How do pay gaps between executives at different stages of career affect firm performance? Evidence from China

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Abstract

Using a sample of Chinese listed companies for the period 2006-2019, we investigate how pay gaps between executives at different stages of career affect firm performance. We find that the pay gap between early-career and mid-career executives undermines firm performance, consistent with the notion that the risk-taking trait of early-career executives prevents them from harvesting the fruits of their creativity. We also find that the pay gap between late-career and mid-career executives lowers corporate performance. This finding is consistent with Bertrand and Mullainathan's (2003) "quiet life" view on the preferences of late-career executives. Overall, our findings suggest that mid-career executives, generally perceived as physically and cognitively fit, contribute more positively to corporate performance, compared to early-career and late-career executives.

Keywords: Pay gap; Career stage; Firm performance; Psychology

JEL Classifications: J33; M12; O15; L25

1. Introduction

The issue of pay gap has attracted considerable attention from the public, media, and governments. A majority of literature brings this topic to the forefront and examines the pay gap between executives and employees (Banker et al. 2016, Rouen 2020, Ferry et al. 2021), between male and female executives (Perryman et al. 2016, Blau and Kahn 2003), and between CEO and lower-level executives (Siegel and Hambrick 2005, Wade et al. 2006, Carpenter and Sanders 2002). However, no research has investigated the pay gap between executives at different career stages. The objective of our research is to explore how pay gaps between early-career, mid-career, and late-career executives affect firm performance. We look at the pay gaps in Chinese companies because they are economically significant, which attract widespread concerns from labor markets. In our sample firms, the pay gap between early-career and mid-career executives (that between late-career and mid-career executives) ranges from 0.143 (0.198) to 3.206 (4.143) on the per capital basis.

On the one hand, a higher pay gap between different career stages of executives can reflect either the creation of relative value by the executives, or the premium for talents (Lazear and Rosen 1981), and motivates them to produce stronger performance for their firms (Rosen 1985). On the other hand, a larger pay gap could result in a sense of unfairness among the executives, impairing their morale and collaboration and thereby lowering firm performance (Gartenberg and Wulf 2017, Faleye et al. 2013, Wade et al. 2006, Siegel and Hambrick 2005). Thus, whether the career pay gap would impose a positive or negative influence on firm performance remains an open issue to explore. To this end, we seek to answer two questions: (1) Are firms with a higher pay gap between early-career executives and mid-career executives better-performing? (2) Do firms with a higher pay gap between late-career executives and mid-career executives perform better?

In light of a bunch of psychological arguments related to the characteristics of different stages of executive career, which stage of executive career could produce superior performance from compensation incentives is ambiguous. Early-career executives are often characterized as creative, growth-oriented, energetic, ambitious, and ready to walk the extra mile for achieving their goals (Rai 2012). However, early-career executives tend to be more overconfident and risk-oriented. They are more likely to pursue riskier strategies and conduct value-decreasing mergers and acquisitions (Karami et al. 2006, Malmendier and Tate 2008). The strengths of late-career executives are their professional experience, expert knowledge, mature communication skills, and high trust by customers (Rožman et al. 2016, Magd 2003). However, late-career executives might have a short horizon when making decisions on investments and operations. For instance, they spend less on research and development that may be beneficial for their firm in the long run (Cazier 2011). They prefer to maintain their status quo and enjoy a peaceful lifestyle (Bertrand and Mullainathan 2003). The related literature on mid-career executives is relatively limited. Ebner et al. (2006) argue that mid-career executives, combined with the merits of early-career executives and late-career executives, are perceived as visionary, rational, experience-grounded, as well as physically and cognitively fit. Judge et al. (1995) characterize a successful executive as a person who is a married, middle-aged male/female, has impressive educational credentials, and displays a high commitment to his/her works.

To explore which career stage the executives would contribute to better firm performance via compensation incentives, we focus on the pay gap of different stages of executive career in our analysis. Applying OLS regression run on a sample of Chinese listed firms for the period 2006-2019, we discover that the pay gap between early-career and mid-career executives lowers firm performance, consistent with our proposition that the risk-taking trait of early-career executives can hinder them from harvesting the fruits of their creativity. We also find that the pay gap between late-career and mid-career executives reduces firm performance. This finding is consistent with Bertrand and Mullainathan's (2003) view of "quiet life" preferred by late-career executives. To alleviate concerns about potential endogeneity, we apply the firm-fixed-effects regression (Bennedsen et al. 2019), analyze the impact threshold for a confounding variable (ITCV) (Frank 2000), and do Oster estimates (Oster 2019) for our baseline model, and obtain the same inferences in support of our conjectures. Our results are also robust to both accounting-based and market-based measurements of firm performance, and suggest that mid-career executives, who are endowed with the foregoing merits of both younger and elder executives, contribute more positively to corporate performance and prospects.

The pay for executives in state-owned enterprises (SOEs) is in line with the compensation hierarchic scales for governmental officials (Mi and Wang 2000), and is thus less based on firm performance, compared to the executive pay in non-SOEs (Lin 2018). Furthermore, SOEs are supposed to serve various social and political objectives to the best interest of the state, rather than merely achieving economic interests. Thus, the executive pay-performance sensitivity is relatively low for SOEs, leading to weaker impact of career pay gap on their performance. In accordance with this supposition, we find that the pay gap between early-/late-career executives and mid-career executives has stronger, negative impact on the corporate performance in non-SOEs. We also find the negative impact of career pay gap to be weaker on the performance of firms with fewer shares held by mid-career executives. Equity-based pay provides executives with an incentive to maximize corporate performance (Jensen and Murphy 2010). Hence, mid-career executives holding fewer stocks of their firms would have weaker incentives for performance maximization. This lack of incentives explains why we find weaker impact of the career pay gap on the performance of firms that have fewer shares owned by mid-career executives.

Our study makes the following contributions to the existing literature. First, we offer insights into the compensation incentives for different career stages of executives. Firth et al. (2006) document that a reasonable design of compensation should incentivize executives to increase the performance of their firms. However, lifespan theory pinpoints that psychological changes occurring with age could lead to varying behaviors and incentives for each stage of executive career, which changes the executives' values and attitudes on work (Sears 1981) and consequently affects firm performance. Early-career executives tend to be creative, growth-oriented but risk-tolerant and overconfident, while late-career executives are often knowledgeable and experienced but conservative and on short horizons for investments and operations. Combined with the merits of early-career and late-career executives, mid-career executives are perceived as far-sighted, rational, experience-grounded, as well as physically and cognitively fit. We provide empirical evidence to suggest that higher compensation for mid-career executives will be the most effective incentive to keep the firm competitive and successful.

Second, our study extends the existing research on pay gap. Previous studies investigate whether executive-employee pay gap (Banker et al. 2016, Rouen 2020), gender pay gap (Perryman et al. 2016), and pay disparity between CEO and lower-level managers (Siegel and Hambrick 2005, Wade et al. 2006, Carpenter and Sanders 2002) influence firm performance. To the best of our knowledge, no research has explored how the pay gaps between executives at different stages of career shape firm performance. Our study fills this void in the literature. Most prior findings imply that a large pay gap would impair fairness, create envies, lower morale, and thereby reduce individual productivity and firm performance. By contrast, our study reconciles with the viewpoint that higher wage premiums should be paid to talented executives who are expected to create greater values for the firm. Our findings suggest that mid-career executives actually act as the backbone and key contributors of firms, and that higher wage premiums for mid-career executives would generate relatively better firm performance.

2. Theory, literature, and hypotheses

2.1 Lifespan theory

Lifespan theories suggest that the individual goals and aspirations be adjusted over time. One of the most important lifespan theories is the selection, optimization, and compensation (SOC) theory. SOC theory was first initiated by Baltes (1987), suggesting that age-related loss in biological function will cause the motivation of gains and growth (loss prevention) to decrease (increase) as an individual ages (Baltes 1997, Baltes et al. 1999). SOC theory has been applied prevailingly for the adaptation to physical and cognitive changes manifested in late life (Baltes 1987). This viewpoint is reinforced by Ebner et al. (2006), implying that younger executives strive for gains and growth, while elder executives focus primarily on maintenance and loss prevention. Another significant lifespan theory is socio-emotional selectivity theory (SST) proposed by Carstensen (Carstensen 1992), which is highly consistent with the SOC theory. SST theory argues that, as time horizons shrink, age-related changes result in changes in life prioritization and selectivity. When the rest of the lifetime is perceived as extensive, the goals of experiencing novelty, exploring knowledge, taking challenges and adventures are prioritized. However, if the remaining lifetime is perceived as limited, people would select and prioritize meaningful targets and emotional achievements for their life (Carstensen et al. 2003). In short, SST theory contends that, with psychological aging, individual motivation changes from instrumental satisfaction to emotional satisfaction (Carstensen et al. 1999, Castensen 1995). This theory is consistent with Bertrand and Mullainathan's "quiet life" view on the preferences of late-career executives.

2.2 Related literature and hypotheses

2.2.1 Pay for early-career *vis-à-vis* mid-career executives and firm performance

Psychological changes will affect executives' values and attitudes towards work (Sear, 1981), and thus the compensation incentives for different career stages of executives will have differential effects on corporate performance. Early-career executives could contribute to better firm performance (Belenzon et al. 2019), because of their higher energy, creativity, and openness (Rai 2012), higher adaptability to new technologies (Jagannathan and Loon 2011), and higher orientation for gains and growth (Ebner et al. 2006). However, early-career executives tend to be overconfident and to overestimate their ability to create firm value (Malmendier and Tate 2008, Forbes 2005, Kovalchik et al. 2005). Additionally, early-career executives are likely to be risk-oriented. They are likely to pursue riskier strategies (Karami et al. 2006) and apply riskier entry modes for new product/service markets (Herrmann and Datta 2002), increasing the likelihood of corporate failure and preventing the executives from harvesting the fruits of their creativity. Consistent with this notion, Gong et al. (2013) provide evidence that executives' creativity is negatively correlated with firm performance when their risk-orientation is high. By contrast, mid-career executives would be more risk-averse and more conservative than their younger counterparts. When inexperienced younger executives might find it challenging to identify and evaluate the strategic risks in a project, mid-career executives, relying on their experience and expertise, often stand a higher chance of success. Thus, a higher compensation incentive for mid-career executives than for early-career executives could better help fulfil the desired goals and outcomes for companies. Given the above discussion, we assume that a higher pay for early-career executives relative to that for mid-career executives would impair firm performance, and put forth our first hypothesis as follows:

Hypothesis 1: The pay gap between early-career executives and mid-career executives decreases firm performance.

2.2.2 Pay for late-career *vis-à-vis* mid-career executives and firm performance

Late-career executives are often proficient in marketing and networking (Grund et al. 2008), skilled at communication, trustworthy to customers, and highly instrumental in developing corporate reputation (Magd 2003). Thus, the professionalism, reliability, and work experience of late-career executives would be value-added for their firm. Nevertheless, they are characterized as less growth-oriented, more conservative in decision-making, and on a shorter horizon for future development of firms. Consistent with this viewpoint, Cazier (2011) find that late-career executives tend to reduce R&D expenditures especially when approaching retirement. Moreover, late-career executives tend to prioritize a quiet and flexible lifestyle (Bertrand and Mullainathan 2003). They have a higher tendency to keep the status quo and have a higher preference for affective rewards such as respect, esteem, and emotional satisfaction (Mor-Barak 1995). Due to stronger orientation at loss prevention and maintenance of current state, late-career executives might make their firms subject to lower profitability, less business expansion, and lower sales growth (Belenzon et al. 2019). By comparison, mid-career executives are more physically healthier and more engaged in their works compared to elder ones. They tend to be subject to higher costs-of-living pressures (e.g., those of fostering and educating their young kids and caring their elder parents). Thus, a higher pay for mid-career executives would likely incentive them to work harder and achieve better performance. The above discussion leads us to conjecture that a higher pay for late-career executives relative to that for mid-career executives would lower firm performance. Accordingly, we propose our second hypothesis as follows:

Hypothesis 2: The pay gap between late-career executives and mid-career executives reduces firm performance.

2.2.3 The effect of the career pay gap on the performance of state-owned enterprises (SOEs) *vis-à-vis* non-SOEs

The State-owned Assets Supervision and Administration Commission (SASAC) stipulates that the executives in state-owned enterprises (SOEs) are paid based on the hierarchic pay scales applied for governmental officials (Mi and Wang 2000). The compensation differentials among executives in SOEs cannot be too large for the purpose of political pursuit of social harmony and salary equality (Lin 2018). Furthermore, SOEs are expected to achieve political goals, such as high employment rate, social stability, and public welfare (Chen et al. 2011, Shleifer and Vishny 1998, Boycko et al. 1996), in addition to financial success. Consequently, the pay-performance sensitivity for executives tends to be low in SOEs. By contrast, non-SOEs have more flexible compensation plans, which stimulate talents to work better to get more pay. In such a case, mid-career executives, characterized as visionary, rational, experience-grounded, physically healthy, and cognitively fit, are likely to be motivated to make use of their strengths to achieve better performance for their firms. From the above discussion, we come up with our third hypothesis as follows.

Hypothesis 3: The negative impact of the pay gap between early-career (late-career) executives and mid-career executives on firm performance, as predicted in Hypothesis 1 (Hypothesis 2), is weaker for state-owned enterprises (SOEs) than for non-SOEs.

2.2.4 Do shareholdings by mid-career executives moderate the effect of career pay gap on firm performance?

Jensen and Meckling (1976) demonstrate that well-designed equity-based compensation for executives could enhance firm performance by aligning executives' incentives with those of shareholders. Consistent with the notion that managerial shareholdings reduce agency costs, Jensen and Murphy (2010) suggest that equity-based pay provides executives with the incentive to maximize firm value. When executives hold a significant amount of company shares, their benefits would be closely aligned with the interests of their firm, thus incentivizing them to operate their firm well for better performance. The existing literature (e.g., Fich and Shivdasani 2005, Jensen and Murphy 2010, Mehran 1995, Morck et al. 1988) provides evidence that a higher level of equity-based compensation for executives is related to higher market valuation, higher firm performance, and higher growth. Therefore, we posit that the more corporate shares owned by mid-career executives, the better performance the firm will achieve. On this basis, we conjecture that the negative effect of the career pay gap on firm performance would be more pronounced in cases when there is a higher portion of corporate shares owned by mid-career executives. We thus put forth the fourth hypothesis as follows.

Hypothesis 4: The negative impact of the pay gap between early-career (late-career) executives and mid-career executives on firm performance, as predicted in Hypothesis 1 (Hypothesis 2), is stronger for firms with more shares owned by mid-career executives.

3. Sample and research design

3.1 Sample selection

The sample used for hypothesis tests comes from the population of Chinese companies publicly listed in Shanghai and Shenzhen stock exchanges. Our sample period starts from 2006, the year after the China's split-share reform in 2005[1], and ends in 2019, the year before the outbreak of Covid-19 pandemic. The global financial crisis in 2007 and 2008 has little, direct impact on China's stock market, since it is subject to potent controls by the central government and has quite limited openness to the international financial market. However, the financial crisis has a substantial impact on China's foreign trades in 2009 (McKibbin and Stoeckel 2009), with a large number of enterprises closing down or reducing production and employment. Therefore, we exclude the year 2009 from our sample period. We drop observations that have missing values in the variables for career pay gap, gender pay gap, executive-employee pay gap, firm performance and in other control variables. We drop the sample firms that are in the finance and insurance sector, as the nature of their business activities are not comparable to that of firms in other sectors (He 2016, He et al. 2021). We exclude firms with special treatment (ST) or particular transfer (PT), since such firms tend to suffer from operating losses and the risks of de-listing (Liu and Lu 2007, He et al. 2021). We remove sample firms with cross-listed stocks, because the executive pay in these firms is more sensitive to firm performance compared with non-cross-listed firms (Chi and Zhang 2010, Lel and Miller 2008). The detail of our sample selection procedure is shown in Appendix 1. All corporate and executive data come from the Chinese Research Data Services Platform (CNRDS) and China Stock Market and Accounting Research (CSMAR) database. We include the board chairman as top executives of a firm, because pursuant to the Chinese company law, the board chairman acts as the firm representative and takes charge of the firm's management (Denis and Sarin 1999, Brickley et al. 1997). All the continuous variables used in our multivariate analyses are winsorized at the levels of 1% and 99%, respectively.

3.2 Research design

[1] China Securities Regulatory Commission (CSRC) initiated the split-share structure reform in 2005, which enables the non-tradable shares to become tradable, alleviates the information asymmetry and conflicts between non-tradable shareholders (controlling shareholders) and tradable shareholders (minority shareholders), and thereby improves firm performance. We start our sample period in 2006 to avoid our analysis being biased by the structure changes associated with the split-share structure reform.

Following the psychology and aging literature (Lindenberger et al. 2000, Levenson et al. 1993, Jansen et al. 2010), we define executives under the age of 40 as early-career executives, executives at the age of 40-50 as mid-career executives, and executives over the age of 50 as late-career executives. We employ an ordinary least squares (OLS) regression model to test our hypotheses. Our key dependent variables in our regression analysis are return on assets (*ROA*), return on equity (*ROE*), and return on sales (*ROS*), which are the proxies for firm performance. The primary independent variable is *E_M*, defined as the executives' pay gap between early-career executives vis-à-vis mid-career executives. The other main independent variable is *L_M*, defined as the executives' pay gap between late-career executives vis-à-vis mid-career executives.

We include a series of control variables associated with firm performance. We first control for the pay gap between male and female executives (*GenderPaygap*) and the pay gap between executives and employees (*ExeEmpPaygap*), since these two types of pay gaps are found by Perryman et al. (2016) and Banker et al. (2016), respectively, to affect corporate performance as well. We further control for a series of firm characteristics that are possibly related to firm performance: firm size (*LnSize*), financial leverage (*Lev*), the market-to-book ratio (*MB*), cash flows from operating activities (*CashFlow*), firm age (*FirmAge*), the largest shareholder's stock ownership (*Top1*), dividend payout (*Payout*), and the indicator for operating losses (*Loss*). Following Bhagat and Bolton (2008), we also control for firms' governance characteristics: CEO duality (*Duality*), board size (*BoardNum*), and board independence (*IndepPer*). In addition, we include investment expenditures (*Inv*) and research & development expenditures (*RD*) as control variables, as corporate investments also have substantive impact on firm performance (Aggarwal and Samwick 2006). All the control variables are lagged by one year behind the dependent variable. *Year* dummies and *Industry* dummies are also included in our models. Standard errors are clustered at the firm level to control for correlation of residuals across years (Petersen 2009). The detailed definitions of all the variables are provided in Appendix 2.

To test Hypothesis 1 (Hypothesis 2) that the pay gap between early-career (late-career) executives and mid-career executives harms firm performance, we use the following OLS regressions:

$$
\begin{aligned}
Performance_{i,t} &= \beta_0 + \beta_1 E\_M_{i,t-1} + \beta_2 LnSize_{i,t-1} + \beta_3 Lev_{i,t-1} + \beta_4 MB_{i,t-1} \\
&+ \beta_5 CashFlow_{i,t-1} + \beta_6 FirmAge_{i,t-1} + \beta_7 Top1_{i,t-1} + \beta_8 Payout_{i,t-1} \\
&+ \beta_9 Loss_{i,t-1} + \beta_{10} Duality_{i,t-1} + \beta_{11} BoardNum_{i,t-1} + \beta_{12} IndepPer_{i,t-1} \\
&+ \beta_{13} Inv_{i,t-1} + \beta_{14} RD_{i,t-1} + +\beta_{15} GenderPaygap_{i,t-1} \\
&+ \beta_{16} ExeEmpPaygap_{i,t-1} + \sum Year + \sum Industry + \varepsilon_t
\end{aligned}
$$

$$
\begin{aligned}
Performance_{i,t} &= \beta_0 + \beta_1 L\_M_{i,t-1} + \beta_2 LnSize_{i,t-1} + \beta_3 Lev_{i,t-1} + \beta_4 MB_{i,t-1} \\
&+ \beta_5 CashFlow_{i,t-1} + \beta_6 FirmAge_{i,t-1} + \beta_7 Top1_{i,t-1} + \beta_8 Payout_{i,t-1} \\
&+ \beta_9 Loss_{i,t-1} + \beta_{10} Duality_{i,t-1} + \beta_{11} BoardNum_{i,t-1} + \beta_{12} IndepPer_{i,t-1} \\
&+ \beta_{13} Inv_{i,t-1} + \beta_{14} RD_{i,t-1} + +\beta_{15} GenderPaygap_{i,t-1} \\
&+ \beta_{16} ExeEmpPaygap_{i,t-1} + \sum Year + \sum Industry + \varepsilon_t
\end{aligned}
$$

If Hypothesis 1 (Hypothesis 2) holds, the coefficient of *E_M* (*L_M*) is negative and statistically significant at a conventional level. To test Hypothesis 3, we divide our full sample into two subsamples based on whether a firm is a state-owned enterprise. The coefficient of *E_M* (*L_M*) is expected to be statistically more negative for non-state-owned enterprises (non-SOEs) than for state-owned enterprises (SOEs). For the test of Hypothesis 4, we partition our full sample into two subsamples based on whether the shares owned by mid-career executives exceeds the full-sample median, and 0 otherwise. It is expected that the coefficient of *E_M* (*L_M*) is statistically more negative for the subsample of firms that have a higher portion of shares held by mid-career executives, compared with those with fewer shares owned by mid-career executives.

4. Results and robustness checks

4.1 Univariate results

Table 1 displays the descriptive statistics of all the variables in our sample. The mean value of *E_M* (*L_M*) is 0.894 (1.233), indicating that the average pay gap between early-career (late-career) executives *vis-à-vis* mid-career executives amounts to 0.894 (1.233). The mean values of *GenderPayGap* and *ExeEmpPaygap* are 1.404 and 5.398, respectively, suggesting that the average gender pay gap between male and female executive is 1.404, and that the average executive-employee pay gap is 5.398. Table 2 provides Spearman correlation for each pair of variables based on our sample. The correlation coefficients of all the variables are below 0.6. Their variance inflation factors (VIF), not tabulated for brevity, are all well below the threshold point of 10 (Neter et al. 1996). Therefore, there should be no multicollinearity concern in our regression estimations.

<Insert Table 1 and Table 2 here>

4.2 Multivariate results for Hypotheses 1-4

Table 3 reports the results for Hypothesis 1. In Columns (1-3), the coefficients of *E_M* are negative and statistically significant, indicating that the pay gap between early-career executives and mid-career executives is negatively associated with ROA, ROE, and ROS, respectively. A one-standard-deviation increase in *E_M* reduces *ROA*, *ROE*, and *ROS* by 5.99%, 10.25%, and 8.72% of their mean values, respectively. Hence, our findings are not only statistically significant but also economically significant in supporting Hypothesis 1.

<Insert Table 3 here>

Table 4 presents the results of Hypothesis 2. In Columns (1-3), *L_M* is negatively associated with *ROA*, *ROE*, and *ROS* with a 5%, 1%, and 5% level of statistical significance, respectively, suggesting that the pay gap between late-career executives and mid-career executives lowers firm performance. A one-standard-deviation increase in *L_M* causes a decrease of *ROA, ROE*, and *ROS* by 5.31%, 11.53%, and 10.38% of their mean values. Thus, the results are both statistically and economically significant in supporting Hypothesis 2.

<Insert Table 4 here>

Panel A (Panel B) of Table 5 presents the regression results from testing how the pay gap between early-career (late-career) executives and mid-career executives affects the performance of state-owned enterprises (namely, SOEs) versus that of non-state-owned enterprises (namely, non-SOEs). In Panel

A, the coefficients of *E_M* are statistically nonsignificant in the *ROA, ROE*, or *ROS* regressions for the SOE sub-sample. These findings are consistent with our proposition that, due to the hierarchic pay scales for SOE executives and to their pursuit of political goals for the state (e.g., high employment rate, social stability, and social welfare), the executive pay-performance sensitivity is relatively lower in the SOEs, leading to an insignificant correlation between the career pay gap and firm performance. In contrast, we find a significantly negative correlation between *E_M* and *ROA* (*ROE* and *ROS*) for the non-SOE subsample. A one-standard-deviation increase in *E_M* leads to a decrease of 6.73% (12.50% and 11.26%) of the sample mean value of *ROA* (*ROE* and *ROS*), implying that the result is economically significant for non-SOEs. This finding indicates that flexible compensation schemes in non-SOEs could better incentivize mid-career executives to meet the best interests of shareholders and increase the profitability of their firms.

We find similar results in Panel B which reports the impact of *L_M* (i.e., the pay gap between late-career executives and mid-career executives) on the performance of SOEs versus non-SOEs. The relationship between *L_M* and corporate performance is significantly negative for non-SOEs, and the result denotes a one-standard-deviation increase in *L_M* results in 5.70%, 12.61%, and 11.23% decrease of the mean values of *ROA, ROE*, and *ROS*, respectively. However, we find no significant results for SOEs. Together, the results in Table 5 are statistically and economically significant in supporting Hypothesis 3 - that the negative impact of the pay gap between early-career (late-career) executives and mid-career executives on firm performance is weaker for SOEs than for non-SOEs.

<Insert Table 5 here>

Panel A of Table 7 demonstrates the results for the impact of *E_M* on the performance of firms that have varying levels of shareholdings by mid-career executives. The results for the subsample of firms that have relatively high stock holdings by mid-career executives are reported in Columns (1-3). *E_M* (i.e., the pay gap between early-career executives and mid-career executives) is significantly and negatively correlated with *ROA*, *ROE*, and *ROS*, with a one-standard-deviation increase in *E_M* associated with a decrease of 4.56%, 7.10%, and 6.54% of their mean values. In contrast, we find no significant result on the association between *E_M* and firm performance for the low-shareholding groups in Columns (4-6). These results suggest that the pay gap between early-career executives and late-career executives takes effect on firm performance only when the shareholdings by mid-career executives are sufficiently high.

Panel B reports the impact of *L_M* (i.e., the pay gap between late-career executives and mid-career executives) on the performance of firms with different levels of shareholdings by mid-career executives. For the high-shareholding groups in Columns (1-3), *L_M* is negatively related to *ROA, ROE*, and *ROS,* with the 5%, 10%, and 1% significance levels, respectively. A one-standard-deviation increase in *L_M* reduce *ROA, ROE*, and *ROS* by 6.10%, 14.73%, and 11.70% of their mean values, respectively, indicating that the pay gap between late-career executives and mid-career executives enhances firm performance to an economically significant degree in cases when mid-career executives own a higher percentage of the company shares. Nevertheless, from Columns (4-6), we find no significant results for the subsample of firms that have relatively fewer shares owned by mid-career executives. As mid-career executives with a small portion of corporate shares have interests less aligned with shareholders, the gap of their pay with that of late-career executives would have less influence on firm performance. Collectively, the findings in Table 6 are supportive of Hypothesis 4, suggesting that the pay gap between early-career (late-career) executives and mid-career executives has stronger, negative impact on the performance of firms with more shares owned by mid-career executives.

<Insert Table 6 here>

4.3 Results for robustness checks

4.3.1 Control of firm-fixed effects

As with prior research (e.g., Bennedsen et al. 2019, Wilner 2016, Manning and Saidi 2010, Webber 2016, and Cardoso et al. 2016), we run firm-fixed-effects regressions to control for time-invariant firm characteristics that are unobservable or unmeasurable and are thus omitted from our earlier OLS regression estimation. In controlling for the firm-fixed effects, the coefficient on *E_M* (*L_M*) reflects the degree to which firm performance would change in response to the change in the pay gap between early-career (late-career) executives and mid-career executives. As shown in Table 7, both *E_M* and *L_M* have negative and statistically significant coefficients, implying that a potential increase in the pay for early-career and late-career executives, relative to that for mid-career executives, would lower firm performance.

<Insert Table 7 here>

4.3.2 Analysis of the impact threshold for a confounding variable (ITCV)

To ensure that the baseline regression results are not driven by potentially confounding, omitted variables, we follow Frank (2000), Larcker and Rusticus (2010), and He et al. (2021), among others, to analyze the impact threshold for confounding variables (ITCV) for the E_M regression and L_M regression, respectively. ITCV refers to the impact threshold of a confounding variable, beyond which our baseline regression results could be biased and even overturned if such a confounding variable were included in the regressions. The greater the magnitude of ITCV is, relative to the partial impact of a control variable, the lesser extent to which the results of the baseline regression would be subject to the omitted-variable(s) bias. We follow Frank (2000) to calculate the value of ITCV and the partial impacts of all the control variables. Table 8 presents the ITCV analysis results for Hypothesis 1 in Columns (1-3) and Hypothesis 2 in Columns (4-6). All the control variables have partial impacts with absolute values higher than that of ITCV, except for *ExeEmpPaygap* in Column 4. The findings thereby provide assurance that the baseline regression results are immune from potential omitted-variable(s) bias.

<Insert Table 8 here>

4.3.3 Oster estimates

We also follow Oster (2019) to test whether the baseline regression results are reasonably robust to potential correlated-omitted-variable(s) bias. The impact of the bias, if any, on the regression results depends on the extent to which the existing control variables are informative of the omitted ones (Bryan et al. 2019). Accordingly, Oster (2019) advises academic researchers to construct a bias-adjusted estimator for the coefficient on the key independent variable under two assumptions. First, the upper bound for δ, which captures the importance of the omitted variables relative to the existing control variables in affecting the coefficient of the key independent variable, is equal to 1. Second, the upper bound for R_{max}, defined as the maximum R-square of a hypothetical regression including both the existing control variables and the omitted variable(s), is 1.3 times the R-square of the baseline regression run based on a sample of randomized trials (Polidano et al. 2017). With these upper bounds, we estimate the bias-adjusted treatment effects as per Oster (2019). Columns (1-3) of Table 9 display the OLS regression estimates without the unobservable variable(s), while Columns (4-6) report the Oster estimates for *E_M* and *L_M*. Similar to the OLS regression results, the bias-adjusted Oster estimates for both *E_M* and *L_M* remain negative and statistically significant for the regressions of *ROA*, *ROE*, and *ROS*, respectively. Thus, our baseline results for Hypothesis 1 and Hypothesis 2 are less likely to be biased by potential omitted variable(s).

<Insert Table 9 here>

4.3.4 Use of market-based measurements of firm performance

We also employ market-based measurements of firm performance, i.e., Tobin's Q and annual stock return (Bharadwaj et al. 1999, Al-Matari et al. 2014), to further check the robustness of our baseline regression results. As shown in Table 10, the coefficient of *E_M* in the regression of Tobin's Q is negative and statistically significant, so too is the coefficient of *L_M* in the regression of Tobin's Q and annual stock return, respectively. These findings imply that mid-career executives contribute more positively to the stock performance of their firms, compared to younger and elder executives.

<Insert Table 10 here>

5. Conclusion

Using a large sample of Chinese listed companies for the period 2006-2019, we examine how executive career pay gap shapes firm performance. Our findings indicate that firms with higher pay gap between early-career (late-career) and mid-career executives exhibit lower performance, and that the negative impact of the career pay gap on firm performance is more pronounced for non-SOEs and for firms with a higher percentage of shares owned by mid-career executives. Our findings could be explained by the lifespan theories which contend that the executives' working styles change with their age (Baltes 1987, Carstensen 1995). Younger executives are less risk-averse and more aggressive, and thus negatively associated with the survival of the firms, whereas elder executives are more likely to focus on firms' survival at the expense of firms' faster growth and higher profits (Belenzon et al. 2019). Our paper highlights that mid-career executives, combined with the merits of younger and elder peers, and endowed with good physical and cognitive ability, cultivated expertise, long-vision strategy, and strong affective organizational commitment, are likely to contribute more substantially to corporate performance.

Theoretical implications

Our research contributes to the literature by investigating executive compensation from a psychological perspective. Our findings are supported by Baltes's selection, optimization, and compensation (SOC) theory and Carstensen's socio-emotional selectivity theory (SST), which provide a general framework of psychological change across different stages of life. As psychological age increases, executives' motivations for gains and growth decrease, whereas the goals for maintenance and prevention of loss increase (Baltes et al. 1999). Elder executives are aiming for obtaining affective rewards and supporting their identity rather than gaining the instrumental value at their younger age (Carstensen et al. 1999). Mid-career executives, who reach a good balance between younger and elder peers, are supposed to create a higher possibility of success for the firm. To this end, our study takes the extant literature in a new direction by integrating psychological theories to better understand how executives' psychological changes impact their selections and optimizations and thereby affect firm performance.

In addition, our study also offers insight into the research on pay gap. Nowadays, the issue of pay gap has gained increasing attention by our society. The research on the gender pay gap speaks up for the right of females (Perryman et al. 2016, Blau and Kahn 2003); the executive-employee pay gap advocates the equality of employees (Rouen 2020, Ferry et al. 2021, Banker et al. 2016); and the pay disparity within top executives endorse the fairness for lower-level executives (Siegel and Hambrick 2005, Wade et al. 2006, Carpenter and Sanders 2002). Less research attention, however, has been given to exploring the pay gap of executives at different stages of career. This study investigates, for the first time, whether pay gaps between executives at different stages of career affect firm performance. We take a critical step towards shedding light on the internal incentive mechanism for executives at different stages of their careers. Or rather, higher compensation for mid-career executives would be the most effective incentive to keep the firm ahead of the competition.

Our research also gives implications for the literature on vocation. This literature focuses on the qualitative analysis of psychological characteristics of career, such as the professional self-concept of different career stages (Gibson 2003), career expectations of women and men (Gibson and Lawrence 2010), career changing (Higgins and Kram 2001, Higgins 2001, Batt 1995), career mobility (McGinn and Milkman 2013), and career advancement (Chattopadhyay and Choudhury 2017). Understanding of the implications of the pay gap between career stages is conducive to extending a broader picture for career research. To date, our research represents the first attempt to empirically explore the relationship between the career pay gap and firm performance, which offers a plausible ground for future studies concerned with career-based organizational outcomes.

Practical implications

This study implies to boards' compensation committees the importance of incorporating career stages into their compensation designing process. Our findings first propose that mid-career executives act as the key contributors for the firm and offer more opportunities to increase firm profits. Thus, increasing the compensation for mid-career executives would be the critical incentives to encourage them to make the extra effort to achieve competitive performance. In addition, our study implies to compensation board that flexible compensation mechanism is a necessary tool to attract and retain talents in tight labor markets (Cannon et al. 2000). Flexible performance-related compensation scheme could link executive performance closely to the goals of the firm, and thereby strengthen executive incentives and increase their commitment to the firm. Besides, considerations of equity-based compensation would also raise productivity through motivating executives and rewarding them for outstanding results and performance, by aligning of the interest of executives with those of shareholders.

Additionally, this study has practical implications for human resource management of promoting interdependence and working relationships between early-career executives and late-career executives to build up new teams to maximize firm value (Millhiser et al. 2011). Team-selection literature identifies the importance of personality characteristics, teamwork knowledge, and social skills, in positively predicting organizational performance (Morgeson et al. 2005). However, few human resource departments have the luxury of hiring the executives with all the ideal advantages. Hence, we suggest mutual complementarity between younger and elder executives. The experience and knowledge of elder executives is of a contributory value to the team, and could be transformed into intellectual capital in supporting younger peers (Peterson and Spiker 2005). We break the glass ceiling of Chinese traditional hierarchy system and encourage the interdependence between early-career and late-career executives to enhance mutual learning and strengthen teamwork cooperation, and thus improving team performance (Gellert and Kuipers 2008).

Limitation and future research

This research is subject to several limitations. Firstly, we fail to eliminate the correlated-omitted -variable(s) issue completely. We apply the firm-fixed effects, the ITCV test (Frank 2000) and Oster estimates (Oster 2019) in an attempt to reduce confounding-factor(s) bias. Nevertheless, we recognize that partial impact of executive-employee pay gap is a bit higher than the magnitude of ITCV on the regression of ROA, suggesting there may be confounding variable(s) that are correlated with both the executive-employee pay gap and ROA, which could possibly drive our inferences. Second, our study is subject to data limitations as well. The findings relied on the compensation data for executive employee in our research because non-executive employees' compensation data is not disclosed to the public in any of the country. We may do case study or questionnaire for future research and investigate how the pay gaps between employees at different stages of career affect firm performance. Third, our results may not apply for specific high-tech companies. In 2020, Huawei announced a "Genius Youth" project, recruiting top technicists with the compensation of more than 200,000 pounds a year for younger employees. This project emphasizes on the value of younger executives for high-tech companies. Meanwhile, 77-year-old Zhengfei Ren, the CEO of Huawei, along with his persistence of "Nine Dead Life", lead Huawei become one of the world's largest manufacturer of mobile phones, implying that elder executives are of great importance for high-tech companies. Therefore, future research could focus on high-tech companies to investigate whether the career pay gap would reach an opposing conclusion.

Appendix 1: Sample selection procedure

Initial sample of firm-year observations	36651
- observations in the year 2009	-1579
- observations with missing values in the variables for career pay gap, gender pay gap, executive-employee pay gap, firm performance and in other control variables	-23475
- observations from special treatment (ST) firms or particular transfer (PT) firms	-312
- observations from firms in the finance and insurance sectors	-105
- observations from firms with cross-listed stocks	-280
Final sample of firm-year observations	10900

Appendix 2: Definition of variables

Variable	Definition
$ROA_{i,t}$	Return on assets in year *t*.
$ROE_{i,t}$	Return on equity in year *t*.
$ROS_{i,t}$	Return on sales in year *t*.
$TobinQ_{i,t}$	The market value of equity divided by the book value of total assets at the end of year *t*.
$StockReturn_{i,t}$	Annual stock return in year *t*.
$E\_M_{i,t-1}$	The pay gap between early-career executives *vis-à-vis* mid-career executives in year *t*-1.
$L\_M_{i,t-1}$	The pay gap between late-career executives *vis-à-vis* mid-career executives in year *t*-1.
$LnSize_{i,t-1}$	The natural logarithm of total assets in year *t*-1.
$Lev_{i,t-1}$	The ratio of total liabilities to total assets in year *t*-1.
$MB_{i,t-1}$	The ratio of the market value of equity to the book value of equity in year *t*-1.
$CashFlow_{i,t-1}$	The ratio of cash flow from operating activities to total assets in year *t*-1.
$FirmAge_{i,t-1}$	The number of years in year *t*-1 since a firm got listed on the stock market.
$Top1_{i,t-1}$	The percentage of stocks held by the largest shareholder, divided by total shares outstanding, in year *t*-1.
$Payout_{i,t-1}$	The ratio of cash dividends to net profit in year *t*-1.
$Loss_{i,t-1}$	1 if net income of a firm is negative in year *t-1* and 0 otherwise.
$Duality_{i,t-1}$	1 if the CEO of a firm serves as chairman of the board in year *t-1* and 0 otherwise.
$BoardNum_{i,t-1}$	The total number of directors on board in year *t-1*.
$IndepPer_{i,t-1}$	The number of independent directors on the board of a firm, divided by its total number of directors, in year *t-1*.
$Inv_{i,t-1}$	Investment expenditures, computed as cash payments for fixed assets, intangible assets, and other long-term assets, minus cash receipts from selling these assets, and scaled by total assets, in year *t*-1.
$RD_{i,t-1}$	Research and development expenditures, scaled by total assets, in year *t*-1.
$GenderPaygap_{i,t-1}$	The pay gap between male executives and female executives of a firm in year *t*-1.
$ExeEmpPaygap_{i,t-1}$	The pay gap between executives and employees of a firm in year *t*-1.
$SOE_{i,t-1}$	1 if the largest shareholder of a firm is a governmental entity in year *t*-1, and 0 otherwise.
$ShareDummy_{i,t-1}$	1 if the shares owned by mid-career executives exceeds the sample median in year *t*-1, and 0 otherwise.

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Table 1. Summary statistics

Variables	N	Mean	Std.	Min.	25th	Median	75th	Max.
$ROA_{i,t}$	10,900	3.473	7.024	-36.796	1.385	3.607	6.541	20.411
$ROE_{i,t}$	10,900	5.488	16.877	-115.050	2.878	6.796	11.372	56.578
$ROS_{i,t}$	10,900	6.397	22.104	-160.999	2.523	6.976	13.563	71.074
$TobinQ_{i,t}$	10,900	2.621	1.866	0.868	1.427	2.022	3.123	11.984
$StockReturn_{i,t}$	10,900	18.229	72.501	-86.934	-27.164	0.214	40.246	912.345
$E\_M_{i,t-1}$	10,900	0.894	0.443	0.143	0.635	0.845	1.042	3.206
$L\_M_{i,t-1}$	8,851	1.233	0.651	0.198	0.868	1.101	1.422	4.143
$LnSize_{i,t-1}$	10,900	21.745	1.102	19.124	20.934	21.642	22.387	26.939
$Lev_{i,t-1}$	10,900	0.415	0.215	0.051	0.241	0.405	0.576	1.150
$MB_{i,t-1}$	10,900	2.103	1.325	0.889	1.293	1.667	2.397	9.093
$CashFlow_{i,t-1}$	10,900	4.046	7.542	-21.135	0.219	4.145	8.301	25.527
$FirmAge_{i,t-1}$	10,900	14.731	7.073	2.000	9.000	13.000	21.000	30.000
$Top1_{i,t-1}$	10,900	0.347	0.146	0.086	0.231	0.327	0.449	0.744
$Payout_{i,t-1}$	10,900	0.028	0.111	-0.078	0.000	0.000	0.003	0.864
$Loss_{i,t-1}$	10,900	0.077	0.267	0.000	0.000	0.000	0.000	1.000
$Duality_{i,t-1}$	10,900	0.693	0.461	0.000	0.000	1.000	1.000	1.000
$BoardNum_{i,t-1}$	10,900	8.581	1.671	4.000	7.000	9.000	9.000	19.000
$IndepPer_{i,t-1}$	10,900	0.371	0.053	0.250	0.333	0.333	0.429	0.571
$Inv_{i,t-1}$	10,900	0.052	0.052	-0.048	0.014	0.037	0.074	0.241
$RD_{i,t-1}$	10,900	0.135	0.480	0.000	0.000	0.000	0.000	3.010
$GenderPaygap_{i,t-1}$	10,900	1.404	0.855	0.443	0.962	1.173	1.535	6.401
$ExeEmpPaygap_{i,t-1}$	10,900	5.398	3.961	0.432	2.907	4.358	6.664	26.182

Notes. This table presents descriptive statistics of all the variables used in the multivariate tests. The definitions of the variables are provided in Appendix 2.

Table 2. Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
$ROA_{i,t}$	1.000																					
$ROE_{i,t}$	0.877***	1.000																				
$ROS_{i,t}$	0.816***	0.688***	1.000																			
$TobinQ_{i,t}$	0.344***	0.207***	0.300***	1.000																		
$StockReturn_{i,t}$	0.114***	0.134***	0.085***	0.336***	1.000																	
$E\_M_{i,t-1}$	-0.011	-0.016	-0.004	-0.007	-0.013	1.000																
$L\_M_{i,t-1}$	0.014	-0.006	-0.003	-0.021**	-0.018*	0.317***	1.000															
$LnSize_{i,t-1}$	-0.089***	0.078***	-0.077***	-0.543***	-0.079***	-0.009	0.028***	1.000														
$Lev_{i,t-1}$	-0.351***	-0.011	-0.384***	-0.410***	0.031***	-0.012	-0.021**	0.448***	1.000													
$MB_{i,t-1}$	0.230***	0.124***	0.216***	0.656***	-0.262***	0.008	0.001	-0.387***	-0.306***	1.000												
$CashFlow_{i,t-1}$	0.360***	0.312***	0.246***	0.165***	0.055***	-0.015	0.039***	-0.017*	-0.130***	0.146***	1.000											
$FirmAge_{i,t-1}$	-0.191***	-0.035***	-0.166***	-0.232***	0.062***	-0.021**	-0.039***	0.205***	0.421***	-0.079***	0.010	1.000										
$Top1_{i,t-1}$	0.135***	0.149***	0.098***	-0.024**	0.047***	-0.004	-0.000	0.074***	0.004	-0.137***	0.063***	-0.076***	1.000									
$Payout_{i,t-1}$	-0.004	0.062***	-0.022**	-0.137***	0.014	-0.006	-0.035***	0.177***	0.178***	-0.065***	0.045***	0.314***	-0.027***	1.000								
$Loss_{i,t-1}$	-0.244***	-0.197***	-0.213***	-0.002	0.041***	-0.009	-0.015	-0.048***	0.164***	-0.017*	-0.117***	0.097***	-0.095***	-0.329***	1.000							
$Duality_{i,t-1}$	-0.033***	0.011	-0.041***	-0.119***	-0.007	0.027***	0.011	0.128***	0.142***	-0.054***	0.027***	0.223***	-0.022**	0.112***	-0.014	1.000						
$BoardNum_{i,t-1}$	0.002	0.048***	-0.029***	-0.136***	0.023**	0.026***	0.000	0.138***	0.148***	-0.124***	0.045***	0.167***	-0.049***	0.112***	-0.034***	0.156***	1.000					
$IndepPer_{i,t-1}$	-0.026***	-0.045***	0.006	0.061***	-0.006	-0.018*	-0.002	-0.017*	-0.055***	0.055***	-0.031***	-0.081***	0.033***	-0.039***	0.019**	-0.094***	-0.580***	1.000				
$Inv_{i,t-1}$	0.143***	0.080***	0.083***	0.048***	0.041***	-0.016*	0.032***	-0.047***	-0.138***	-0.016	0.186***	-0.213***	0.065***	-0.085***	-0.110***	-0.057***	0.050***	-0.032***	1.000			
$RD_{i,t-1}$	-0.005	-0.035***	0.026***	0.066***	-0.014	-0.002	-0.012	0.091***	-0.075***	0.102***	-0.033***	-0.049***	-0.117***	0.014	-0.021**	-0.042***	-0.067***	0.043***	0.070***	1.000		
$GenderPaygap_{i,t-1}$	0.009	-0.012	-0.013	0.001	-0.013	-0.139***	0.085***	-0.009	-0.033***	0.007	0.011	-0.013	-0.020**	-0.017*	-0.011	-0.032***	-0.020**	-0.003	0.021**	0.037***	1.000	
$ExeEmpPaygap_{i,t-1}$	0.144***	0.155***	0.037***	-0.080***	-0.018*	-0.073***	0.088***	0.236***	0.035***	-0.058***	0.091***	-0.024**	0.011	0.029***	-0.090***	0.008	0.088***	-0.030***	0.168***	0.063***	0.076***	1.000

Notes. This table reports the Spearman correlation among variables used for the baseline regression. All variables are defined in Appendix 2. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 3. Multivariate tests of Hypothesis 1: The effect of the pay gap between early-career executives and mid-career executives (*E_M*) on firm performance

	(1) $ROA_{i,t}$	(2) $ROE_{i,t}$	(3) $ROS_{i,t}$
$E\_M_{i,t-1}$	-0.469***	-1.271***	-1.259**
	(0.170)	(0.432)	(0.550)
$LnSize_{i,t-1}$	0.609***	0.687***	1.979***
	(0.112)	(0.262)	(0.366)
$Lev_{i,t-1}$	-6.736***	-1.255	-19.209***
	(0.527)	(1.333)	(1.913)
$MB_{i,t-1}$	0.696***	1.308***	1.414***
	(0.091)	(0.169)	(0.283)
$CashFlow_{i,t-1}$	0.188***	0.327***	0.288***
	(0.012)	(0.028)	(0.038)
$FirmAge_{i,t-1}$	-0.105***	-0.159***	-0.244***
	(0.016)	(0.038)	(0.057)
$Top1_{i,t-1}$	4.710***	9.277***	9.754***
	(0.552)	(1.235)	(1.676)
$Payout_{i,t-1}$	-2.937***	-5.940***	-4.635***
	(0.665)	(1.842)	(1.680)
$Loss_{i,t-1}$	-3.846***	-8.757***	-10.838***
	(0.368)	(1.176)	(1.262)
$Duality_{i,t-1}$	0.374**	0.550	0.401
	(0.165)	(0.411)	(0.490)
$BoardNum_{i,t-1}$	0.027	0.019	0.111
	(0.051)	(0.122)	(0.155)
$IndepPer_{i,t-1}$	-0.792	-2.381	-0.252
	(1.522)	(3.710)	(4.790)
$Inv_{i,t-1}$	0.402	3.319	0.012
	(1.341)	(3.238)	(4.654)
$RD_{i,t-1}$	-0.155	-0.497	-0.013
	(0.197)	(0.419)	(0.637)
$GenderPaygap_{i,t-1}$	-0.155*	-0.290	-0.406
	(0.084)	(0.217)	(0.269)
$ExeEmpPaygap_{i,t-1}$	0.134***	0.258***	0.167**
	(0.020)	(0.049)	(0.070)
Year dummies	included	included	included
Industry dummies	included	included	included
Intercept	-10.209***	-17.941***	-35.731***
	(2.308)	(5.682)	(7.214)
Adj. R^2	0.207	0.101	0.121
N	10,900	10,900	10,900

Notes. This table reports the effect of the pay gap between early-career executives and mid-career executives on firm performance. Year dummies and industry dummies are included in the regressions, but their results are not reported for simplicity. Industry dummies are constructed based on the industrial classification made by China Securities Regulatory Commission in 2012. All variables are defined in Appendix 2. The standard errors reported in the parentheses are clustered by firm. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4. Multivariate tests of Hypothesis 2: The effect of the pay gap between late-career executives and mid-career executives (L_M) on firm performance

	(1) $ROA_{i,t}$	(2) $ROE_{i,t}$	(3) $ROS_{i,t}$
$L\_M_{i,t-1}$	-0.283**	-0.972***	-1.020**
	(0.133)	(0.336)	(0.483)
$LnSize_{i,t-1}$	0.643***	0.731**	1.830***
	(0.120)	(0.289)	(0.390)
$Lev_{i,t-1}$	-7.212***	-1.711	-21.113***
	(0.591)	(1.530)	(2.163)
$MB_{i,t-1}$	0.728***	1.291***	1.387***
	(0.101)	(0.190)	(0.306)
$CashFlow_{i,t-1}$	0.196***	0.343***	0.309***
	(0.013)	(0.032)	(0.041)
$FirmAge_{i,t-1}$	-0.087***	-0.130***	-0.176***
	(0.016)	(0.038)	(0.057)
$Top1_{i,t-1}$	4.659***	9.214***	9.541***
	(0.592)	(1.350)	(1.763)
$Payout_{i,t-1}$	-3.502***	-7.364***	-4.678**
	(0.732)	(2.085)	(1.974)
$Loss_{i,t-1}$	-3.579***	-7.696***	-9.837***
	(0.392)	(1.249)	(1.366)
$Duality_{i,t-1}$	0.346*	0.410	0.403
	(0.177)	(0.457)	(0.525)
$BoardNum_{i,t-1}$	0.006	-0.058	0.066
	(0.053)	(0.132)	(0.170)
$IndepPer_{i,t-1}$	-1.142	-4.917	-0.172
	(1.597)	(4.013)	(5.215)
$Inv_{i,t-1}$	0.912	2.612	-0.511
	(1.422)	(3.470)	(4.795)
$RD_{i,t-1}$	-0.095	-0.408	0.286
	(0.204)	(0.435)	(0.655)
$GenderPaygap_{i,t-1}$	-0.073	-0.031	-0.205
	(0.084)	(0.225)	(0.271)
$ExeEmpPaygap_{i,t-1}$	0.141***	0.280***	0.217***
	(0.022)	(0.054)	(0.074)
Year dummies	included	included	included
Industry dummies	included	included	included
Intercept	-11.045***	-18.232***	-33.752***
	(2.449)	(6.292)	(7.796)
Adj. R^2	0.214	0.098	0.125
N	8851	8851	8851

Notes. This table reports the effect of the pay gap between late-career executives and mid-career executives on firm performance. Year dummies and industry dummies are included in the regressions, but their results are not reported for simplicity. Industry dummies are constructed based on the industrial classification made by China Securities Regulatory Commission in 2012. All variables are defined in Appendix 2. The standard errors reported in the parentheses are clustered by firm. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5. Multivariate tests of Hypothesis 3

Panel A: The effect of E_M on the performance of SOEs versus non-SOEs

	$SOE_{i,t-1}=1$			$SOE_{i,t-1}=0$		
	(1) $ROA_{i,t}$	(2) $ROE_{i,t}$	(3) $ROS_{i,t}$	(4) $ROA_{i,t}$	(5) $ROE_{i,t}$	(6) $ROS_{i,t}$
$E\_M_{i,t-1}$	-0.222	-0.459	-0.404	-0.536***	-1.482***	-1.580**
	(0.254)	(0.720)	(0.785)	(0.205)	(0.518)	(0.661)
$LnSize_{i,t-1}$	1.067***	1.496***	3.206***	0.425***	0.384	1.366***
	(0.185)	(0.433)	(0.569)	(0.141)	(0.339)	(0.466)
$Lev_{i,t-1}$	-7.243***	-1.035	-19.832***	-6.344***	-1.086	-18.416***
	(0.863)	(2.370)	(2.899)	(0.663)	(1.625)	(2.435)
$MB_{i,t-1}$	0.870***	1.971***	1.717***	0.670***	1.126***	1.408***
	(0.149)	(0.312)	(0.570)	(0.109)	(0.204)	(0.321)
$CashFlow_{i,t-1}$	0.142***	0.216***	0.182***	0.209***	0.373***	0.331***
	(0.019)	(0.046)	(0.054)	(0.015)	(0.036)	(0.049)
$FirmAge_{i,t-1}$	-0.070***	-0.138**	-0.114	-0.128***	-0.168***	-0.345***
	(0.026)	(0.057)	(0.082)	(0.022)	(0.056)	(0.085)
$Top1_{i,t-1}$	3.931***	9.358***	6.863**	4.758***	9.147***	9.312***
	(0.910)	(2.316)	(3.122)	(0.694)	(1.532)	(1.998)
$Payout_{i,t-1}$	-3.130***	-7.502***	-6.105***	-2.538**	-3.680	-3.008
	(0.731)	(2.105)	(1.975)	(1.122)	(3.143)	(2.705)
$Loss_{i,t-1}$	-2.952***	-9.027***	-8.056***	-4.176***	-8.611***	-11.804***
	(0.559)	(2.035)	(1.829)	(0.465)	(1.392)	(1.606)
$Duality_{i,t-1}$	0.283	0.536	-0.227	0.379**	0.494	0.478
	(0.304)	(1.027)	(0.963)	(0.189)	(0.453)	(0.562)
$BoardNum_{i,t-1}$	-0.023	-0.191	-0.054	0.074	0.208	0.195
	(0.061)	(0.176)	(0.194)	(0.076)	(0.171)	(0.228)
$IndepPer_{i,t-1}$	-3.703*	-4.698	-9.781	0.278	-0.193	2.333
	(2.094)	(5.245)	(7.479)	(2.030)	(4.867)	(6.179)
$Inv_{i,t-1}$	1.396	2.092	4.033	0.043	4.388	-1.551
	(2.020)	(5.310)	(7.514)	(1.690)	(4.032)	(5.703)
$RD_{i,t-1}$	-0.054	-0.945	0.801	-0.161	-0.405	-0.121
	(0.327)	(1.165)	(0.986)	(0.221)	(0.438)	(0.711)
$GenderPaygap_{i,t-1}$	-0.370**	-0.317	-1.083**	-0.064	-0.281	-0.120
	(0.161)	(0.498)	(0.457)	(0.099)	(0.231)	(0.327)
$ExeEmpPaygap_{i,t-1}$	0.058	0.179	-0.146	0.160***	0.280***	0.315***
	(0.036)	(0.115)	(0.130)	(0.025)	(0.055)	(0.086)
Year dummies	included	included	included	included	included	included
Industry dummies	included	included	included	included	included	included
Intercept	-18.362***	-31.735***	-58.528***	-4.778*	-6.960	-15.854*
	(3.701)	(9.065)	(11.863)	(2.783)	(7.009)	(8.956)
Adj. R^2	0.241	0.096	0.170	0.204	0.106	0.119
N	3066	3066	3066	7834	7834	7834

Notes. This table reports the effect of the pay gap between early-career executives and mid-career executives on the performance of state-owned enterprises versus that of non-state-owned enterprises. The moderation variable equals 1 if the largest shareholder of a firm pertains to a governmental entity in year *t*-1, and 0 otherwise. Year dummies and industry dummies are included in the regressions, but their results are not reported for simplicity. Industry dummies are constructed based on the industrial classification made by China Securities Regulatory Commission in 2012. All variables are defined in Appendix 2. The standard errors reported in the parentheses are clustered by firm. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel B: The effect of L_M on the performance of SOEs versus non-SOEs

	$SOE_{i,t-1}=1$			$SOE_{i,t-1}=0$		
	(1) $ROA_{i,t}$	(2) $ROE_{i,t}$	(3) $ROS_{i,t}$	(4) $ROA_{i,t}$	(5) $ROE_{i,t}$	(6) $ROS_{i,t}$
$L\_M_{i,t-1}$	-0.158	-0.911	-0.705	-0.300**	-0.989***	-1.042*
	(0.250)	(0.733)	(0.878)	(0.152)	(0.377)	(0.553)
$LnSize_{i,t-1}$	1.115***	1.630***	3.083***	0.440***	0.370	1.136**
	(0.194)	(0.475)	(0.601)	(0.152)	(0.363)	(0.502)
$Lev_{i,t-1}$	-7.295***	-0.523	-20.442***	-7.097***	-2.359	-21.318***
	(0.873)	(2.755)	(2.980)	(0.763)	(1.857)	(2.830)
$MB_{i,t-1}$	0.942***	2.041***	1.359**	0.683***	1.068***	1.459***
	(0.154)	(0.355)	(0.619)	(0.123)	(0.228)	(0.349)
$CashFlow_{i,t-1}$	0.156***	0.258***	0.231***	0.215***	0.378***	0.342***
	(0.018)	(0.049)	(0.053)	(0.017)	(0.042)	(0.054)
$FirmAge_{i,t-1}$	-0.081***	-0.186***	-0.135	-0.100***	-0.111**	-0.250***
	(0.027)	(0.060)	(0.084)	(0.023)	(0.055)	(0.086)
$Top1_{i,t-1}$	3.744***	9.338***	6.798**	4.632***	8.856***	8.916***
	(1.026)	(2.671)	(3.420)	(0.723)	(1.590)	(2.024)
$Payout_{i,t-1}$	-3.185***	-7.751***	-5.295**	-3.649***	-6.260*	-3.579
	(0.797)	(2.357)	(2.247)	(1.223)	(3.611)	(3.294)
$Loss_{i,t-1}$	-2.802***	-7.530***	-6.673***	-3.857***	-7.818***	-10.938***
	(0.559)	(2.180)	(1.809)	(0.503)	(1.483)	(1.759)
$Duality_{i,t-1}$	0.067	-0.098	-1.233	0.376*	0.390	0.620
	(0.299)	(1.051)	(0.932)	(0.204)	(0.503)	(0.610)
$BoardNum_{i,t-1}$	-0.065	-0.268	-0.135	0.072	0.149	0.204
	(0.068)	(0.200)	(0.215)	(0.079)	(0.184)	(0.250)
$IndepPer_{i,t-1}$	-5.093**	-10.347*	-14.222*	0.646	-1.312	5.253
	(2.310)	(5.985)	(7.904)	(2.102)	(5.212)	(6.770)
$Inv_{i,t-1}$	0.532	-2.776	2.897	1.133	5.361	-2.337
	(2.073)	(5.575)	(7.946)	(1.822)	(4.370)	(5.821)
$RD_{i,t-1}$	-0.124	-1.407	0.757	-0.085	-0.248	0.226
	(0.375)	(1.326)	(1.141)	(0.227)	(0.439)	(0.725)
$GenderPaygap_{i,t-1}$	-0.191	0.156	-0.723	-0.010	-0.101	0.035
	(0.149)	(0.471)	(0.450)	(0.103)	(0.251)	(0.330)
$ExeEmpPaygap_{i,t-1}$	0.051	0.148	-0.122	0.177***	0.328***	0.388***
	(0.037)	(0.124)	(0.133)	(0.027)	(0.061)	(0.090)
Year dummies	included	included	included	included	included	included
Industry dummies	included	included	included	included	included	included
Intercept	-18.347***	-30.299***	-52.061***	-5.252*	-6.931	-12.681
	(3.793)	(9.656)	(12.281)	(3.088)	(7.834)	(10.057)
Adj. R^2	0.257	0.096	0.168	0.210	0.102	0.125
N	2571	2571	2571	6280	6280	6280

Notes. This table reports the effect of pay gap between late-career executives and mid-career executives on the performance of state-owned enterprises versus that of non-state-owned enterprises. The moderation variable equals 1 if the largest shareholder of a firm pertains to a governmental entity in year *t*-1, and 0 otherwise. Year dummies and industry dummies are included in the regressions, but their results are not reported for simplicity. Industry dummies are constructed based on the industrial classification made by China Securities Regulatory Commission in 2012. All variables are defined in Appendix 2. The standard errors reported in the parentheses are clustered by firm. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6. Multivariate tests of Hypothesis 4

Panel A: The moderating effect of mid-career executives' shareholding on the association between E_M and firm performance

	$ShareDummy_{i,t-1} = 1$			$ShareDummy_{i,t-1} = 0$		
	(1) $ROA_{i,t}$	(2) $ROE_{i,t}$	(3) $ROS_{i,t}$	(4) $ROA_{i,t}$	(5) $ROE_{i,t}$	(6) $ROS_{i,t}$
$E\_M_{i,t-1}$	-0.444*	-1.015*	-1.155	-0.269	-0.958	-1.016
	(0.246)	(0.554)	(0.722)	(0.238)	(0.660)	(0.883)
$LnSize_{i,t-1}$	0.484***	0.615	1.447***	0.600***	0.575	2.495***
	(0.162)	(0.375)	(0.481)	(0.141)	(0.385)	(0.560)
$Lev_{i,t-1}$	-6.323***	-1.505	-18.844***	-6.687***	-0.004	-19.517***
	(0.698)	(1.710)	(2.286)	(0.703)	(2.009)	(2.902)
$MB_{i,t-1}$	0.722***	1.001***	1.440***	0.630***	1.411***	1.434***
	(0.122)	(0.219)	(0.345)	(0.125)	(0.258)	(0.482)
$CashFlow_{i,t-1}$	0.243***	0.390***	0.393***	0.133***	0.256***	0.164**
	(0.015)	(0.036)	(0.041)	(0.018)	(0.044)	(0.064)
$FirmAge_{i,t-1}$	-0.140***	-0.241***	-0.352***	-0.028	-0.000	-0.078
	(0.026)	(0.066)	(0.094)	(0.023)	(0.054)	(0.082)
$Top1_{i,t-1}$	3.774***	6.789***	6.946***	6.483***	14.247***	12.802***
	(0.759)	(1.660)	(2.117)	(0.763)	(1.844)	(2.725)
$Payout_{i,t-1}$	-2.730**	-6.968**	-2.760	-2.999***	-5.349***	-5.146**
	(1.227)	(3.469)	(2.940)	(0.818)	(2.071)	(2.196)
$Loss_{i,t-1}$	-4.384***	-10.924***	-11.742***	-3.570***	-7.500***	-11.032***
	(0.590)	(1.695)	(1.974)	(0.501)	(1.630)	(1.832)
$Duality_{i,t-1}$	0.334	0.523	0.361	0.339	0.192	0.317
	(0.211)	(0.484)	(0.626)	(0.255)	(0.722)	(0.818)
$BoardNum_{i,t-1}$	0.022	-0.019	0.073	0.074	0.152	0.137
	(0.077)	(0.197)	(0.219)	(0.068)	(0.148)	(0.233)
$IndepPer_{i,t-1}$	0.048	-0.508	1.067	-0.423	-1.424	0.106
	(2.037)	(4.754)	(5.876)	(2.300)	(5.914)	(8.414)
$Inv_{i,t-1}$	-0.747	0.071	-3.646	1.666	4.066	1.524
	(1.854)	(4.367)	(5.679)	(1.919)	(5.181)	(8.062)
$RD_{i,t-1}$	-0.198	-0.366	-0.188	0.106	-0.073	0.588
	(0.219)	(0.447)	(0.780)	(0.337)	(0.732)	(1.061)
$GenderPaygap_{i,t-1}$	-0.069	0.062	-0.177	-0.172	-0.661*	-0.436
	(0.109)	(0.227)	(0.357)	(0.125)	(0.358)	(0.407)
$ExeEmpPaygap_{i,t-1}$	0.135***	0.282***	0.138	0.140***	0.262***	0.238**
	(0.024)	(0.061)	(0.090)	(0.031)	(0.075)	(0.096)
Year dummies	included	included	included	included	included	included
Industry dummies	included	included	included	included	included	included
Intercept	-8.899***	-17.532**	-24.671**	-11.246***	-18.677**	-47.843***
	(3.300)	(8.319)	(9.604)	(2.751)	(7.775)	(10.679)
Adj. R^2	0.218	0.122	0.132	0.189	0.083	0.117
N	6044	6044	6044	4432	4432	4432

Notes. This table reports the results of the test of the effect of pay gap between early-career executives and mid-career executives on the performance of firms that have the high versus low shareholdings by mid-career executives. We define *ShareDummy* as equal to 1 if the shares owned by mid-career executives exceeds the full-sample median in year *t*-1, and 0 otherwise. Year dummies and industry dummies are included in the regressions, but their results are not reported for simplicity. Industry dummies are constructed based on the industrial classification made by China Securities Regulatory Commission in 2012. All variables are defined in Appendix 2. The standard errors reported in the parentheses are clustered by firm. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel B: The moderating effect of mid-career executives' shareholding on the association between L_M and firm performance

	$ShareDummy_{i,t-1} = 1$			$ShareDummy_{i,t-1} = 0$		
	(1) $ROA_{i,t}$	(2) $ROE_{i,t}$	(3) $ROS_{i,t}$	(4) $ROA_{i,t}$	(5) $ROE_{i,t}$	(6) $ROS_{i,t}$
$L\_M_{i,t-1}$	-0.403**	-1.429***	-1.403*	-0.085	-0.263	-0.573
	(0.197)	(0.514)	(0.753)	(0.189)	(0.449)	(0.605)
$LnSize_{i,t-1}$	0.431***	0.595	1.167**	0.652***	0.626	2.146***
	(0.164)	(0.394)	(0.482)	(0.151)	(0.415)	(0.570)
$Lev_{i,t-1}$	-6.700***	-3.256*	-20.627***	-7.199***	1.000	-21.677***
	(0.753)	(1.953)	(2.570)	(0.790)	(2.270)	(3.171)
$MB_{i,t-1}$	0.782***	1.050***	1.530***	0.611***	1.316***	1.153**
	(0.130)	(0.237)	(0.322)	(0.143)	(0.294)	(0.546)
$CashFlow_{i,t-1}$	0.240***	0.392***	0.394***	0.149***	0.276***	0.203***
	(0.017)	(0.043)	(0.049)	(0.019)	(0.047)	(0.062)
$FirmAge_{i,t-1}$	-0.095***	-0.176***	-0.197**	-0.030	-0.010	-0.066
	(0.024)	(0.061)	(0.082)	(0.024)	(0.056)	(0.084)
$Top1_{i,t-1}$	4.187***	7.522***	8.235***	5.938***	13.105***	11.166***
	(0.801)	(1.813)	(2.210)	(0.855)	(2.018)	(2.897)
$Payout_{i,t-1}$	-3.701***	-9.948***	-4.565	-3.245***	-6.013**	-4.034
	(1.338)	(3.821)	(3.254)	(0.912)	(2.356)	(2.609)
$Loss_{i,t-1}$	-3.981***	-10.108***	-10.339***	-3.318***	-5.938***	-10.126***
	(0.645)	(1.876)	(2.128)	(0.519)	(1.686)	(1.985)
$Duality_{i,t-1}$	0.312	0.630	0.416	0.360	-0.123	0.390
	(0.226)	(0.541)	(0.676)	(0.276)	(0.771)	(0.862)
$BoardNum_{i,t-1}$	0.023	0.005	0.078	0.045	-0.003	0.092
	(0.078)	(0.209)	(0.226)	(0.073)	(0.160)	(0.261)
$IndepPer_{i,t-1}$	-0.459	-2.031	1.125	-0.322	-5.012	1.186
	(2.020)	(4.937)	(5.803)	(2.587)	(6.673)	(9.600)
$Inv_{i,t-1}$	0.175	0.999	-2.421	2.079	2.509	-0.104
	(1.995)	(4.957)	(5.996)	(1.998)	(5.163)	(8.048)
$RD_{i,t-1}$	-0.134	-0.200	0.307	0.133	-0.175	0.247
	(0.220)	(0.437)	(0.782)	(0.382)	(0.841)	(1.242)
$GenderPaygap_{i,t-1}$	0.026	0.188	0.037	-0.094	-0.286	-0.231
	(0.113)	(0.264)	(0.319)	(0.116)	(0.327)	(0.435)
$ExeEmpPaygap_{i,t-1}$	0.135***	0.306***	0.162*	0.158***	0.280***	0.328***
	(0.025)	(0.067)	(0.088)	(0.033)	(0.080)	(0.104)
Year dummies	included	included	included	included	included	included
Industry dummies	included	included	included	included	included	included
Intercept	-8.712**	-18.637**	-22.685**	-12.123***	-17.402**	-40.178***
	(3.415)	(9.202)	(10.189)	(2.960)	(8.303)	(11.190)
Adj. R^2	0.221	0.121	0.136	0.200	0.075	0.119
N	4836	4836	4836	3680	3680	3680

Notes. This table represents the effect of pay gap between late-career executives and mid-career executives on firm performance for firms that have the high versus low shareholdings by mid-career executives. We define *ShareDummy* as equal to 1 if the shares owned by mid-career executives exceeds the full-sample median in year *t*-1, and 0 otherwise. Year dummies and industry dummies are included in the regressions, but their results are not reported for simplicity. Industry dummies are constructed based on the industrial classification made by China Securities Regulatory Commission in 2012. All variables are defined in Appendix 2. The standard errors reported in the parentheses are clustered by firm. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7. Firm-fixed effects regression on E_M and L_M

	regression on $E\_M_{i,t-1}$			regression on $L\_M_{i,t-1}$		
	(1) $ROA_{i,t}$	(2) $ROE_{i,t}$	(3) $ROS_{i,t}$	(4) $ROA_{i,t}$	(5) $ROE_{i,t}$	(6) $ROS_{i,t}$
$E\_M_{i,t-1}$	-0.268*	-1.103**	-1.404**			
	(0.162)	(0.430)	(0.557)			
$L\_M_{i,t-1}$				-0.267**	-0.903**	-0.987**
				(0.135)	(0.356)	(0.457)
$LnSize_{i,t-1}$	-0.689***	-2.115***	-1.981***	-0.661***	-2.257***	-2.338***
	(0.174)	(0.462)	(0.598)	(0.200)	(0.529)	(0.679)
$Lev_{i,t-1}$	-3.327***	3.609**	-7.420***	-3.817***	2.663	-11.295***
	(0.603)	(1.599)	(2.072)	(0.699)	(1.845)	(2.368)
$MB_{i,t-1}$	0.376***	0.834***	0.889***	0.443***	0.992***	1.060***
	(0.074)	(0.197)	(0.255)	(0.084)	(0.222)	(0.285)
$CashFlow_{i,t-1}$	0.074***	0.155***	0.129***	0.080***	0.165***	0.130***
	(0.010)	(0.026)	(0.034)	(0.011)	(0.030)	(0.038)
$Top1_{i,t-1}$	7.960***	16.103***	14.759***	6.534***	15.059***	12.619***
	(1.040)	(2.760)	(3.577)	(1.195)	(3.155)	(4.049)
$Payout_{i,t-1}$	-1.649**	-0.824	-2.091	-2.146***	-2.768	-1.825
	(0.665)	(1.765)	(2.287)	(0.728)	(1.920)	(2.465)
$Loss_{i,t-1}$	-1.023***	-2.007***	-3.211***	-0.461	-0.409	-1.074
	(0.256)	(0.680)	(0.881)	(0.282)	(0.745)	(0.956)
$Duality_{i,t-1}$	-0.004	-0.118	-0.144	-0.143	-0.155	-0.596
	(0.207)	(0.550)	(0.712)	(0.232)	(0.611)	(0.784)
$BoardNum_{i,t-1}$	0.007	-0.344*	-0.013	0.075	-0.146	0.186
	(0.076)	(0.202)	(0.262)	(0.085)	(0.224)	(0.288)
$IndepPer_{i,t-1}$	-0.674	-2.110	-8.943	1.899	-1.232	-3.016
	(2.041)	(5.418)	(7.021)	(2.253)	(5.948)	(7.633)
$Inv_{i,t-1}$	-0.002	5.546	3.659	0.778	5.888	4.874
	(1.538)	(4.081)	(5.289)	(1.725)	(4.552)	(5.842)
$RD_{i,t-1}$	-0.732***	-1.584***	-2.873***	-0.439*	-0.940	-1.374
	(0.226)	(0.600)	(0.778)	(0.260)	(0.685)	(0.880)
$GenderPaygap_{i,t-1}$	-0.190**	-0.472**	-0.697**	-0.120	-0.182	-0.576*
	(0.090)	(0.240)	(0.310)	(0.101)	(0.267)	(0.343)
$ExeEmpPaygap_{i,t-1}$	0.115***	0.126*	0.311***	0.109***	0.198**	0.295***
	(0.027)	(0.071)	(0.093)	(0.031)	(0.082)	(0.105)
Year dummies	included	included	included	included	included	included
Intercept	17.270***	60.149***	51.143***	15.983***	61.312***	56.822***
	(5.286)	(14.029)	(18.181)	(5.588)	(14.750)	(18.929)
Adj. R^2	-0.173	-0.213	-0.213	-0.232	-0.269	-0.266
N	10900	10900	10900	8851	8851	8851

Notes. This table reports the results of firm-fixed effects regression on E_M and L_M. Year dummies are included in the regressions, but their results are not reported for simplicity. All variables are defined in Appendix 2. The standard errors reported in the parentheses are clustered by firm. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8. Analysis of the impact threshold for a confounding variable in the OLS regression on *E_M* and *L_M*

	regression on $E\_M_{i,t-1}$			regression on $L\_M_{i,t-1}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	$ROA_{i,t}$	$ROE_{i,t}$	$ROS_{i,t}$	$ROA_{i,t}$	$ROE_{i,t}$	$ROS_{i,t}$
$LnSize_{i,t-1}$	-0.0004	-0.0002	-0.0004	-0.0006	-0.0002	-0.0005
$Lev_{i,t-1}$	0.0007	0.0001	0.0006	0.0016	0.0001	0.0014
$MB_{i,t-1}$	0.0011	0.0008	0.0007	0.0005	0.0004	0.0003
$CashFlow_{i,t-1}$	-0.0028	-0.0019	-0.0013	0.0017	0.0012	0.0008
$FirmAge_{i,t-1}$	0	0	0	0.0006	0.0004	0.0004
$Top1_{i,t-1}$	-0.0006	-0.0004	-0.0003	0.001	0.0008	0.0006
$Payout_{i,t-1}$	0	0	0	0.0009	0.0007	0.0003
$Loss_{i,t-1}$	0.001	0.0009	0.0009	-0.0007	-0.0006	-0.0006
$Duality_{i,t-1}$	0.0008	0.0004	0.0002	0.0003	0.0002	0.0001
$BoardNum_{i,t-1}$	0	0	0.0001	0	0.0001	-0.0001
$IndepPer_{i,t-1}$	0	0	0	-0.0001	-0.0001	0
$Inv_{i,t-1}$	0	-0.0001	0	0	0	0
$RD_{i,t-1}$	-0.0001	-0.0001	0	0.0001	0.0001	-0.0001
$GenderPaygap_{i,t-1}$	0.0013	0.0009	0.001	-0.0017	-0.0008	-0.0016
$ExeEmpPaygap_{i,t-1}$	-0.0018	-0.0014	-0.0007	**0.0096**	0.0072	0.0043
Impact threshold for confounding variable ***(ITCV)***	**-0.0079**	**-0.0094**	**-0.0029**	**-0.0040**	**-0.0111**	**-0.0054**

Notes. This table reports the results of the analysis of the impact threshold for a confounding variable (ITCV) in the regressions on *E_M* and *L_M*, respectively. ITCV refers to the impact threshold of a confounding variable, beyond which the baseline regression results could be biased and even overturned if we include such a confounding variable in the baseline regressions. We follow Frank (2000) to calculate the value of ITCV and the partial impact of each control variable. The greater the magnitude of ITCV is, relative to the partial impact of the control variables, the lesser extent to which the regression results for *E_M* and *L_M* are biased by confounding, omitted variable(s). All variables are defined in Appendix 2.

Table 9. Oster estimates

	$\delta = 0$			$\delta = 1$ $R_{max} = 1.3R$		
	(1)	(2)	(3)	(4)	(5)	(6)
	$ROA_{i,t}$	$ROE_{i,t}$	$ROS_{i,t}$	$ROA_{i,t}$	$ROE_{i,t}$	$ROS_{i,t}$
$E\_M_{i,t-1}$	-0.469***	-1.271***	-1.259**	-0.434**	-1.188***	-1.154**
	(0.170)	(0.432)	(0.550)	(0.175)	(0.450)	(0.559)
$L\_M_{i,t-1}$	-0.283**	-0.972***	-1.020**	-0.376***	-1.128***	-1.139***
	(0.133)	(0.336)	(0.483)	(0.125)	(0.316)	(0.405)

Notes. This table compares the baseline regression results in Columns (1-3) with the bias-adjusted estimates in Columns (4-6) following Oster (2019). δ is defined as the importance of omitted variables relative to the existing control variables in affecting the coefficient of the independent variable. R_{max} is defined as the maximum R-squared if both the existing control variables and the omitted variables were included in the hypothetical regression. Following Oster (2019), we assume that (i) the upper bounds for δ is 1, and that (ii) R_{max} is 1.3 times the actual R-squared of the baseline regression. We apply the STATA program as to PSACALC (Oster 2019) to estimate the coefficients on *E_M* and *L_M* through bootstrapping, with the number of bootstrap replications set to 1000, under the two assumptions. The standard errors reported in the parentheses are clustered by firm. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 10. The effect of E_M and L_M on the market-based firm performance

	regression on $E\_M_{i,t-1}$		regression on $L\_M_{i,t-1}$	
	(1)	(2)	(3)	(4)
	$TobinQ_{i,t}$	$StockReturn_{i,t}$	$TobinQ_{i,t}$	$StockReturn_{i,t}$
$E\_M_{i,t-1}$	-0.050*	-0.810		
	(0.029)	(1.042)		
$L\_M_{i,t-1}$			-0.050**	-1.376*
			(0.020)	(0.704)
$LnSize_{i,t-1}$	-0.385***	-6.245***	-0.364***	-5.792***
	(0.027)	(0.648)	(0.029)	(0.725)
$Lev_{i,t-1}$	-0.455***	9.239***	-0.333***	8.942***
	(0.116)	(2.652)	(0.129)	(2.877)
$MB_{i,t-1}$	0.704***	-3.259***	0.730***	-3.272***
	(0.026)	(0.518)	(0.029)	(0.575)
$CashFlow_{i,t-1}$	1.728***	29.697***	1.585***	30.748***
	(0.237)	(6.321)	(0.257)	(6.953)
$FirmAge_{i,t-1}$	-0.021***	0.095	-0.022***	0.101
	(0.003)	(0.076)	(0.003)	(0.083)
$Top1_{i,t-1}$	0.703***	7.407**	0.672***	8.166**
	(0.112)	(2.923)	(0.119)	(3.222)
$Payout_{i,t-1}$	-0.251**	-5.148	-0.342***	-8.527**
	(0.106)	(4.382)	(0.106)	(4.071)
$Loss_{i,t-1}$	0.036	-5.213***	0.012	-5.661***
	(0.050)	(1.740)	(0.052)	(1.882)
$Duality_{i,t-1}$	-0.084***	-1.771*	-0.075**	-2.067**
	(0.032)	(0.961)	(0.035)	(1.044)
$BoardNum_{i,t-1}$	0.010	0.259	0.008	-0.019
	(0.010)	(0.311)	(0.010)	(0.329)
$IndepPer_{i,t-1}$	0.589*	13.503	0.579*	7.550
	(0.315)	(8.778)	(0.330)	(9.454)
$Inv_{i,t-1}$	-0.308	-13.482	-0.311	-14.116
	(0.296)	(9.004)	(0.321)	(9.586)
$RD_{i,t-1}$	15.081***	281.567***	14.690***	258.426***
	(4.594)	(88.532)	(5.040)	(90.847)
$GenderPaygap_{i,t-1}$	-0.008	-0.588	-0.003	-0.251
	(0.014)	(0.437)	(0.015)	(0.486)
$ExeEmpPaygap_{i,t-1}$	0.010***	0.239**	0.012***	0.337***
	(0.004)	(0.107)	(0.004)	(0.120)
Year dummies	included	included	included	included
Industry dummies	included	included	included	included
Intercept	8.507***	94.931***	8.016***	90.858***
	(0.530)	(14.046)	(0.562)	(15.734)
Adj. R^2	0.564	0.558	0.571	0.552
N	10900	10900	8851	8851

Notes. This table reports the effect of E_M and L_M on the market-based firm performance, measured by Tobin's Q and annual stock return. Year dummies and industry dummies are included in the regressions, but their results are not reported for simplicity. Industry dummies are constructed based on the industrial classification made by China Securities Regulatory Commission in 2012. All variables are defined in Appendix 2. The standard errors reported in the parentheses are clustered by firm. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.