTREG function in STATA and used robust standard errors to control for heteroskedasticity issues. The Hausman test (Table 1) for the regression predicting ROA indicated that a fixed-effects model would be preferred over the random-effects model ($x^2(10)= 105.8$, p=0.0000).

Insert table 1 here.

The fixed-effect model containing fixed effects for company and time variables can be expressed with the following regression:

$$Y_{it} = \alpha + \beta x_{it} + \mu_1 D1_i + \mu_2 D2_i + \cdots + \mu_i Dn_i + \lambda_1 D1_t + \lambda_2 D2_t + \cdots + \lambda_T DT_t + \mu_i + \nu_{it}$$

Where

- Y is the dependent variable with i=company and t=time
- α is the intercept term
- x_{it} represents the independent variables
- β_k is the estimated coefficient for the independent variables
- μ_{it} is the coefficient for binary variables
- D_t is a binary time regressor
- λ_t is the binary time regressor coefficient
- μ_i is the individual specific effect
- ν_{it} is the error term that varies over time and companies.

For the regression predicting top management team pay dispersion, I chose to create a nested model. I did so because a fixed-effects model controls for time-invariant differences between individuals and thus does not allow for an understanding of how time-invariant variables (i.e. gender) may influence the dependent variable, whereas the nested random-effects model allows the analysis of such variables (Princeton, 2007). Thus, a nested model was created which allowed for the analysis of time-invariant variables, while incorporating company and time fixed effects as well as all other control variables.

The nested model containing fixed effects for each firm and time can be expressed with

the following regression:

$$Y_{it} = \alpha + \beta x_{it} + u_{it} + \epsilon_{it}$$

Where

- Y is the dependent variable with i=company and t=time
- α is the intercept term
- x_{it} represents the independent variables
- β_k is the estimated coefficient for the independent variables
- u_{it} is the error term that varies over time and companies, also known as between-entity error
- ϵ_{it} is the random deviation from α, also known as within-entity error.

III. Results

Descriptive Statistics

Table 2 shows the means, standard deviations and Pearson pairwise correlations for all variables in analyses. Firms in the sample have on average 16,321.13 million in total assets and are 58.3 years old. As expected, I find a negative relationship between TMT pay dispersion and firm performance ($p<0.01$). Moreover, I find that firm size is positively related to board interlocks ($p<0.001$), while firm age is positively related with having a female CEO ($p<0.001$).

Insert table 2 here.

Hypotheses Testing

In order to examine the baseline hypothesis that high TMT pay dispersion will hurt firm performance, I ran a fixed-effects regression model, as shown in table 3. As can be seen in model 1 (ΔR^2 = .01, $\Delta F(9, 421) = 7.29$, p=0.0000), of all the controls, only few were significant. More specifically, firm size (β = -0.028, p= 0.002) and market-to-book ratio (β = -0.2028, p= 0.0000) demonstrate a negative relationship with ROA, while firm age has a positive relationship with firm performance (β = 0.1247, p= 0.008). Although the relationship between firm size and firm performance is not consistent with past researchers (i.e. Carpenter & Sanders, 2002; Jaskiewicz et al., 2017), a plausible explanation for the negative relationship found in our sample is that firms that are larger in size also tend to be more mature and thus face greater competition. It is worthwhile noting that Siegel and Hambrick (2005) also found a negative relationship between firm size and firm performance, although the relationship was non-significant. The second model (ΔR^2 = .01, $\Delta F(10, 419) = 6.09$, p=0.0000) in table 3 adds TMT pay dispersion and indicates a significant negative relationship between TMT pay dispersion and ROA (β = -0.0178, p= 0.05), thus supporting our first hypothesis.

Insert table 3 here.

I test hypotheses 2 through 5 using a nested panel regression model. Table 4 summarizes the results. The first model in table 5 includes only the control variables (ΔR^2 = .08, *Wald's* $x^2(16) = 39.65$, p=0.0009), while models 2-4 add the relevant independent variables in question. Model 5, finally, adds all three independent variables (ΔR^2 = .10, *Wald's* $x^2(19) = 59.28$, p=0.0000).

Model 1 of table 4 demonstrates that several of the controls significantly impact TMT pay dispersion. More specifically, of the firm-level controls, market-to-book ratio (β = 0.0924, p= 0.072) has a significant positive relationship with TMT pay dispersion, consistent with Fredrickson and colleagues (2010). Moreover, firm age (β = -0.0553, p= 0.029) has a significantly positive relationship with TMT pay dispersion. With regards to the compensation controls, the following industries all demonstrate a significantly negative relationship with TMT pay dispersion: manufacturing (β = -0.0553, p= 0.079), retail (β = -0.0724, p= 0.054), and finance (β = -0.0645, p= 0.079). Lastly, only age TMT dispersion (β = 0.5454, p= 0.001), of the team-level controls, reveals a significant positive relationship with pay dispersion, consistent with prior research (Jaskiewicz et al., 2017

Model two of table 4 confirms that our second hypothesis regarding the positive main effect of board size on TMT pay dispersion is supported. More specifically, a larger board size (β = 0.008, p= 0.065) is associated with an increase in TMT pay dispersion. Moreover, model three of table 4 reveals that the average interlocks of board members is also a significant negative predictor of TMT pay dispersion. There is a negative relationship between average board interlocks and TMT pay dispersion (β = -0.027, p= 0.078), such that a higher number of interlocks is associated with a decrease in TMT pay dispersion, supporting hypothesis 3. Furthermore, as can be seen by the fourth model, having a female CEO is associated with an increase in top management pay dispersion (β = 0.10, p= 0.001). Thus, as predicted by hypothesis 4, having a female CEO compared to a male CEO is associated with higher TMT pay dispersion. Finally, the fifth model of table 4 includes all the controls as well as the independent variables. Importantly, the main effects of board size, average board interlocks, and female CEO remain statistically significant (β = 0.0077, p= 0.072; β = -0.0342, p= 0.032; β = 0.10, p= 0.001,

respectively). The fact that the main effects remain significant when they appear as the only independent variable in the model, or when they all appear together in one model, demonstrates that the results are not driven by multicollinearity.

Insert table 4 here.

Robustness Tests

In order to determine if the main effects obtained were robust, I performed a subset of additional analyses. First, regarding the analyses for the baseline firm performance hypothesis, I used the lagged version of TMT pay dispersion in replace of the non-lagged version. As can be seen in table 5, the model (ΔR^2 = .02, $\Delta F(10, 421) = 6.58$, p=0.0000) reveals that there is a negative, but non-significant relationship between the lagged TMT pay dispersion and ROA (β = -0.0078, p= .19). However, since the p-value was slightly below p=0.20, the negative relationship between the lagged TMT pay dispersion and ROA would be marginally significant on a one-tailed t-test. Importantly, such results are consistent with Jaskiewicz and colleagues (2017), because as the authors note a one-year lag actually implies a two-year difference between the allocation of rewards and when ROA is reported. Indeed, this is consistent with Hayes and Schafer's (2000) argument regarding that the majority of total compensation is known in advance and tends to be used as an incentive for motivating performance rather than used as a reward. Nevertheless, both the TMT pay dispersion variables are negatively associated with firm performance, supporting hypothesis 1.

Insert table 5 here.

Moreover, considering research findings that board members tend to hire those that are demographically similar, and board appointments tend to favour white Caucasian males (Westphal & Stern, 2007; Westphal & Zajac, 1995), it is plausible to assume that female CEO's may have on average, a lower number of interlocks, compared to male CEO's because they are seen as dissimilar and are not part of the "in-crowd". Because CEOs are often simultaneously board chairs, who influence TMT pay dispersion, I developed an interaction term between the gender of CEO's who are also chair of the company (i.e., CEO duality) and the number of interlocks held by each chair/CEO. Said differently, I wanted to investigate whether it was the average number of board interlocks *or* the number of interlocks held by a female vs. male chair/CEO that was the better predictor of TMT pay dispersion. The variable entitled *CEOinterlocksXGender*, was created by multiplying the number of interlocks each dual CEO had in a given year by the CEO's gender. The nested model only has a total of 978 observations, because only a subset of companies was used in which the CEO was also chairman of the board (i.e. presence of CEO duality). Table 6 provides the results for the TMT pay dispersion model with addition of the interaction term ($\Delta R^2 = 0.11$, *Wald's* $x^2(20) = 45.11$, p=0.0011). Unfortunately, the inclusion of the interaction term between CEO interlocks and gender is not a significant predictor of TMT pay dispersion (β = -0.0028, p= 0.78). I therefore cannot decipher which is more important, board interlocks or female vs. male CEO interlocks. A potential reason for why the interaction term is non-significant is due to the high-multicollinearity between the moderation term and the independent variables.

Insert table 6 here.

As a final robustness test, I wanted to determine whether the results regarding average board interlocks was driven by the number of additional interlocks, or if such results also applied to the tails of the distribution. I therefore created two dummy variables known as high interlocks and low interlocks, whereby a 1 indicates the presence of a high or low presence of interlocks, respectively. The dummy variables are operationalized as 1.5 standard deviations (*SD*=0.52) above the mean of the average interlocks variable (high interlocks) and below the mean (low interlocks). Please refer to table 7 for the nested model regression testing the effects of high vs. low interlocks on TMT pay dispersion. Interestingly, the results indicate that low average board interlocks has a significant positive relationship with TMT pay dispersion (β = 0.0943, p= 0.006), while high average board interlocks has a negative relationship with TMT pay dispersion but is not significant (β = -0.0154, p= 0.634). Thus, it seems that having a low number of board interlocks is associated with increases in TMT pay dispersion, but high board interlocks doesn't seem to drive TMT pay dispersion. It is plausible that the presence of low interlocks is more harmful to TMT pay dispersion because it indicates the presence of less experienced board members and thus the inability to transfer better corporate governance practices via interlocks. It is worthwhile noting that even with the new operationalization of average board interlocks (i.e. high vs. low), the additional independent variables of board size (β = 0.0076, p= 0.074) and female CEO (β = 0.0946, p= 0.002) remain significant predictors of TMT pay dispersion.

Insert table 7 here.

IV. Discussion

The aim of the present thesis was to determine if horizontal TMT pay dispersion is harmful to firm performance, and whether corporate governance mechanisms affect TMT pay dispersion. Using panel data on firms appearing on the S&P500 from 2008 to 2013, I demonstrate that in a high interdependence context, such as the one experienced by TMT members, pay dispersion among executives reduces firm performance. More importantly, the current findings further our limited knowledge regarding which corporate governance mechanisms, namely characteristics of the board, as well as the CEO, are associated with higher versus lower levels of TMT pay dispersion.

As predicted by my baseline hypothesis, there is a negative relationship between horizontal TMT pay dispersion and firm performance, thereby substantiating past research findings (Fredrickson et al., 2010; Jaskiewicz et al., 2017; Hambrick & Siegel, 1997; Siegel & Hambrick, 2005). I predicted that high pay dispersion among executives would lead to an unfavourable social comparison, leaving executives feeling undervalued (Adams, 1963). Based on my findings, it does seem that wage inequality among executives can lead to reduced cohesion and collaboration, resulting in decreased firm performance.

In line with Siegel and Hambrick (2005) and Shaw and colleagues (2002), the issue concerning whether dispersed or compressed pay is best for performance, is best answered by specifying the types of pay dispersion analyzed (i.e. horizontal vs. vertical), as well as the situational contingencies. I have argued that in high interdependence contexts, such as top

management teams, social comparison theory (Festinger, 1954) is more applicable compared to tournament theory. The unfavourable social comparison made my top managers can be exacerbated when pay dispersion is attributable to unjustifiable compared to justifiable reasons. More specifically, I attempted to control for firm, team and compensation characteristics that could be interpreted as justifiable reasons for pay dispersion, while examining corporate governance mechanisms that may be interpreted as unjustifiable. According to Shaw and colleagues (2002), unjustifiable reasons for pay dispersion can be attributable to dysfunctional procedures, and the findings of this paper demonstrate how corporate governance mechanisms associated with board and CEO characteristics can encourage dysfunctional procedures regarding executive compensation. Considering that board members, as well as the CEO determine the allocation of rewards (Hillman & Dalziel, 2003; Westphal & Zajac, 1995), I hope that the aforementioned findings will encourage the implementation of compensation practices that are more equitable.

The present findings demonstrate that corporate governance mechanisms, such as larger board size and having a female CEO are associated with higher levels of TMT pay dispersion. First, I argue that the positive relationship between board size and TMT pay dispersion occurs because a larger board is associated with increased number of firm goals, and past researchers have shown that multiple performance goals in a high interdependence team context is associated with decreases in firm performance (Ethiraj & Levinthal, 2009). The decreases in firm performance can be attributable to the pursuit of different goals among executives and consequently executives will receive different pay based upon their pursuit of individual sub-unit goals. This is in line with Jaskiewicz and colleagues (2017) who found that family ownership, indicating one type of firm owner, which is associated with the pursuit of multiple goals, leads to

increases in horizontal pay dispersion. It therefore seems that larger board size is another corporate governance mechanism that contributes to higher levels of pay dispersion among TMT members. Linking such findings to my baseline hypothesis, the fragmentation of goals associated with a larger board size therefore results in high pay dispersion among executives and according to social comparison theory (Festinger, 1954) can contribute to decreased cohesion and trust among executives, resulting in decreased firm performance. These findings are important because they suggest that multiple, potentially conflicting goals that are difficult to reconcile are not an exception that applies to family firms but the norm among all firms. To keep TMT pay dispersion under control, firms thus need to ensure upper bounds on the heterogeneity of their board size. Second, the presence of a female CEO, compared to a male CEO, was associated with higher levels of TMT pay dispersion, as predicted by my hypothesis. The aforementioned hypothesis is in line with the human agency perspective, whereby agents must be motivated to seek legitimacy for their firms, often doing so by conforming to what other firms are doing (Ashforth & Gibbs 1990; Deephouse & Suchman 2008; Suchman, 1995), in order to gain trustworthiness and access to resources (Miller et al., 2013). Female CEOs are motivated to gain legitimacy because they tend to be considered as "out-group" members (Ragins et al., 1998) and stakeholders tend to view female CEO appointment suspiciously as reflected by a decrease in firm stock prices (Fortune, 2016). Applying legitimacy research to this context, female CEOs seem to conform to traditional organizational norms in order to gain legitimacy, and inadvertently encourage the maintenance of ineffective compensation practices, as exhibited by the high pay dispersion among TMT members. It is imperative that in interpreting these findings we do not place blame on female CEOs because their actions are a result of their social environment (i.e. organizational cultures) and not a result of malicious intent. Female CEOs are

embedded in male-oriented organizational cultures, and in an attempt to become a member of the "in-group" (i.e. TMT), they likely focus on developing their legitimacy, even if it might not be most conducive to the firm. Indeed this is consistent with Burt (1998) who argued that women pose a puzzle (p.13) to the way in which legitimacy affects social capital because women do not accrue the same advantages from networks as men do. Part of the reason is that female networks are often composed of same-sex relationships, and although such relationships may provide emotional support, they do not offer tangible benefits, such as career advancements (Burt, 1998; Gorji, Carney & Prakash, forthcoming). Such findings point to the difficulty of changing male-dominated organizational cultures and removing the additional tournaments that women face when attempting to reach the upper echelons of the organization.

Furthermore, the analyses revealed that one corporate governance mechanism, namely average board interlocks, was associated with a reduction in horizontal TMT pay dispersion. This finding therefore supports social network theory (Granovetter, 1985), which argues that organizations that are linked via multiple directorships have the ability to learn best practices from one another. Moreover, such findings are indicative of board members learning vicariously through their corporate linkages, providing them with greater insight and ability to contribute to decision-making in their focal firm (Carpenter & Westphal, 2001). Accordingly, a higher number of average board interlocks is associated with a decrease in TMT pay dispersion because board members are connected to more firms, thus increasing their ability to learn more effective compensation practices and apply them to their focal firm. Said differently, board interlocks are a corporate governance mechanism that can be used to reduce horizontal pay dispersion among executives. These findings therefore re-affirm past research regarding the spread of organizational practices among interlocked firms (Bizjak et al., 2009; Davis, 1991; Oehmichen et

al., 2014; Westphal et al., 2001). I add to the literature by examining the impact that average board interlocks have on a new organizational outcome, namely that of TMT pay dispersion. My findings point to an interesting implication: while it might be difficult for female CEOs to reduce TMT pay dispersion because they lack legitimacy, I find that board members are able to gain such legitimacy via their multiple directorships, and seem to use it in favour of firm performance. Importantly, future researchers could analyze whether firms that boards with a higher number of interlocks and a female CEO are more or less effective at reducing pay dispersion among executives. On one hand, the board might have the required legitimacy to implement a different and more equitable pay scheme for the TMT and the female CEO might appreciate this. Such a prediction is line with Burt's (1998) and Gorgi and colleagues (forthcoming) reasoning that females would benefit from more heterogeneous hierarchical networks, potentially because females can "borrow" social capital. In this case, female CEOs could borrow social capital from interlocked board members. On the other hand, the female CEO might lobby against such pay schemes that reduce pay dispersion in an attempt to gain legitimacy with their male colleagues on the TMT.

Outlook

As with all research, several limitations merit discussion. First, due to scope of this project, I was only able to include a quantifiable measure of board interlocks by calculating the average number of additional directorships for each board member. As Shropshire (2010) critiques, past researchers have often wrongly assumed board interlock homogeneity; assuming that organizational practices are spread uniformly between firms via board interlocks. Indeed, I *surmised* that the dissemination of organizational practices occurred, rather than actually measuring which firms the focal board member was connected to, and whether such connected

firms did indeed have more effective compensation practices. Thus, perhaps future research can replicate my findings by using a different operationalization of average board interlocks. For instance, the eigen vector centrality method takes into consideration whether the board interlocks are more or less important based upon a mathematical algorithm (Bizjak et al., 2009; Oehmichen et al., 2014; Westphal et al., 2001).

Second, I operationalized the top management team based upon SEC firm reporting's of the four highest paid members of the CEO team (excluding the CEO). Although such an approach is common in the TMT literature (Fredrickson et al., 2010; Jaskiewicz et al., 2017; Mehran, 1995), some firms may still have more than four top executives (excluding the CEO), causing the TMT pay dispersion variable to be underestimated. Unfortunately, the pay of these next highest paid individuals is unknown. A survey-based study analyzing the extent of pay dispersion among the top 10 or 15 top executives across firms might help generalize and refine our knowledge on the drivers and consequences of executive pay dispersion.

Third, the findings regarding TMT pay dispersion and subsequent effects on firm performance may only be generalizable to other publicly listed firms because private firms are not legally required to report compensation data. Consequently, executives in private firms may be less likely to engage in social comparisons because they might not have all the necessary information (i.e. compensation data), to do so. Future research could therefore address the last two limitations by conducting research on privately held firms because privately-owned firms would need to report the exact number of executives on the TMT, as well as their exact compensation. Consequently, such future research can avoid the conservative bias associated with public firms, and determine if similar findings are applicable to private firms.

Moreover, future researchers may want to focus on other corporate governance mechanisms that affect horizontal TMT pay dispersion. For instance, past researchers have shown that board and CEO appointments tend to favour male *Caucasians* (Westphal & Stern, 2007; Westphal & Zajac, 1995), it is therefore plausible that non-Caucasian CEOs face similar additional tournaments and stereotypes that women do and will therefore attempt to gain legitimacy by conforming to existing organizational norms. Consequently, I would predict that firms run by non-Caucasian CEOs would also exhibit higher TMT pay dispersion compared to firms run by Caucasian CEOs, especially male Caucasians. Once again, it is important to keep in mind that non-Caucasian CEOs may have the best intentions, but given their social environments they might seek to gain legitimacy in ways that are not always conducive for the firm.

In addition, Shropshire (2010) proposed that board receptivity regarding the diffusion of organizational practices via multiple directorships would actually *decrease* if the focal firm is experiencing environmental uncertainty. Future researchers could use Dess and Beard's (1984) typology of three dimensions of environmental uncertainty, which in brief relate to, level of resources available, level of turbulence, and level of complexity. If Shropshire's (2010) prediction is true, then an increased level of environmental turbulence would be associated with higher levels of TMT pay dispersion because boards are less receptive to make changes to their existing corporate practices. Interestingly, van Essen, Engelen and Carney (2013) examined the effects of adhering to corporate governance prescriptions on firm performance before and during the financial crisis, using firms from 26 countries in Europe. It is plausible that the financial crisis can be characterized as a time of high environmental uncertainty. The authors (van Essen et al., 2013) find that during a financial crisis the adherence to universal governance prescriptions may actually undermine firm performance, and firms might actually benefit from

providing managers with greater discretionary ability. The findings therefore challenge the idea of universally "good" corporate governance systems, and van Essen and colleagues (2013) argue that corporate governance prescriptions are subject to firm and country-level contingencies. Said differently, these findings indicate that perhaps during times of uncertainty firms would benefit from changing the status-quo of their corporate governance practices. One way for practitioners to do this would be to find ways to help increase board receptivity regarding the diffusion of organizational practices during such turbulent times, in hopes of reducing rather than increasing TMT pay dispersion. While the former (i.e. non-Caucasian CEOs) might be unjustified and the latter example might be justified, we still do not know for sure whether it is interpreted as such by executives. Therefore, future researchers can follow Fredrickson and colleagues (2010) methodology by creating measures for expected and excess dispersion (i.e. difference between the *actual* levels of pay dispersion and *expected)* in order to disentangle whether the aforementioned corporate governance antecedents to TMT pay dispersion are justifiable or not.

The current paper adds to the existing literature in several ways. First, and perhaps most importantly, I attempt to answer Shaw's (2014) research calling for research that examines the underlying mechanisms that affect pay dispersion. As previously mentioned, certain corporate governance mechanisms, such as larger board size and having a female CEO compared to a male CEO was related to higher levels of pay dispersion among executives. Second, I examine the importance of board interlocks in a new context. More specifically, the negative relationship between average board interlocks and TMT pay dispersion demonstrates the ability of organizations to learn best practices via the social networking of board members. Moreover, practioners may want to encourage board members to sit on multiple boards as a cost-effective strategy to learning best practices from interlocking firms. As shown, inter-organizational

learning via board interlocks reduces horizontal pay dispersion, and can therefore mitigate the negative effects on firm performance. Third, I substantiate past research regarding the fact that high pay dispersion might reduce cohesion and collaboration among executives, resulting in decreased firm performance.

Conclusion

I empirically examined the corporate governance antecedents to horizontal TMT pay dispersion and the subsequent effects on firm performance using longitudinal data on firms appearing on the S&P500 from 2008 to 2013. This study adds to the little existing research on the antecedents of pay dispersion (Fredrickson et al., 2010; Jaskiewicz et al., 2017), and is the first to explicitly examine these corporate governance antecedents. The pattern of results is consistent with social comparison and social network theory, and is indicative of compressed, rather than dispersed pay, as being best for individual and/or organizational performance.

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Table 1. Hausman test for ROA as dependent variable.

	(b) Fixed	(B) Random	(b-B) Difference	sqrt(diag(V_b-V_B) S.E.
Firm size	-0.02	-0.01	-0.01	0.01
Firm age	0.10	0.02	0.08	0.03
Market-to-book	-0.19	-0.03	-0.17	0.03
RD intensity	1.33	3.85	-2.51	2.73
Advertising intensity	-3.74	6.69	-10.43	3.23
CEO duality	0.01	0.01	0.00	0.00
TMT average compensation	0.00	0.01	-0.01	0.00
Age dispersion	-0.06	-0.06	0.00	0.02
Tenure dispersion	0.00	0.00	0.00	0.00
TMT pay dispersion	-0.02	-0.02	0.00	0.00

H_0: difference in coefficients not systematic
chi2(10) = (b-B)' [(V_b-V_B)^(-1)](b-B)
= 105.8
Prob>chi2= 0.0000

Table 2. Descriptive statistics and Pearson pairwise correlations.

Variables	Mean	Std Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. ROA	0.05	0.07	1.000																					
2. TMT pay dispersion	0.35	0.25	-0.06***	1.000																				
3. Firm size	9.70	1.47	-0.23****	-0.07**	1.000																			
4. Firm age	1.63	0.36	0.09****	-0.07***	0.04**	1.00																		
5. Market-to-book	0.61	0.19	0.18****	0.12****	-0.37****	0.00	1.00																	
6. RD intensity	0.0004	0.0010	0.16****	-0.01	-0.39****	-0.12****	0.10****	1.00																
7. Advertising intensity	0.0004	0.0008	0.25****	0.05**	-0.38****	0.06***	0.00	0.10****	1.00															
8. CEO duality	0.61	0.49	0.00	-0.08****	0.15****	0.09****	-0.12****	-0.13****	-0.02	1.00														
9. Industry pay dispersion	0.35	0.08	0.02	0.34****	-0.10****	0.01	0.18****	-0.07****	0.09****	-0.09****	1.00													
10. Mining	0.04	0.20	-0.02	0.12****	0.01	0.05**	0.09****	-0.07****	-0.08****	0.03	0.29****	1.00												
11. Construction	0.01	0.11	-0.09****	0.08****	-0.07***	-0.05**	0.04*	-0.04**	0.01	-0.06***	0.18****	-0.02	1.00											
12. Manufacturing	0.37	0.48	0.16****	-0.05**	-0.13****	0.24****	0.19****	0.26****	-0.02	0.08****	-0.14****	-0.16****	-0.09****	1.00										
13. Transportation	0.11	0.31	-0.09****	-0.02	0.14****	-0.15****	0.02	-0.14****	-0.14****	0.04**	*-0.04	-0.07****	-0.04****	-0.26****	1.00									
14. Wholesale	0.02	0.13	0.03	0.00	-0.05**	0.01	-0.06***	-0.04*	0.04*	0.01	0.00	-0.03	-0.01	-0.10***	-0.04**	1.00								
15. Retail	0.08	0.27	0.06****	-0.03	-0.09****	0.01	0.01	-0.10****	0.27****	0.03	-0.08****	-0.06****	-0.03*	-0.22****	-0.10****	-0.04*	1.000							
16. Finance	0.16	0.37	-0.20****	**-0.05	0.33****	-0.12****	-0.35****	-0.16****	-0.11****	0.01	-0.13****	-0.09****	-0.05***	-0.34****	-0.15****	-0.06****	-0.13****	1.000						
17.TMT avg. compensation	8.21	0.64	0.06***	0.11****	0.53****	0.10****	-0.07****	-0.22****	-0.14****	0.06***	0.09****	0.06****	-0.04*	0.04*	-0.01	-0.06***	-0.05**	-0.04*	1.00					
18. Age dispersion	0.10	0.05	-0.03	0.17****	-0.13****	-0.06****	0.06***	0.02	0.03	-0.15****	0.12****	0.02	0.01	-0.07****	0.03	0.03	-0.01	0.02	-0.02	1.00				
19. Tenure dispersion	0.64	0.31	-0.06***	0.01	0.04*	-0.03	-0.09****	0.05**	-0.03	-0.02	-0.01	-0.04	0.00	0.00	-0.04*	-0.05**	-0.02	0.00	0.01	0.03	1.00			
20. Board size	10.78	2.07	-0.10****	-0.05**	0.44****	0.23****	-0.21****	-0.25****	-0.15****	0.08****	-0.16****	-0.06***	-0.07****	-0.04*	0.12****	-0.01	-0.03	0.19****	0.29****	-0.08****	0.02	1.00		
21. Avg. board interlocks	1.13	0.52	-0.02	0.09****	0.22****	0.12****	-0.10****	-0.05**	-0.12****	0.07****	-0.04*	-0.03	-0.05***	0.13****	-0.03	0.01	-0.04**	-0.08****	0.17****	-0.10****	0.07****	0.08****	1.00	
22. Female CEO	0.04	0.19	0.02	0.00	0.03	0.08****	-0.03	0.00	0.00	-0.03	0.02	-0.05**	-0.02	0.10****	0.01	-0.03	0.00	-0.08****	0.04*	-0.03	0.06***	0.04*	0.16****	1.00

*Note. ****p<.001, ***p<.01, **p<.05, *p<.10.*

Table 3. Fixed-effects regression for ROA as dependent variable.

Variables	ROA	ROA
Firm controls		
Firm size	-0.0280***	-0.0235***
	(0.0090)	(0.0089)
Firm age	0.1247***	0.1030**
	(0.0467)	(0.0458)
Market-to-book	-0.2028****	-0.1921****
	(0.0373)	(0.0370)
RD Intensity	0.9677	1.3322
	(6.1344)	(6.5430)
Advertising Intensity	-4.1452	-3.7355
	(5.1012)	(5.3686)
CEO duality	0.0048	0.0059
	(0.0068)	(0.0069)
Compensation controls		
Industry pay dispersion	Omitted	Omitted
	-	-
TMT average compensation	0.0004	0.0008
	(0.0028)	(0.0030)
Team controls		
Age dispersion	-0.0857	-0.063
	(0.0780)	(0.0745)
Tenure dispersion	0.0002	-0.0004
	(0.0060)	(0.0061)
Independent variables		
TMT pay dispersion		-0.0178**
		(0.0090)
Constant	0.2561****	0.2404***
	(0.0792)	(0.0780)
R-sq overall	0.01	0.01

Note. Standardized regression coefficients, values in parentheses represent robust standard errors. N=1717.
***** p < .001, ***p < .01, ** p < .05, *p<.10.*

Table 4. Random-effects regression with fixed company and time effects for TMT pay dispersion as dependent variable.

Variables	TMT Pay Dispersion	TMT Pay Dispersion	TMT Pay Dispersion	TMT Pay Dispersion	TMT Pay Dispersion
Firm controls					
Firm size	-0.0072	-0.0144	-0.0046	-0.0069	-0.0111
	(0.010)	0.0100	(0.0101)	(0.0101)	(0.0101)
Firm age	-0.0553**	-0.0657***	-0.0568**	-0.0567**	-0.0674***
	(0.0253)	(0.0263)	(0.0269)	(0.0256)	(0.0267)
Market-to-book	0.0924*	0.0933*	0.0882*	0.0979*	0.0919*
	(0.0514)	(0.0496)	(0.0515)	(0.0512)	(0.0486)
RD Intensity	-4.0211	-5.7893	-4.0795	-3.8205	-5.714
	(7.8143)	(8.0848)	(7.9447)	(7.6162)	(7.9394)
Advertising Intensity	16.64	18.3660	15.7443	16.4621	17.45
	(11.8304)	(13.5344)	(11.8062)	(11.7813)	(13.3268)
CEO duality	0.0005	0.0026	0.0016	0.0025	0.006
	(0.0192)	(0.019)	(0.0193)	(0.0193)	(0.019)
Compensation controls					
Mining	0.0722	0.0805	0.0823	0.0686	0.0793
	(0.0665)	(0.0694)	(0.0711)	(0.0668)	(0.0714)
Construction	0.081	0.0783	0.0817	0.0780	0.0765
	(0.14)	(0.1444)	(0.1350)	(0.1396)	(0.1383)
Manufacturing	-0.0553*	-0.0569*	-0.0546*	-0.0634**	-0.0635**
	(0.0315)	(0.0321)	(0.0315)	(0.0323)	(0.0328)
Transportation	-0.0556	-0.0693*	-0.0595	-0.063*	-0.0828**
	(0.0366)	(0.0362)	(0.0369)	(0.0373)	(0.0372)
Wholesale	-0.0713	-0.0820	-0.0714	-0.0742	-0.084
	(0.0636)	(0.0667)	(0.0643)	(0.0643)	(0.07)
Retail	-0.0724**	-0.0895**	-0.075**	-0.0783**	-0.0993***
	(0.0375)	(0.0388)	(0.0375)	(0.0380)	(0.0391)
Finance	-0.0645*	-0.0655*	-0.0727**	-0.0690*	-0.0781
	(0.0368)	(0.0367)	(0.0372)	0.0382	(0.0381)
TMT average compensation	0.0332***	0.0346*	0.0321**	0.0324**	0.0336**
	(0.0136)	(0.014)	(0.0136)	0.0137	(0.0141)
Team controls					
Age dispersion	0.5454****	0.591****	0.5450****	0.5547****	0.6043****
	(0.1643)	(0.168)	(0.1655)	(0.1645)	(0.1691)
Tenure dispersion	-0.0172	-0.0205	-0.0147	-0.0196	-0.02
	(0.0189)	(0.0196)	(0.0193)	(0.0190)	(0.02)
Independent variables					
Board size		0.008*			0.0077*
		(0.0043)			(0.0042)
Average board interlocks			-0.027*		-0.0342**
			(0.0153)		(0.016)
Female CEO				0.0757**	0.10****
				(0.0356)	(0.0305)
Constant	0.1631	0.1540	0.1828	0.1679	0.176
	(0.1191)	(0.1194)	(0.12)	(0.1186)	(0.1192)
R-sq overall	0.08	0.09	0.09	0.08	0.10

Note. Standardized regression coefficients, values in parentheses represent robust standard errors. N=1647.
***** p < .001, ***p < .01, ** p < .05, *p<.10.*

Table 5. Robustness check for fixed effects regression for ROA as dependent variable.

Variables	ROA
Firm controls	
Firm size	-0.029*** (-0.0091)
Firm age	0.1184*** (-0.0459)
Market-to-book	-0.2007**** (-0.0376)
RD Intensity	0.9362 (-6.0835)
Advertising Intensity	-4.0462 (5.07)
CEO duality	0.0047 (0.0067)
Compensation controls	
Industry pay dispersion	Omitted -
TMT average compensation	0.0017 (0.0029)
Team controls	
Age dispersion	-0.0838 (0.0782)
Tenure dispersion	0.0001 (0.006)
Independent variables	
Lag TMT pay dispersion	-0.0078 (0.0059)
Constant	0.262 (-0.0787)
R-sq overall	0.02

Note. Standardized regression coefficients, values in parentheses represent robust standard errors.
N=1768.
***** p < .001, ***p < .01, ** p < .05.*

Table 6. Nested model for TMT pay dispersion as dependent variable with inclusion of interaction term.

Variables	TMT Pay Dispersion
Firm controls	
Firm size	-0.0125
	(0.0116)
Firm age	-0.0851**
	(0.0354)
Market-to-book	0.0667
	(0.0661)
RD Intensity	1.3173
	(10.4524)
Advertising Intensity	32.5778
	(19.0767)
CEO duality	-0.0487
	(0.0373)
Compensation controls	
Mining	0.1542*
	(0.0903)
Construction	-0.0296
	(0.0454)
Manufacturing	-0.031
	(0.0467)
Transportation	-0.0494
	(0.05)
Wholesale	-0.0687
	(0.0867)
`Retail	-0.0679
	(0.0534)
Finance	-0.0272
	(0.0566)
TMT average compensation	0.0364**
	(0.0171)
Team controls	
Age dispersion	0.4547**
	(0.2134)
Tenure dispersion	0.0029
	(0.0236)
Independent variables	
Board size	0.0063
	(0.0052)
Average board interlocks	-0.0252
	(0.0176)
Female CEO	0.1009*
	(0.0514)
CEOinterlocksXGender	-0.0028
	(0.001)
Constant	0.2184
	(0.1557)
R-sq overall	0.11

*Note. Standardized regression coefficients, values in parentheses represent robust standard errors. **** p < .001, ***p < .01, ** p < .05, *p<.10.*

Table 7. Robustness check for high vs. low average board interlocks.

Variables	TMT Pay Dispersion
Firm controls	
Firm size	-0.0128
	(0.01)
Firm age	-0.0686***
	(0.0259)
Market-to-book	0.1044**
	(0.0496)
RD Intensity	-5.8057
	(7.9151)
Advertising Intensity	16.9606
	(13.0071)
CEO duality	0.00651
	(0.0189)
Compensation controls	
Mining	0.0721
	(0.0694)
Construction	0.0610
	(0.1317)
Manufacturing	-0.0651**
	(0.0328)
Transportation	-0.0785**
	(0.0370)
Wholesale	-0.0844
	(0.0681)
Retail	-0.0986***
	(0.0390)
Finance	-0.0768**
	(0.0374)
TMT average compensation	0.0339**
	(0.0140)
Team controls	
Age dispersion	0.5713****
	(0.1683)
Tenure dispersion	-0.0222
	(0.0197)
Independent variables	
High board interlocks	-0.0154
	(0.0322)
Low board interlocks	0.0943***
	(0.0343)
Board size	0.0076*
	(0.0042)
Female CEO	0.0946***
	(0.0307)
Constant	0.1491
	(0.1197)
R-sq overall	0.10

*Note. Standardized regression coefficients, values in parentheses represent robust standard errors. **** p < .001, ***p < .01, ** p < .05, *p<.10.*