ABACUS A Journal of Accounting, Finance and Business Studies

ABACUS, Vol. 52, No. 3, 2016 doi: 10.1111/abac.12082

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Pay Gap and Performance in China

The growing gap between the pay of executives and employees has been the subject of much media publicity and political attention in recent times. We analyze the pay gap between executives and employees, focusing on three components: executive pay premium relative to industry peers; employee pay premium; and average pay gap at the industry level. We examine how the executive and employee pay premium components of the pay gap drive firm performance. On one hand, economic theories of matching and managerial talent suggest talented executives who generate relatively better firm performance receive wage premiums, implying a positive relation between pay gap and performance. On the other hand, sociological theories suggest that the inequity implied by a larger pay gap lowers firm performance by adversely affecting employee morale and productivity. To test these alternative theories, we utilize pay gap data from China that provides a setting with strong national preferences towards social equity but also with a scarcity of experienced managers and abundance of low-cost labour. Our results strongly support the economic theories—firm performance is largely driven by pay premium for executive talent. Additional tests using a smaller sample of US firms with pay gap data are consistent with our primary findings. Our study is likely to be of interest to politicians, regulators, and company executives responsible for understanding and evaluating pay gap and executive pay.

Key words: Accounting performance; Employee pay premium; Executive pay premium; Matching theory; Pay gap.

The performance implications of the increasing gap in the average pay of executives and employees has been the subject of significant media and political scrutiny in recent years. International news and business articles suggest politicians and regulators face mounting pressure to curb a widening executive–employee pay gap driven by growth in executive pay.[1] For instance, Section 953(b) of the Dodd–Frank Wall Street Reform and Consumer Protection Act of 2010 now requires all US public firms to disclose median employee compensation as well as the CEO total compensation to median employee compensation ratio. The recently released Hutton report recommends similar disclosures for public firms in Britain. As pay gap is the ratio of

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[1] For example, see recent articles in the *Wall Street Journal* and CNNMoney.com by Hymowitz (2008) and Sahadi (2007) respectively; and in *The Guardian* by Seager and Finch (2009) for a report about the UK pay gap.

chief executive pay to average employee pay, the pay gap increases with the wage premium paid for talented and motivated executives and decreases with the wage premium paid to employees. Performance, however, depends on the productivity of executives and employees relative to their pay.

Many populist commentators draw upon sociological theories to argue that a larger pay gap can adversely affect employee morale because employees believe they are underpaid and executives are expropriating the wealth created in the firm. This in turn is believed to lead to a negative relationship between pay gap and firm performance (e.g., Levine, 1991). The possible adverse effect of pay gap is well documented in sociological research on equity and relative deprivation theories of distributive justice. Relative deprivation theory argues that individuals experience deprivation when they find that they have received fewer rewards than they deserve compared to rewards received by their reference groups (Martin, 1981; Crosby, 1984; Cowherd and Levine, 1992) and firms should reduce the pay gap in order to increase cohesiveness and employee productivity (Levine, 1991). Thus, sociological theories suggest that a smaller pay gap is associated with *higher* firm performance.

By contrast, on analyzing the issue from an economic perspective, exactly the opposite relationship between pay gap and performance is predicted. Market forces and the relative supply and demand of executive and employee talent affect pay gap via the effect on wage premiums. When talented senior executive leadership is scarce, pay gap may be driven by wage premiums for executives who can generate relatively better firm performance (Lazear, 1979; Rosen, 1982; Raff and Summers, 1987; Mortensen and Pissarides, 1994; Pissarides, 2000). Recent research in accounting establishes a positive link between executive pay and current and future performance because current pay reflects the persistent ability of the executive[2] (Hayes and Schaefer, 2000; Ederhof, 2010, Banker *et al*., 2013). If the skill of lower level employees is not as scarce a resource, they will not receive premium wages. Thus, when executive talent is in short supply and employee labour is abundant, wage premiums are likely to be greater for talented executives than for employees, leading to a higher pay gap and a higher performance. This alternative economic perspective predicts the pay gap is positively related to performance when talented executives are scarce but employees are not.[3]

Matching theory argues that talented managers are sought and recruited by firms that benefit most from employing them so, in equilibrium, talented executives receive relatively greater compensation than their peers, and premium wages paid to talented managers are expected to be more than offset by the executive's subsequent contribution to the creation of firm value (Coughlan and Schmidt, 1985;

[2] A large literature in accounting and financial economics examines the relation between executive pay and firm performance. Examples include Lewellen and Huntsman (1970), Coughlan and Schmidt (1985), Murphy (1985), Antle and Smith (1986), Lambert and Larcker (1987), Jensen and Murphy (1990), Abowd (1990), and Leonard (1990).

[3] Related economic theories include matching theory (Mortensen and Pissarides, 1994; Pissarides, 2000) and managerial talent theory (Rosen, 1982), as well as efficiency wage theory (Lazear, 1979; Raff and Summers, 1987).

Murphy, 1985; Jensen and Murphy, 1990; Joskow and Rose, 1994; Banker *et al.*, 2000). In other words, the incremental firm value created by hiring a talented manager is shared between the firm and the executive. Managerial talent theory also predicts a positive relation between executive pay and pay gap. Recruiting and compensation are linked to observable signals about executive talent, and attracting and retaining talent requires compensation above the industry average. Unusually high talents and abilities must earn scarcity rents even in the absence of agency and incentive problems (Rosen, 1982; Hubbard and Palia, 1995; Ke *et al.*, 1999). Wage premiums result in greater firm performance because greater talent filters through the entire firm suggesting a positive relation between executive pay (and therefore the pay gap if workers are not scarce) and firm performance, *ceteris paribus*.[4] Efficiency wage theory predicts that remunerating employees with above-average wages relative to peers may increase employee morale, reduce turnover, and deliver gains in productivity and profitability that exceed the incremental wage cost (Lazear, 1979; Malcolmson, 1981; Akerlof, 1982; Raff and Summers, 1987).

While pay gap has been subject to much international media attention, the mechanisms through which pay gap affects firm performance have received relatively less attention. There is no prior study that has looked at how the pay gap between executives and employees affects firm performance through the lens of how talented executives and employees are paid compared to their peers in their industries. Whereas much prior academic research has focused on the pay–performance relation for the CEO or top executive team, our study is different in two ways. First, we consider the effect of wage premiums for both executive *and* employee talent on firm performance. Second, we consider how the relative gap *between* executive and employee pay affects firm performance from both economic and sociological perspectives. Evaluating the contrasting theories from sociology and economics is an empirical question, and is the main objective of our paper.

China's economic and social characteristics make it an interesting setting to test the contrasting predictions. A large available pool of low-cost low-skilled labour has fuelled China's rapid growth in the global market for manufacturing low-value-added goods. A World Bank report (2009) indicates the Chinese labour force comprises a large pool of homogenous unskilled labour with low marginal product of employees. Marginal contribution from less skilled labour to firm value is relatively low, and instead the strategic challenge for Chinese firms is in identifying new markets, customers, and products (Lane and Pollner, 2008). At the same time, a recent report notes that 44% of surveyed Chinese firm executives identified inadequate supply of executive talent as the biggest barrier to their global ambitions (Lane and Pollner, 2008).[5] A *Forbes Magazine* article on Chinese executives notes

[4] These economic theories predict a negative relation when a lower pay gap is driven by wage premiums for scarce skilled employees, but executive talent is not a significant value driver. A famous example is Henry Ford's 'Five Dollar Workday' strategy (see Raff and Summers, 1987). Efficiency wage theory, however, is not likely to apply if the labour required is low skill and abundant.

[5] For China, see Lane and Pollner (2008); and Kelly HBR China 2010 Talent Competence Survey: http://www.executivecentre.com/blog/2010/12/chinas-talent-market-faces-competency-shortage/

companies are finding it '… increasingly difficult to recruit and retain talented employees because the demand for such employees by foreign and domestic firms outstrips supply' and 'these shortages frequently affect bottom lines as companies seek to retain employees through improved compensation and benefits packages' (Rapoza, 2011). As a result, growth in firm value is driven more by talented executives with skills that allow the exploitation of Chinese firms' comparative advantages and growth opportunities. This characteristic of the Chinese economy suggests that a wage premium for talented executives is likely to improve firm performance consistent with economic theories of matching and managerial talent. In other words, economic conditions in China are also consistent with economic theories that predict a positive relation between pay gap and performance because executive talent is in short supply and labour is abundant. In addition, China's growing global economic influence makes it an even more relevant setting and the availability of a large sample of executive and employee wage data makes the study feasible.

Sociological theories of equity and relative deprivation predict a negative relation between *pay gap* and firm performance. China's history of socialism provides a setting where the predicates of sociological theories are likely to hold. For instance, senior Chinese Communist Party leaders have made reducing income inequality a top priority with the Chinese president asserting that China needs to build a 'more balanced and harmonious society', consistent with sociological theories that predict a negative relation between pay gap and performance.[6] Chinese companies face political pressure to minimize the executive–employee pay gap because of the importance of social equality to the central government (Firth *et al*., 2006; Chen, 2014; Chen *et al*., 2014). Chinese bureaucrats are directed to impose constraints on executive compensation and keep pay gaps in check. Bureaucrats want to avoid the consequences of falling out of favour with Communist Party officials, consistent with Jensen and Murphy's (1990) theory of political pressure.[7] In addition, Chinese bureaucrats want to avoid publicity from the dissatisfaction of low-level employees with pay inequality that may also reduce employee productivity and firm performance.

Our empirical results strongly support economic theories rather than sociological theories: firm performance is positively related to lagged pay gap. In order to check how pay gap affects firm performance, we conduct further analysis based on a decomposition of the pay gap into executive pay premium, employee pay premium, and industry pay gap. The empirical results reveal that the wage premium paid to talented executives drives the positive relation, but there is no evidence that the pay premium to employees (which reduces the pay gap) improves performance

[6] http://www.thestandard.com.hk/news_detail.asp?pp_cat=20&art_id=46550&sid=14013054&con_type=1); http://news.bbc.co.uk/2/hi/business/4382714.stm)

[7] Jensen and Murphy (1990) argue that third parties create political forces that affect public and private sector executive pay in the US. They state: '[f]ueled by the public disclosure of executive pay required by the SEC, parties such as employees, labor unions, consumer groups, Congress, and the media create forces in the political milieu that constrain the type of contracts written between management and shareholders'.

for Chinese firms. Our tests also control for differences in the pay gap and performance relation for listed firms that (i) are state-owned enterprises (SOEs) and/or (ii) have received foreign investment to examine if ownership structure and firm objectives have a moderating effect on the relation between pay gap and performance.[8]

In additional tests, we examine whether our results are driven by cross-sectional differences in the degree to which Chinese firms are exposed to foreign market competition (measured using whether the firm is classified as a manufacturing or non-manufacturing firm), as well as geographic proximity to shipping ports (measured using whether the firm is situated in a coastal or inland location). Our empirical results suggest our main findings are robust across manufacturing and non-manufacturing industry partitions as well as regional differences in economic development. We also find that our results are robust to an alternate specification of pay gap, in which we examine the relation between performance and the deviation from expected pay gap. Finally, a supplemental test using a sample of US firms reveals similar findings to our main results.

HYPOTHESIS DEVELOPMENT

We first consider economic theories that explain how the relation between pay gap and performance is affected by wage premiums for executives and employees. To the extent to which scarce executive or employee talent is a critical driver of firm value, it is likely to influence relative pay levels and therefore the pay gap. We decompose firm pay gap into executive pay premium, employee pay premium, and industry pay gap. We measure firm-level pay premium by comparing firm-level pay to median industry-level pay. The executive pay premium and employee pay premium are respectively measured as the mean executive or employee pay for a firm relative to the median of corresponding mean values measured across all firms in its industry. The industry pay gap is the ratio of the median average executive pay and average employee pay.

Executive Talent and Pay Premium

Executive wage premiums arise to attract talented executives who can identify and exploit opportunities for the firm and create relatively greater value. Empirical studies in accounting and financial economics provide strong evidence of a positive relation between executive pay and contemporaneous performance (Coughlan and Schmidt, 1985; Murphy, 1985; Jensen and Murphy, 1990) and more recently, evidence of a positive relation between current executive pay and *future* performance (Hayes and Schaefer, 2000; Ederhof, 2010, Banker *et al*., 2013). Executives with greater ability command greater compensation and because ability is correlated

[8] Prior studies suggest evidence that SOE managers have incentives to focus on performance and the realization of growth opportunities (Hu and Leung, 2012; Cao *et al*., 2009).

over time, compensation is predictive of future performance. *Ceteris paribus*, a higher executive pay premium thus implies both a larger pay gap between executives and higher firm performance.

Economic theories of matching and managerial talent predict a positive relation between pay premiums for executives and firm performance. Matching theory argues that effective matches between firms that demand executive talent and executives with desired abilities occur when there are complementarities between executive-specific productivity and firm-specific productivity (Mortensen and Pissarides, 1994; Pissarides, 2000). The mutually selective nature of the executive labour market implies an 'assortative matching' of executive–firm pairs in equilibrium (Li and Ueda, 2006; Pan *et al*., 2010). Executives with superior talent are assigned to larger firms because greater talent filters through the entire firm and a larger firm enjoys economies of scale. As such, firms that require executives with specific or high levels of skills pay above-market wages to attract and retain such executives, who, in turn, generate greater firm value, resulting in a positive relation between executive pay and performance.

Managerial talent theory also predicts a positive relation between performance and executive pay in equilibrium. Managerial talent theory argues that the adverse selection problem arising from uncertainty about an executive's ability is addressed by executive compensation based on observable signals such as an executive's past performance (Rosen, 1982). Executives with a better track record of performance are seen as having greater ability and command greater remuneration. Thus, managers who are paid relatively more than their peers are likely to be more talented and hence able to create relatively greater firm value for their firms.[9]

Ke *et al*. (1999) and Hubbard and Palia (1995) provide empirical evidence supporting the managerial talent hypothesis. Ke *et al*. (1999) find that executives in public insurance firms earn relatively more than executives in private insurance firms, suggesting that public firms that are on average larger and more complex require more talented and skilled executives. Hubbard and Palia (1995) find that the level and structure of pay for banking executives match the competitiveness of the banking environment. Economic theories therefore suggest a positive relation between firm performance and executive pay measured relative to others in the industry.

Executive pay is thus affected by the availability of executive talent. A limited supply can lead to higher pay and performance. By contrast, if executive entrenchment is caused simply by upward pressure on executive compensation, the relationship between executive pay and performance can be negative if higher pay is not for higher talent (Shleifer and Vishny, 1989; Core *et al*., 1999; Faleye, 2007).

This leads to our first hypothesis:

H1: Higher executive pay relative to others in the industry is positively related to firm performance when executive talent is scarce.

[9] Greater ability can be intrinsic, or arise because of an executive's social network and connections. This is especially relevant in China because connections to the Communist Party can facilitate growth opportunities and reduce bureaucratic red tape.

Employee Talent and Wage Premium

The relation between employee pay and firm performance is similar. Efficiency wage theory predicts that remunerating employees with above-average wages relative to peers may increase employee morale, reduce turnover (Shapiro and Stiglitz, 1984), and deliver gains in productivity and profitability that exceed the incremental wage cost (Lazear, 1979; Malcolmson, 1981; Akerlof, 1982; Raff and Summers, 1987). This leads to higher financial performance if the higher productivity more than offsets the higher wages. A widely cited application of efficiency wage theory is Henry Ford's introduction of the 'five-dollar day' in 1915.[10] Cappelli and Chauvin (1991) find empirical evidence consistent with efficiency wage theory: wage premiums are associated with lower levels of shirking, and the effect is stronger in labour markets with fewer alternative sources of employment. Banker *et al.* (2000) find increased incentive pay to retail workers is associated with higher productivity. Therefore, because pay gap is lower when employee wage premiums are higher, efficiency wage theory suggests a negative relation between firm performance and pay gap.

The basic tenet is that efficiency wage theory, however, only applies when the marginal product of labour is high (Katz, 1986). If employees are responsible for relatively low value-added, routine tasks, firms have limited opportunities to obtain efficient gains by attracting talented employees with high wage premiums. Routine tasks are commonly performed by less skilled labour in abundant supply. For instance, the World Bank (2009) report indicates the Chinese labour force is comprised of a large pool of homogenous unskilled labour with low marginal product of employees. Koopman *et al.* (2008) find that the share of indigenous labour content in China's exports is below 20% in relatively sophisticated sectors. Accordingly, it is unlikely that the improved performance outcomes suggested by the efficiency wage theory are applicable to Chinese firms that reward low-skilled labour with above industry-average wages. In fact, paying wage premiums for such employees is likely to reduce firm performance and value because of the negative return on wage premiums. Therefore when employee wage premiums are higher but the marginal product of employees is lower, a smaller firm pay gap results in lower performance, implying a *positive* relation between firm performance and pay gap. The discussion above leads to the following prediction based on economic theories:

H2: Higher employee pay relative to others in the industry is negatively related to firm performance when labour supply is abundant.

The first two hypotheses based on economic theories together imply that the pay gap is positively related to firm performance.

H3: In accord with economic theories, pay gap is positively related to performance when executive talent is scarce and labour supply is abundant.

[10] Raff and Summers (1987) find that Ford's decision to substantially increase wages for most workers resulted in significant improvements in productivity and profitability.

Pay Gap and Sociological Theories

In contrast to predictions based on economic theories, sociological theories suggest a large pay gap is likely to negatively affect employee morale, create envy, and lower employee productivity and firm performance. For instance, equity theory states that workers expect their rewards to match the level of their individual contribution (Adams, 1965; Homans, 1974; Walster *et al.*, 1978). Individuals evaluate fairness by comparing the equity between their contributions and associated outcomes with the contributions and outcomes of their reference groups. Dissimilar ratios lead to perceptions of inequity, and individuals react by reducing their productivity or demanding wage increases, resulting in reduced firm profitability (Cowherd and Levine, 1992). Alternatively, individuals may choose to resign and the higher employee turnover is likely to be more costly, especially for firms in industries with a high marginal product of skilled labour because of the larger training and development investment in employees. In sum, equity theory suggests firm pay gap is likely to be negatively related to performance.

Relative deprivation theory argues that individuals experience deprivation if they find they have been given less than they deserve when compared to rewards given to their reference groups (Cowherd and Levine, 1992; Crosby, 1994; Martin, 1981). Sociological studies of the pay gap appeal to relative deprivation theory because the theory typically relates to upward comparisons made by lower status people. Feelings of deprivation lead to behavioural reactions of frustration and lack of optimism about the possibility of change. Crosby (1984) and Martin (1981, 1986) find that externally directed behavioural responses include absenteeism, strikes, and vandalism.[11] Staw (1984) finds that product quality may also be affected. Akerlof and Yellen (1986, 1990) find that if employee wages are lower than what they perceive as fair, employees decrease their individual effort. Levine (1991) develops a similar argument based on cohesiveness. In his model, firms have incentives to reduce the pay gap to increase cohesiveness and employee productivity. In summary, relative deprivation theory also suggests that when pay gap is larger, employees feel less motivated to work, resulting in worse firm performance, implying that consistent with predictions under equity theory, pay gap and performance are negatively related.

Sociological theories of aspirational behaviour suggest that low-level employees who observe a large pay gap may be motivated to work hard because they aspire to be in those senior executive positions. This implies a positive association between pay gap and performance. However, employees are unlikely to work harder when they are homogenous and less skilled because they realize they do not possess the technical or managerial skills required for senior-level jobs. Further, one form of executive 'talent' that makes them more productive in countries like China is the

[11] Numerous examples of Chinese workers undertaking strikes have been reported in the popular press. These strikes are typically due to employee dissatisfaction with wage levels, and often to productivity and production quota requirements imposed on workers. For example, see, 'China Workers Strike at Lingerie, IBM Parts Factories Demanding More Pay' (Bloomberg.com, 24 November 2011); and 'A Dangerous Year' (*The Economist*, 28 January 2012).

tie that some executives have to the ruling party or local government officials (Yang *et al.*, 2009). The likely absence of political ties for low-level workers makes it unlikely that employees with realistic aspirational beliefs expect that increases in effort can ultimately result in significant increases in status and compensation. This is well established in sociology as early as Lewin (1939), who finds workers calibrate their aspirations with the prospects for attaining them. The discussion above of sociological theories suggests the following alternative hypothesis:

H4: According to sociological theories, pay gap is negatively related to performance.

SAMPLE SELECTION AND RESEARCH DESIGN

We choose to evaluate these alternative arguments using a sample of firms domiciled in China. The economic and social characteristics make China an interesting setting because both economic and sociological theories can be applied. China provides a setting where arguments that both support and refute both sociological and economic theories hold, thus allowing empirical tests of the theoretical predictions.

Sample

We obtain financial statement, compensation, and return data for Chinese firms from the Chinese Stock Market & Accounting Research (CSMAR) financial database, corporate governance database, and stock market databases respectively. The data are publicly available from GTA Information Technology Company Limited. CSMAR data are collected directly from public firms' annual financial reports as published in *Securities Time*, *Shanghai Securities Daily*, *China Securities Daily*, and other major newspapers designated by CSRC. Double-checking has been performed to ensure coding accuracy, and the CPI data are from the World Bank.[12]

Our sample period is the 10-year period from 2000 to 2009. We merge financial data with corporate governance and stock market data and drop observations for which data required to calculate *Return on Assets*, *Margin*, *Growth*, the pay gap variables, or the control variables are missing. This generates a sample of 5,835 firm-year observations. We allow firms to enter and exit our sample, resulting in an unbalanced panel.[13]

Empirical Models

Our empirical analysis seeks to examine the impact of gap between executive and employee pay (*Firm pay gap*) on firm performance. We estimate the relation between *Firm pay gap* in year t and *Performance* in year $t + 1$ using the following primary empirical specification:

[12] Source: http://data.worldbank.org/indicator

[13] Our use of an unbalanced panel reduces the likelihood that our results are driven by a survivorship bias. Untabulated tests show that our results are robust to restricting the sample to firms that are in the database for the entire sample period. We lose over 50% of the primary sample when imposing this condition.

$$Performance_{i,t+1} = \alpha + \beta_1 Firm\ pay\ gap_{i,t} + gX_{i,t} + e_{i,t} \quad (1)$$

Where subscript *i* refers to the firm, and *t* refers to the year. $Performance_{i,t+1}$ is set to either: *Return on Assets* (ROA), *Margin*, or *Growth*, all measured at $t + 1$. ROA_{t+1} is calculated as net income scaled by total assets (CSMAR # $B002000000_{t+1}$ / $A001000000_{t+1}$). $Margin_{t+1}$ is net income scaled by total sales (CSMAR # $B002000000_{t+1}$ / $B001101000_{t+1}$). $Growth_{t+1}$ is the sum of asset growth and sales growth from *t* to $t + 1$, and calculated as [((($CSMAR\ A001000000_{t+1}$ / $A001000000_{t}$) – 1) + (($B001101000_{t+1}$ / $B001101000_{t}$)) – 1)].[14]

$Firm\ pay\ gap_{i,t}$ is calculated as ($Meanexecpay_{i,t}$ / $Meanemppay_{i,t}$). $Meanexecpay_{i,t}$ is the sum of salary, bonus, and all other compensation for all executives in firm *i* during year *t* divided by the total number of executives for the firm during year *t*, and calculated as (CSMAR $Y1501a_{i,t}$ / ($Y1101a_{i,t}$ – $Y1101b_{i,t}$ + $Y1201a_{i,t}$ + $Y1301b_{i,t}$)).[15] In contrast to US firms, compensation in the form of stock and stock options is rare in China and typically non-existent in SOEs (Mengistae and Xu, 2004; Li *et al*. 2007). Prior to 2005, executives were prohibited from receiving any stock-based compensation. In untabulated tests, we include stock-based compensation in the calculation of total compensation. Results from these tests are qualitatively similar to those presented in our main tables.

Mean employee expense is the sum of total salary expense net of executive compensation scaled by total employees, net of executives and directors, measured as [(CSMAR # (($A002112000_{i,t}$ – $A002112000_{i,t-1}$) + (($C001020000_{i,t}$ – $Y1501a_{i,t}$) / ($Y0601b_{i,t}$ – $Y1101a_{i,t}$ + $Y1201a_{i,t}$ + $Y1301b_{i,t}$ – $Y1101b_{i,t}$))].

In our model (1), X_{it} represents a vector of firm-specific control variables, including book-to-market, firm size, stock return, and current period performance. Book-to-market is calculated as the book value of equity divided by the market value of equity, both calculated in year *t* and measured as (CSMAR # T61701). Firm size is logged total assets in year *t* [log (CSMAR # A001000000)]. Stock return is the firm's stock return from *t*–1 to *t* less the value-weighted market return over the same period.[16] Lagged performance variables are the corresponding performance variable for each of *ROA*, *Margin* or *Growth* measured at time *t*.

We also include two indicator variables to capture ownership characteristics shown to affect Chinese firm performance. State ownership (*SOE_Dummy*) is set

[14] Our results are robust to the use of industry-adjusted performance.

[15] We acknowledge that a limitation of our study is reported executive compensation does not include executive compensation such as entertainment, dining, cars, travel, drinks, and karaoke bars, or free personal mobile phones (Adithipyangkul *et al*., 2011). Note that many of these are largely unobservable to workers. To the extent that observable values of compensation exclude this form of compensation, we do not fully capture the predictions from sociological theories about employee perceptions of wage inequality. Further, while these are absent from reported compensation thus reducing the pay gap, we do not expect this omission to have a systematic relation with firm performance.

[16] Untabulated tests show that our results are robust to the use of equal-weighted market returns instead of value-weighted market returns, or if we include lagged returns over the period *t* to *t*+1 or *t*–1 to *t*+1.

to one if the firm is classified as state owned or controlled, and zero otherwise. Qi *et al.* (2005) find that performance is negatively related to state ownership. This is because state-owned enterprises are less efficient and less incentivized to maximize firm value relative to firms without state ownership influence (Firth *et al.*, 2007; Fan *et al.*, 2007). *Foreign_Dummy* is an indicator variable set to one if the firm has foreign ownership, and zero otherwise. We do not have an *ex-ante* prediction about the relation between foreign ownership and performance. On one hand, foreign investment is likely to occur in firms that have a large investment opportunity set and can benefit from the foreign investor's expertise and proprietary technology. This suggests a positive relation between foreign investment and future performance. Consistent with this, Wei *et al.* (2005) find a positive relation between foreign investment in public Chinese firms and Tobin's Q. In contrast, foreign investors may be more likely to invest in larger, more stable Chinese firms with strong governance and greater political clout. Such firms may have relatively smaller investment opportunity sets. This suggests a negative relation between the presence of foreign investment and future performance. Our model also includes year and industry fixed effects. Standard errors are clustered by firm and year (Petersen, 2009). All raw financial and compensation variables are winsorized at the 1% and 99% levels.[17] Compensation variables are deflated to constant year values (the base year for the index is 2000).

Our hypothesis based on economic theories of matching and efficiency wages requires that we estimate how each of executive pay and employee pay (relative to industry averages) affect performance. Accordingly, we decompose the *Firm pay gap* into *Executive pay premium*, *Employee pay premium*, and *Industry pay gap*. This decomposition allows us to identify firm-level pay premiums by comparing firm-level pay relative to median industry-level pay. The *Executive pay premium* and *Employee pay premium* are respectively measured as the mean executive or employee pay for a firm relative to the median of corresponding mean values measured across all firms in its industry. The *Industry pay gap* is the ratio of the median average executive pay and average employee pay. The decomposition can be formally written as follows:

$$\begin{aligned} \textit{Firm pay gap}_{i,j,t} = {} & \textit{Executive pay premium}_{i,j,t} / \textit{Employee pay premium}_{i,j,t} \\ & * \textit{Industry pay gap}_{i,j,t} \end{aligned} \tag{2}$$

We calculate *Executive pay premium*$_{i,j,t}$ as [(Meanexecpay$_{i,t}$ / Med_meanexecpay$_{j,t}$)], where industry j corresponds to the primary industry classification for firm i in year t. Meanexecpay$_{i,t}$ is as previously defined and Med_meanexecpay$_{j,t}$ is the median of the industry mean executive compensation for industry j in year t. *Employee pay premium*$_{i,j,t}$ is calculated as the [(Meanemppay$_{i,t}$/Med_meanexecpay$_{j,t}$)]. Meanemppay$_{i,t}$ is as previously defined and Med_meanexecpay$_{j,t}$ is the median of the industry mean employee expense for industry j in year t. *Industry pay gap*$_{j,t}$ is

[17] Our results are qualitatively similar if we truncate variables at the 1% and 99% levels.

calculated as [(Med_meanexecpay$_{j,t}$ / Med_meanemppay$_{j,t}$)]. Our extended model is now specified as[18]:

$$\begin{aligned} Performance_{i,t+1} = {} & \alpha + \beta_1 Executive\ pay\ premium_{i,j,t} \\ & + \beta_2 Employee\ pay\ premium_{i,j,t} + \beta_3 Industry\ pay\ gap_{j,t} \\ & + gX_{i,t} + e_{i,t} \end{aligned} \quad (3)$$

We hypothesize that the coefficient for *Executive pay premium* is positive as motivated for Hypothesis 1 and the coefficient for *Employee pay premium* is negative as motivated for Hypothesis 2. The *Industry pay gap* captures the extent to which the *Firm pay gap* is driven by structural pay gaps at the industry level. Pay gap variation at the industry level can occur because of industry-specific demand for executives with required skills or experience (for example, demand for executives with foreign language fluency, technical skills, or geographic experience) driving up compensation in some industries to attract scarce executive talent. Alternatively, the *Industry pay gap* may be affected by differences at the industry level in required employee skill levels. Industries that require more skilled labour pay higher wages, mechanically reducing the *Industry pay gap*. As the *Industry pay gap* is driven by a number of structural factors and is not central to our study, we do not have a prior expectation for the direction of its coefficient.

RESULTS

Descriptive Statistics

Table 1 presents descriptive statistics for our sample. Average *Firm pay gap* is 6.20 (median = 4.43) indicating that, on average, executive salaries are six times those of non-executive employees. *Pay premiums* are much smaller. Average *Executive pay premium* is 1.39 (median = 1.02 and standard deviation = 1.29) while average *employee pay premium* is 1.61 (median = 1.00; standard deviation = 2.86) indicating a skewed distribution at the industry level. The relatively large standard deviation for *Employee pay premium* reflects regional differences in the cost of labour. Brandt and Holz (2006) find the cost of living in Chinese urban areas is 39% higher than the cost of living in rural areas. Further, a 2005 US Bureau of Labor Statistics study finds that employees of Chinese manufacturing firms located in urban areas earn US$1.06 per hour whereas similar workers in suburban and rural areas earn an average of US$0.45 per hour (Banister, 2005).

Industry pay gap has a mean value of 4.56 (median = 4.48; standard deviation = 1.04). The median *Firm pay gap* and *Industry pay gap* are almost the same, indicating that a large portion of *Firm pay gap* is determined by industry-level factors. This is a useful insight from the decomposition analysis that identifies the effect of *Executive pay premium* and *Employee pay premium* separately from the *Industry pay gap*.

[18] We report results based on the additive model. The results are robust if the log transforms are used.

TABLE 1

DESCRIPTIVE STATISTICS

	N	Mean	Median	Standard Deviation
Firm pay gap	5835	6.20	4.43	5.86
Executive pay premium	5835	1.39	1.02	1.29
Employee pay premium	5835	1.61	1.00	2.86
Industry pay gap	5835	4.56	4.48	1.04
Sales ($m RMB)	5835	2720	1010	5814
Total assets ($m RMB)	5835	3646	1656	8323
Book-to-market	5835	0.05	0.03	0.07
Adjusted returns	5835	−1%	−6%	62%
ROA_t	5835	3%	3%	5%
$Margin_t$	5835	2%	5%	35%
$Growth_t$	5835	30%	28%	21%

Descriptive statistics for sample firms. All financial values are reported in Chinese Renminbi (millions). All variables are defined in Appendix A.

Firm size measured by average sales and total assets exhibits considerable variation in our sample. We use the average in keeping with prior literature due to the high correlation between sales growth and asset growth. The results are similar when either growth measure is used. Due to collinearity, the relative importance of the two measures cannot be reliably separated. Average book-to-market is 0.05, which suggests Chinese firms have large investment opportunity sets. The mean and median market adjusted returns for year t are both negative (mean = –1%; median =−6%) but subject to significant variation (standard deviation = 62%). Two of our measures of performance, mean ROA_t and $Margin_t$, are relatively small, 3% and 2% respectively. Further, $Growth_t$, which captures both asset and sales growth is 30% on average, consistent with the high growth rate in industrial activity in China in the last decade. Taken together, our ROA, margin, and growth results suggest that the value of Chinese firms is driven by sales and asset growth activity, rather than increases in operating efficiencies. This is intuitive: growth and expansion opportunities attract new firms to an industry, increasing competition, which subsequently decreases margins and ROA.

Consistent with China's strengths in manufacturing, the primary industry classification for approximately two-thirds of our sample is from manufacturing industries (untabulated). We also identify the province that firms report as their primary place of business. Nearly 55% of the firms in our sample are from provinces that have coastal access along China's eastern seaboard. Coastal provinces include major Eastern metropolitan areas such as Beijing, Shanghai, and Guangdong that have been subject to greater increases in wages and cost of living relative to many inland provinces.[19] In the tests below, we consider the possibility that our results are affected by differences in coastal and inland province labour costs.

[19] A recent article ('The end of cheap China') notes that coastal labour costs have risen by 20% a year for the past four years. (*The Economist*, 10 March 2012).

TABLE 2

CORRELATIONS

	Firm pay gap	Executive pay premium	Employee pay premium	Industry pay gap	ROA_{t+1}	$Margin_{t+1}$	$Growth_{t+1}$
Firm		**0.5991**	**–0.4438**	**0.2151**	**0.1809**	**0.1227**	**0.0986**
pay gap		**<.0001**	**<.0001**	**<.0001**	**<.0001**	**<.0001**	**<.0001**
Executive	**0.6459**		**0.3355**	**0.0185**	**0.3547**	**0.2411**	**0.2096**
pay premium	**<.0001**		**<.0001**	**0.157**	**<.0001**	**<.0001**	**<.0001**
Employee	**–0.2194**	**0.0898**		0.0069	**0.2162**	**0.1459**	**0.1253**
pay premium	**<.0001**	**<.0001**		0.5967	**<.0001**	**<.0001**	**<.0001**
Industry	**0.1732**	**–0.0272**	–0.0096		**0.0655**	**0.0239**	–0.0170
pay gap	**<.0001**	**0.0379**	0.4653		**<.0001**	**0.0683**	0.1948
ROA_{t+1}	**0.1527**	**0.2925**	**0.0339**	**0.0504**		**–0.1190**	**0.0676**
	<.0001	**<.0001**	**0.0096**	**0.0001**		**<.0001**	**0.0072**
$Margin_{t+1}$	**0.0545**	**0.1375**	0.0201	**0.0332**	**0.5828**		**0.0749**
	<.0001	**<.0001**	0.1255	**0.0113**	**<.0001**		**0.0029**
$Growth_{t+1}$	**0.0420**	**0.0538**	0.0069	**–0.0425**	**0.1423**	**0.1199**	
	0.0013	**<.0001**	0.6002	**0.0012**	**<.0001**	**<.0001**	

Table 2 displays correlations for key variables. Spearman (Pearson) correlations are above (below) the diagonal. Values in bold indicate significance at the 10% level or better. All variables are defined in Appendix A.

Table 2 reports Spearman and Pearson correlations for pay gap and performance variables. Spearman (Pearson) correlations are above (below) the diagonal. *Firm pay gap* is positively associated with *Executive pay premium* and *Industry pay gap* and negatively associated with *Employee pay premium* by construction as in equation (2). The relation between *Firm pay gap* and each of the three measures of performance is positive, contrary to arguments in sociology that suggest a larger *Firm pay gap* will reduce performance. Further, each pay gap measure is positively correlated with performance, but with relatively small correlations, ranging from 0.29 (*Executive pay premium* and ROA_{t+1}) to 0.03 (*Employee pay premium* and ROA_{t+1}).[20] The only exception is the negative correlation between the *Industry pay gap* and $Growth_{t+1}$ −0.017. Overall, these positive correlations are consistent with the economic theories of matching rather than with sociological theories of deprivation.

Main Results

Table 3 presents results for empirical tests of the relation between *Firm pay gap* and performance. Columns 1, 2, and 3 report results where the dependent variable is one-period ahead ROA_{t+1}, $Margin_{t+1}$, and $Growth_{t+1}$ respectively. We find a positive and significant relation between *Firm pay gap* and all three performance measures, consistent with economic theories. Further, the coefficient for *Firm pay gap* is statistically significant at the 1% level for the three performance measures. In column 1,

[20] No significant multicollinearity was detected between the pay gap variables upon examining VIF factors.

TABLE 3

PAY GAP AND PERFORMANCE

	(1)	(2)	(3)
	ROA_{t+1}	$Margin_{t+1}$	$Growth_{t+1}$
Firm pay gap_t	0.04*** (3.269)	0.14*** (2.914)	0.22*** (2.686)
Book-to-$market_t$	5.05*** (3.618)	–15.12*** (–3.172)	–57.14*** (–6.298)
Firm $size_t$	–0.13* (–1.820)	0.06 (0.187)	0.63 (0.833)
Adjusted $returns_{t-1,\ t}$	0.47*** (4.744)	1.37*** (4.375)	7.00*** (5.842)
SOE_$Dummy_t$	–0.62*** (–4.169)	–2.29*** (–3.816)	–0.78 (–0.559)
Foreign_$Dummy_t$	–0.50 (–1.020)	–0.65 (–0.283)	–7.18*** (–2.656)
ROA_t	0.45*** (21.379)		
$Margin_t$		–0.02 (–0.837)	
$Growth_t$			–0.00 (–0.694)
Constant	5.39*** (3.482)	7.21 (1.027)	108.66*** (6.369)
Industry fixed effects	YES	YES	YES
Province fixed effects	YES	YES	YES
Observations	5,835	5,835	5,835
R-squared	0.29	0.06	0.05

Table 3 reports results from tests of the relation between firm performance and firm pay gap during the period 2000–2009 for Chinese firms. All regressions include standard errors clustered by firm and year and include year and industry fixed effects. *t*-statistics are in brackets.
*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All variables are defined in Appendix A.

for the performance measure ROA_{t+1}, the coefficient for *Firm pay gap* is 0.04 and the *t*-statistic is 3.27. Results for tests using $Margin_{t+1}$ in column 2 and $Growth_{t+1}$ in column 3 report similar results (*Firm pay gap* coefficient = 0.14; *t*-stat = 2.91 for $Margin_{t+1}$ and coefficient = 0.22; t-stat = 2.69 for $Growth_{t+1}$). The results are consistent with theories of managerial talent because growth opportunities in China are likely to be related to executive talent rather than employee talent.

Book-to-market$_t$ (BtM) is positively related to ROA_{t+1} (coefficient = 5.05, *t*-statistic = 3.62), and negatively associated with $Margin_{t+1}$ and $Growth_{t+1}$ ($Margin_{t+1}$ coefficient = –15.12, *t*-statistic = –3.17; and $Growth_{t+1}$ coefficient = –57.14, *t*-statistic = –6.30). Lagged returns are positively related to all performance measures, consistent with market participants impounding good news information into stock prices prior to information being reflected in accounting numbers. State ownership is negatively associated with all performance measures, consistent with state-owned firms being less efficient than non-state-owned firms.[21] Foreign investment is negatively related to performance for all performance measures but statistically significant only for $Growth_{t+1}$ (coefficient = –7.18, *t*-statistic = –2.66). We also include controls for performance measured contemporaneously with *Firm pay gap*, and find that ROA_t is positively and significantly related to ROA_{t+1}, but both $Margin_t$ and $Growth_t$ are

[21] In sensitivity tests, we consider whether central or local government state ownership affect firm performance. Our results are qualitatively similar when we split the sample by central and local government state ownership control and rerun empirical tests.

negatively and insignificantly related to $Margin_{t+1}$ and $Growth_{t+1}$ respectively. Our overall findings in Table 3 do not support sociological theories that predict larger pay gaps have an adverse effect on firm performance because of decreased employee morale (Hypothesis 3a but not Hypothesis 3b).

In Table 4, we present results of the estimation of the relation between the *Firm pay gap* components and performance. Coefficients for *Executive pay premium* using all three measures of performance are positive and statistically significant at conventional levels (for ROA_{t+1} coefficient = 0.50, *t*-statistic = 7.36; for $Margin_{t+1}$ coefficient = 1.65, t-statistic = 7.67; for $Growth_{t+1}$ coefficient = 1.81, *t*-statistic = 4.67). This finding supports economic theories of managerial talent and matching (Hypothesis 3a but not Hypothesis 3b). Talented executives receive relatively higher pay, and in turn respond by using their talents to improve the firm's performance. These empirical results reveal an economically significant relationship between profit and paying premium wages to talented executives. On average, a one standard deviation increase in *Executive pay premium* corresponds to an increase in ROA_{t+1} from 3.0% to 3.7%, and an increase in $Margin_{t+1}$ from 2.0% to 4.1%. Because growth in firm size in China is usually driven by political and economic planning rather than managerial talent, the impact on $Growth_{t+1}$ is more modest. On average, a one standard deviation increase in *Executive pay premium* corresponds to an increase in $Growth_{t+1}$ from 30.0% to only 32.3%.

TABLE 4

PAY GAP DECOMPOSITION AND PERFORMANCE

	(1)	(2)	(3)
	ROA_{t+1}	$Margin_{t+1}$	$Growth_{t+1}$
Executive pay premium$_t$	0.50*** (7.357)	1.65*** (7.666)	1.81*** (4.668)
Employee pay premium$_t$	0.03 (0.883)	0.24 (1.267)	–0.21 (–1.369)
Industry pay gap$_t$	0.23*** (2.690)	0.53* (1.691)	0.04 (0.049)
Book-to-market$_t$	4.59*** (3.431)	–15.53*** (–3.159)	–56.03*** (–6.057)
Firm size$_t$	–0.32*** (–4.203)	–0.61* (–1.868)	0.11 (0.144)
Adjusted returns$_{t-1,\ t}$	0.47*** (4.806)	1.29*** (4.224)	7.02*** (5.834)
SOE_Dummy$_t$	–0.60*** (–4.108)	–2.19*** (–3.791)	–0.87 (–0.627)
Foreign_Dummy$_t$	–0.74 (–1.481)	–1.36 (–0.612)	–7.88*** (–2.994)
ROA_t	0.43*** (20.273)		
$Margin_t$		–0.02 (–1.002)	
$Growth_t$			–0.00 (–0.403)
Constant	7.88*** (4.978)	16.89** (2.460)	118.14*** (6.889)
Year fixed effects	YES	YES	YES
Industry fixed effects	YES	YES	YES
Observations	5,835	5,835	5,835
R-squared	0.30	0.08	0.05

Table 4 reports results from tests of the relation between firm performance and the executive pay premium, the employee pay premium, and the industry pay gap during the period 2000–2009. All regressions include standard errors clustered by firm and year and include year and industry fixed effects. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All variables are defined in Appendix A.

Coefficients on *Employee pay premium* are positive but statistically insignificant for all measures of performance indicating that firms that compensate workers with above market wages do not realize commensurate increased productivity and returns expected under efficiency wage theory. This finding is expected given China's large homogenous low-skilled labour pool and its focus on low-value add manufacturing. The *Industry pay gap* is positive and significant for both ROA_{t+1} and $Margin_{t+1}$ suggesting pay differences at the industry level affect performance. For instance, some industries that have potential for greater growth and operating efficiency may provide wage premiums to attract talented executives.

Similar to our findings reported in Table 3, $Book\text{-}to\text{-}market_t$ is positively and significantly associated with ROA_{t+1} but negatively with $Margin_{t+1}$ and $Growth_{t+1}$. Firm size is negatively associated with ROA_{t+1} and $Margin_{t+1}$, consistent with expectations. State ownership is negatively associated with all three measures of performance, but statistically significant only for $Growth_{t+1}$. All specifications include year and industry fixed effects, and standard errors are clustered.

In summary, our cumulative results in Tables 3 and 4 provide little support for sociological arguments about adverse performance effects of *Firm pay gap*, and actually suggest that *larger* pay gap is associated with higher performance. To better understand this result, we decompose *Firm pay gap* and examine how the executive and employee pay premiums and industry pay gap affect performance. Consistent with economic theory, we find that the relation between pay gap and performance is driven by compensation premiums for talented executives rather than wage premiums for employees.

We perform a number of sensitivity tests. First, we find our results above are qualitatively similar (untabulated) when we use CEO pay or non-CEO top executive pay to calculate *Meanexecpay* rather than the average pay for top executives. This suggests that wage premiums for executive talent is not driven by premiums just for CEOs but rather, for all members of the executive team. Second, we replicate our tests for a sub-sample using observations from the period from 2005 to 2010 for which we can obtain (i) dual CEO-Chairman and CEO power data, and (ii) CEO political connections to the ruling party data. In untabulated tests, we find that our results are qualitatively similar after partitioning firms into high and low CEO power and high and low political connection groups.

Third, we replicate our tests after partitioning firms into non-SOE and SOE groups. We find that for non-SOE firms, *Firm pay gap* is positive and significant in regressions where the dependent variable is set to either *ROA* or *Margin* (but not for tests where the dependent variable is *Growth*). In contrast, tests for the SOE group indicate that *Firm pay gap* is positively and significantly related to *Growth*, but not the other performance measures. This finding is consistent with the differences in the objective function for SOE and non-SOE firms, and thus their demand for executive skills and talents. The Chinese government seeks to have greater recognition in the world of business and has been encouraging rapid growth for many of its SOEs. By contrast, private firms seek to be more profitable. This is also consistent with a report by the Chinese State-Owned Assets Supervisor and Administration Commission (SASAC, 2004), which states that SOE managers

should be highly incentivized to focus on increasing scale rather than profitability—about 50% of executive salary is typically linked to growth targets, 10% to profitability targets, and 40% to firm-specific characteristics such as operating complexity.

Panel A of Table 5 presents regressions of performance on pay gap and Panel B presents results regressing performance on components of pay gap with firms partitioned into manufacturing and other (non-manufacturing) industry groups. To the extent that the use of unskilled Chinese labour is concentrated in manufacturing industries, the predominance of manufacturing firms in our sample could be driving our results. First, Panel A reports results from regressions of the relation between the *Firm pay gap* and performance. Columns 1 and 2 report results using ROA_{t+1}, 3 and 4 using $Margin_{t+1}$, and 5 and 6 using $Growth_{t+1}$ to measure performance. The first column for each performance measure displays results for tests using manufacturing firms and the second for non-manufacturing firms. Results for both groups of firms indicate that the *Firm pay gap* is positive for all specifications and statistically significant at conventional levels for ROA_{t+1} in both partitions (manufacturing firms coefficient = 0.03, *t*-statistic = 2.28; other firms coefficient = 0.05, *t*-statistic = 2.43) and for $Margin_{t+1}$ for the manufacturing firm partition (coefficient = 0.14, *t*-statistic = 2.61). Results for control variables are consistent with earlier findings reported in Table 3 for the full sample.

Panel B of Table 5 reports results of tests of the relation between pay gap components and firm performance. Coefficients for *Executive pay premium* remain positive and statistically significant for all sub-sample specifications, indicating that the positive effect of executive talent for firm performance is not driven by manufacturing or other industry groupings. Next, we observe a positive relation between manufacturing firms and ROA_{t+1} and $Margin_{t+1}$ for *Employee pay premium*, but a negative relation for non-manufacturing firms, consistent with our expectations. In both subsamples, coefficients for $Growth_{t+1}$ are negative, and all but one of the coefficients for all measures of performance are statistically insignificant. Overall, these results also indicate that the main driver of performance is executive talent. Coefficients for control variables are largely consistent with earlier results. Book-to-market is positively related to ROA_{t+1} and negatively related to $Margin_{t+1}$. Both *SOE_Dummy* and *Foreign_Dummy* are negatively related to all measures of performance for both partitions (with the exception of *SOE_Dummy* and $Growth_{t+1}$ for the non-manufacturing sub-sample where the coefficient is positive and significant at 10%).

The next set of results in Table 6 considers whether differences in labour costs across coastal and inland provinces affect the pay gap and performance relation documented above. Coastal provinces have experienced relatively greater blue-collar wage increase demands and inflationary pressure over the sample period compared to inland provinces.[22] Greater wage increases in coastal regions could mechanically

[22] A recent article in *The Economist* notes: 'Labour costs have surged by 20% a year for the past four years … China's coastal provinces are losing their power to suck workers out of the hinterland' and 'Labour costs (including benefits) for blue-collar workers in Guangdong rose by 12% a year, in dollar terms, from 2002 to 2009; in Shanghai, 14% a year.' (*The Economist*, 'The end of cheap China', March 10, 2012).

TABLE 5

PAY GAP AND PERFORMANCE BY MANUFACTURING AND OTHER FIRMS

Panel A: Firm pay gap and performance, partitioned by manufacturing and other firms

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA_{t+1}		$Margin_{t+1}$		$Growth_{t+1}$	
	Manufacturing firms	Other firms	Manufacturing firms	Other firms	Manufacturing firms	Other firms
Firm pay gap_t	0.03** (2.276)	0.05** (2.427)	0.14*** (2.613)	0.15 (1.435)	0.16 (1.563)	0.26 (1.451)
Book-to-$market_t$	4.67*** (2.833)	4.91** (2.311)	–20.36*** (–3.344)	–6.15 (–0.719)	–50.94*** (–5.387)	–76.06*** (–4.012)
Firm $size_t$	–0.09 (–1.020)	–0.24* (–1.839)	0.26 (0.724)	–0.04 (–0.061)	0.74 (0.936)	–0.34 (–0.223)
Adjusted $returns_{t-1,\ t}$	0.61*** (4.842)	0.12 (0.752)	1.80*** (5.538)	0.38 (0.558)	7.56*** (4.927)	5.53*** (3.010)
SOE_Dummy_t	–0.65*** (–3.529)	–0.63** (–2.428)	–1.99*** (–2.839)	–3.03*** (–2.676)	–2.41 (–1.407)	4.74* (1.694)
$Foreign\_Dummy_t$	–0.55 (–1.076)	–0.30 (–0.474)	0.27 (0.122)	–9.48 (–1.378)	–7.11** (–2.398)	–9.50** (–2.040)
ROA_t	0.49*** (20.377)	0.33*** (8.465)				
$Margin_t$			–0.03 (–1.235)	–0.00 (–0.017)		
$Growth_t$					0.01 (0.747)	–0.01 (–1.125)
Constant	4.51** (2.410)	7.80*** (2.759)	2.67 (0.357)	10.40 (0.696)	105.48*** (5.649)	129.53*** (3.982)
Year fixed effects	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES
Observations	3,911	1,924	3,911	1,924	3,911	1,924
R-squared	0.34	0.20	0.07	0.07	0.04	0.08

TABLE 5

CONTINUED

Panel B: *Pay gap components and performance, partitioned by manufacturing and other firms*

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA_{t+1}		$Margin_{t+1}$		$Growth_{t+1}$	
	Manufacturing firms	Other firms	Manufacturing firms	Other firms	Manufacturing firms	Other firms
Executive pay premium$_t$	0.54*** (6.641)	0.37*** (3.693)	1.67*** (6.399)	1.60*** (3.842)	1.52*** (3.349)	2.60*** (3.207)
Employee pay premium$_t$	0.07 (1.390)	–0.03 (–1.190)	0.44* (1.663)	–0.10 (–0.624)	–0.13 (–0.851)	–0.44 (–1.534)
Industry pay gap$_t$	0.15 (1.291)	0.39*** (2.962)	–0.15 (–0.432)	1.29** (2.311)	–0.30 (–0.307)	0.57 (0.368)
Book-to-market$_t$	3.79** (2.485)	5.12** (2.434)	–21.51*** (–3.309)	–5.03 (–0.590)	–50.84*** (–5.211)	–72.76*** (–3.935)
Firm size$_t$	–0.30*** (–3.270)	–0.38*** (–2.733)	–0.45 (–1.307)	–0.70 (–0.989)	0.24 (0.286)	–1.21 (–0.763)
Adjusted returns$_{t-1,\ t}$	0.60*** (4.835)	0.14 (0.859)	1.64*** (5.371)	0.43 (0.635)	7.45*** (4.835)	5.91*** (3.212)
SOE_Dummy$_t$	–0.64*** (–3.549)	–0.58** (–2.251)	–1.89*** (–2.975)	–2.71** (–2.388)	–2.56 (–1.508)	5.37* (1.868)
Foreign_Dummy$_t$	–0.85 (–1.584)	–0.43 (–0.904)	–0.51 (–0.228)	–9.99* (–1.686)	–7.80*** (–2.695)	–10.01* (–1.747)
ROA_t	0.46*** (19.018)	0.32*** (8.026)				
$Margin_t$			–0.04 (–1.417)	–0.00 (–0.087)		
$Growth_t$					0.01 (0.745)	–0.00 (–0.862)
Constant	7.78*** (3.928)	8.86*** (3.150)	16.32** (2.212)	17.52 (1.184)	116.37*** (6.011)	143.09*** (4.353)
Year fixed effects	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES
Observations	3,911	1,924	3,911	1,924	3,911	1,924
R-squared	0.35	0.21	0.10	0.08	0.04	0.09

Table 5 reports results from tests of the relation between firm performance and pay gap during the period 2000–2009. Panel A reports results for tests of the relation between firm pay gap and firm performance. Panel B reports results for tests of the relation between the pay gap decomposition variables and performance. In both panels, firms are partitioned into manufacturing and other (non-manufacturing) groups, based on their primary industry classification. All regressions include standard errors clustered by firm and year and include year and industry fixed effects. *t*-statistics are in brackets.
*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All variables are defined in Appendix A.

TABLE 6

PAY GAP AND PERFORMANCE BY LOCATION

Panel A: *Firm pay gap and performance, partitioned by coastal and inland province location*

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA_{t+1}		$Margin_{t+1}$		$Growth_{t+1}$	
	Coastal firms	Inland firms	Coastal firms	Inland firms	Coastal firms	Inland firms
Firm pay gap_t	0.04* (1.947)	0.04** (2.461)	0.08 (0.827)	0.16*** (3.005)	0.16 (1.044)	0.24** (2.411)
Book-to-$market_t$	4.12 (1.012)	5.17*** (3.401)	–45.53*** (–3.629)	–12.98** (–2.561)	–79.90*** (–4.542)	–54.16*** (–5.870)
Firm $size_t$	–0.20 (–1.436)	–0.09 (–1.098)	0.91 (1.387)	–0.26 (–0.679)	1.40 (1.413)	0.18 (0.179)
Adjusted $returns_{t-1,\ t}$	0.43** (2.068)	0.49*** (4.326)	1.33* (1.822)	1.37*** (3.882)	9.46*** (2.844)	6.23*** (5.367)
SOE_Dummy_t	–0.48 (–1.469)	–0.64*** (–3.799)	–3.02** (–2.009)	–2.08*** (–3.109)	–0.10 (–0.041)	–0.74 (–0.442)
$Foreign\_Dummy_t$	0.37 (0.601)	–1.03 (–1.539)	–2.12 (–0.660)	0.13 (0.041)	–2.77 (–0.731)	–9.47** (–2.488)
ROA_t	0.46*** (9.703)	0.44*** (18.876)				
$Margin_t$			–0.00 (–0.136)	–0.02 (–0.920)		
$Growth_t$					0.03 (1.194)	–0.01 (–1.366)
Constant	7.29** (2.344)	4.68** (2.563)	–6.39 (–0.463)	13.78* (1.681)	91.41*** (4.305)	118.80*** (5.240)
Year fixed effects	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES
Observations	1,306	4,529	1,306	4,529	1,306	4,529
R-squared	0.32	0.28	0.09	0.07	0.08	0.05

TABLE 6

CONTINUED

Panel B: *Pay gap components and performance, partitioned by coastal and inland province location*

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA_{t+1}		$Margin_{t+1}$		$Growth_{t+1}$	
VARIABLES	Inland firms	Coastal firms	Inland firms	Coastal firms	Inland firms	Coastal firms
Executive pay premium$_t$	0.65*** (7.679)	0.27*** (2.721)	1.99*** (7.491)	1.10*** (3.200)	2.51*** (5.321)	0.58 (0.837)
Employee pay premium$_t$	0.02 (0.470)	0.04 (1.092)	0.30 (1.187)	0.10 (0.845)	–0.13 (–0.750)	–0.55** (–2.017)
Industry pay gap$_t$	0.27*** (2.855)	0.11 (0.556)	0.49 (1.469)	0.62 (0.792)	0.50 (0.455)	–0.82 (–0.531)
Book-to-market$_t$	4.65*** (3.204)	3.85 (0.951)	–13.29** (–2.545)	–46.35*** (–3.788)	–52.43*** (–5.611)	–79.69*** (–4.501)
Firm size$_t$	–0.31*** (–3.439)	–0.30** (–2.042)	–0.95** (–2.485)	0.33 (0.519)	–0.49 (–0.466)	1.46 (1.351)
Adjusted returns$_{t-1,\ t}$	0.48*** (4.315)	0.43** (2.051)	1.25*** (3.694)	1.31* (1.813)	6.16*** (5.302)	9.39*** (2.799)
SOE_Dummy$_t$	–0.60*** (–3.644)	–0.51 (–1.572)	–1.95*** (–3.109)	–2.88* (–1.942)	–0.79 (–0.477)	–0.14 (–0.058)
Foreign_Dummy$_t$	–1.22* (–1.733)	0.23 (0.381)	–0.34 (–0.111)	–3.01 (–0.931)	–10.00** (–2.547)	–2.95 (–0.778)
ROA_t	0.41*** (17.740)	0.45*** (9.263)				
$Margin_t$			–0.02 (–1.062)	–0.01 (–0.237)		
$Growth_t$					–0.01 (–1.112)	0.03 (1.227)
Constant	7.22*** (3.886)	8.58*** (2.739)	23.43*** (2.936)	0.98 (0.073)	128.05*** (5.657)	94.95*** (4.368)
Year fixed effects	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES
Observations	4,529	1,306	4,529	1,306	4,529	1,306
R-squared	0.30	0.33	0.09	0.09	0.04	0.08

Table 6 reports results from tests of the relation between firm performance and pay gap during the period 2000–2009. Panel A reports results for tests of the relation between firm pay gap and firm performance. Panel B reports results for tests of the relation between the pay gap components and performance. In both panels, firms are partitioned into coastal and inland province groups, based on their primary place of business. All regressions include standard errors clustered by firm and year and include year and industry fixed effects. *t*-statistics are in brackets.

*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All variables are defined in Appendix A.

reduce the *Firm pay gap*. Alternatively, workers enjoying large wage increases may exhibit greater morale and productivity. Panels A and B present regressions of performance on pay gap and its components respectively, with firms being partitioned by coastal or inland location. Results in Panel A for *Firm pay gap* show a consistent positive relation between pay gap and performance for all sub-samples and significant at the 5% level for all inland sub-samples. This result is again inconsistent with predictions from sociology, and may be better understood by examining the components of pay gap.

In Panel B we examine how each of the *Firm pay gap* components affects performance for the coastal and inland firm sub-samples. The results once again indicate that the *Executive pay premium* is the dominant driver of the relation between pay gap and performance. All coefficients are positive and significant at the 1% level in five of the six specifications. We find no evidence that a larger *Employee pay premium* increases firm performance, and in fact, a larger *Employee pay premium* for coastal firms seems to be linked to lower $Growth_{t+1}$ (Column 6; coefficient = –0.55, *t*-statistic = –2.02). In sum, the evidence in Table 6 indicates that location-level wage differences do not affect our main results and, in fact, provide further evidence that the performance and pay gap relation is driven by wage premiums for executive talent.

Alternative Empirical Approach to Examine the Pay Gap and Performance Relation
We consider an alternative empirical approach to validate our primary tests. Some evidence in prior sociology studies suggests that perceptions of pay gap inequality are affected by deviations from *expected* pay gap rather than the actual pay gap (Cowherd and Levine, 1992; Baron and Pfeffer, 1994; Bloom, 1999). These studies argue that low-level employees rationally expect to observe differences between their own wages and those of executives, and thus perceptions of fairness and equality are based on *deviations* from the expected pay gap. Positive deviations result in a greater perception of inequality and are associated with reduced productivity and employee morale suggesting a negative relation between larger-than-expected deviations from pay gap and performance. In contrast, managerial talent and matching theory from economics suggest that positive deviations from expected pay represent wage premiums for talented managers, suggesting a positive relation between larger-than-expected deviations from pay gap and performance.

In order to calculate deviations from expected pay gap, we first need estimates of the expected pay gap. We obtain estimates of pay gap by regressing *Firm pay gap* on its determinants using the following specification:

$$Firm\ pay\ gap_{i,t+1} = \alpha + \beta X_{i,t} + e_{i,t} \quad (4)$$

where X includes variables to capture the firm's investment opportunity set, measured using *Book-to-market*, *Firm size*, *Adjusted returns*, *ROA*, and indicator variables for the presence of state and foreign ownership (*SOE_Dummy* and *Foreign_Dummy* respectively), as well as year and industry fixed effects. Estimation results for equation (4) are presented in Table 7, Column 1. Consistent with

TABLE 7

PERFORMANCE AND DEVIATIONS FROM EXPECTED PAY GAP

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Firm pay gap$_t$	ROA$_{t+1}$	Margin$_{t+1}$	Growth$_{t+1}$	ROA$_{t+1}$	Margin$_{t+1}$	Growth$_{t+1}$
Pay gap residual$_t$		0.13*** (3.391)	0.76*** (5.166)	1.14** (2.104)			
Pay gap positive Residual$_t$					0.14*** (3.342)	0.81*** (5.660)	1.25** (2.123)
Pay gap negative Residual$_t$					–0.10* (–1.506)	–0.48 (–1.105)	–1.48 (–1.090)
Book-to-market$_t$	11.49*** (2.965)	4.61*** (3.667)	–5.89 (–0.986)	–124.06*** (–5.272)	4.57*** (3.625)	–6.14 (–1.037)	–124.58*** (–5.326)
Firm size$_t$	0.90*** (3.865)	–0.10 (–1.180)	0.07 (0.221)	–0.79 (–0.554)	–0.10 (–1.206)	0.04 (0.133)	–0.86 (–0.600)
Adjusted returns$_{t-1,\ t}$	–0.05 (–0.017)	0.56*** (5.147)	1.25*** (4.130)	13.21*** (7.306)	0.56*** (5.125)	1.23*** (4.025)	13.16*** (7.263)
SOE_Dummy$_t$	–2.05*** (–4.894)	–0.44** (–2.533)	–1.07 (–1.492)	–7.50*** (–2.702)	–0.44** (–2.463)	–0.96 (–1.319)	–7.41*** (–2.631)
Foreign_Dummy$_t$	1.35 (0.910)	–0.27 (–0.433)	–3.66 (–1.258)	–17.79*** (–3.297)	–0.27 (–0.437)	–3.71 (–1.273)	–17.84*** (–3.300)
ROA$_t$	0.14*** (4.289)	0.54*** (23.751)			0.54*** (23.687)		
Margin$_t$	–2.05*** (–4.894)		0.08** (2.504)			0.08** (2.491)	
Growth$_t$	1.35 (0.910)			–0.00** (–2.035)			–0.00** (–2.043)
Constant	–13.37** (–2.344)	4.50*** (2.687)	4.95 (0.759)	251.94*** (8.748)	4.53*** (2.696)	5.30 (0.808)	252.82*** (8.751)
Year industry fixed Effects	YES	YES	YES	YES	YES	YES	YES
Observations	5,835	5,835	5,835	5,835	5,835	5,835	5,835
R-squared	0.41	0.42	0.16	0.06	0.42	0.17	0.06

Table 7 presents results for tests of deviations from expected pay gap on performance. Column 1 presents results for a regression of *Firm pay gap* on its determinants. Columns 2–7 present results from tests of the relation between one period ahead performance and the residual value of *Firm pay gap*, where the residual is calculated as the difference between the actual and expected *Firm pay gap* at the firm-year level over the period 2000–2009. Expected pay gap is calculated using coefficients from a regression of *Firm pay gap* on its determinants. All regressions include standard errors clustered by firm and year and include year and industry fixed effects.

*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. Variables are defined in Appendix A.

expectations, *Book-to-market*, *Firm size* and *ROA* are all positively and significantly associated with *Firm pay gap*. *SOE_Control* is negatively associated with *Firm pay gap*, consistent with government objectives to limit pay gaps. *Foreign_Dummy* is positively but insignificantly associated with *Firm pay gap*. The adjusted *R*-square from the regression is 0.41 suggesting our model explains pay gap reasonably well.

Next, we use the results from equation (4) to calculate firm-year expected pay gap estimates. The residual pay gap is then calculated as the actual *Firm pay gap* less the expected *Firm pay gap*. We follow prior work (e.g., Ittner *et al*., 2003; Rajagopal and Srinivasan, 2006; Wade *et al*., 2006) and create variables to capture the absolute level of deviation (*Pay Gap Deviation*) as well as separate variables for positive deviation (*Pos Pay Gap Deviation*) and negative deviation (*Neg Pay Gap Deviation*). We then estimate the following specifications:

$$Performance_{i,t+1} = \alpha + \beta Pay\ Gap\ Deviation_{i,t} + gX_{i,t} + e_{i,t} \tag{5}$$

and:

$$\begin{aligned} Performance_{i,t+1} = {} & \alpha + \beta_1 Pos\ Pay\ Gap\ Deviation_{i,t} \\ & + \beta_2 Neg\ Pay\ Gap\ Deviation_{i,t} + gX_{i,t} + e_{i,t} \end{aligned} \tag{6}$$

Table 7, Columns 2 to 7 present empirical results for tests of equations (5) and (6) for *Performance* measured as one of one-period ahead ROA_{t+1}, $Margin_{t+1}$, and $Growth_{t+1}$ respectively. Evidence in Columns 2, 3, and 4 presents results estimating equation (4). We find *Pay Gap Deviation* is positively and significantly associated with all three performance measures, consistent with economic theories that suggest a positive relation between pay gap deviation and performance. Next, in Columns 5, 6, and 7, we present results estimating equation (6) where we decompose *Pay Gap Deviation* into *Pos Pay Gap Deviation* and *Neg Pay Gap Deviation*. The results are again consistent with economic theories of managerial talent and matching: *Pos Pay Gap Deviation* is positively and significantly associated with *ROA*, *Margin,* and *Growth* suggesting greater than expected pay gaps are associated with better future performance. In contrast, *Neg Pay Gap Deviation* displays no significant relation to any of the performance measures. Firms with pay gaps smaller than expected do not appear to be paying premiums to hire the most talented executives. In sum, the evidence in Table 7 is consistent with our primary findings, and provides support for economic theories of executive talent and matching.[23]

Robustness Check with Controls for Corporate Governance Attributes

A large body of work shows that a firm's corporate governance attributes affect firm performance (Core *et al*., 1999). We replicate our tests for a sub-sample of firms for

[23] In additional sensitivity tests, we check that our results hold when using a 2SLS approach. In the first stage, we instrument for pay gap using two-period lagged values of pay gap. Untabulated regression results indicate that our main results are robust to this alternate specification to address potential endogenity concerns.

which we can obtain firm-specific corporate governance and detailed leverage data.[24] Consistent with prior work, we expect a positive relation between firm performance and corporate governance quality. Our corporate governance controls capture the total number of executives on the board (*Number of Executives*), the average executive age (*Executive Age*), the proportion of non-executive directors on the board (*Board Independence*), and the number of times the board met during the calendar year (*Board Meetings*). We also include a control for firm leverage (*Leverage*). To save space, we do not present the detailed regression results in our paper.

Additional Results for a Sample of US Firms

While our use of a sample of Chinese firms for the primary tests provides a setting that is conducive to sociological theories of equity and distributive justice, we replicate our tests using a sample of US firms to validate the robustness of our findings. The capitalist history and culture in the US setting provides possibly weaker support for the predicates of sociological theories. This is consistent with anecdotal evidence: *New York Times* and *Business Week* articles suggest that relative well-being has been relatively unimportant for American workers over the past decade: employees appear to expect and accept wage cuts and reduced benefits while observing increases in executive compensation.[25] Further, the market for executive talent is better developed in the US than in China, which allows firms to more easily identify and reward talented managers. A recent report (AON, 2008) notes that nearly 60% of US firms face a shortage of skilled executives. We therefore expect a positive relation between pay gap and performance, and expect that the relation be driven by premiums paid for executive talent rather than for skilled labour.[26]

A limitation with the US firm data is that employee wage expense and employee count disclosures are not mandated, significantly reducing the sample size and potentially introducing a sample selection bias. We create our sample by merging data from Compustat, C/R/S/P, and Execucomp. After deleting observations missing financial accounting, stock return, executive pay, or employee pay data, our dataset consists of 3,747 firm-year observations, of which approximately 50% represent financial services firms. Accordingly, our tests for US firms are partitioned into financial and non-financial firms. The sample period is identical to that used for our main tests: from 2000 to 2009.

[24] We do not include these variables in our primary tests because of the substantial decrease in the number of observations: we can obtain corporate governance data and leverage data for only about 65% of our full sample (i.e., 3,785 observations).

[25] For example, see Greenhouse (2008), http://www.nytimes.com/2008/08/04/business/economy/04paycuts.html; and Herbst (2009), http://www.businessweek.com/bwdaily/dnflash/content/jul2009/db20090710_255918.htm

[26] We note that compensation disclosures for the top five highest paid executives in industries such as Financial Services often include non-C-level executives. We assume that the top five highest paid executives (regardless of position) are remunerated because of their influence and ability to affect firm performance.

Panel A in Table 9 presents regressions of firm performance on pay gap, with partitions into Financial Services and Non-financial Services sub-samples. The relation between *Firm pay gap* and performance is positive for all performance measures and significant for ROA_{t+1} and $Growth_{t+1}$ in the Financial Services partition (ROA_{t+1} coefficient = 0.39, *t*-stat = 1.768; $Growth_{t+1}$ coefficient = 0.09, *t*-stat = 2.24). Results from tests for the Non-financial Services partition display similar results for all performance measures. Coefficients for $Margin_{t+1}$ and $Growth_{t+1}$ are positive and significant ($Margin_{t+1}$ coefficient = 0.95, *t*-stat = 2.31; $Growth_{t+1}$ coefficient = 0.09, *t*-stat = 3.10). Coefficients for *Firm size*$_t$ and *Book-to-market*$_t$ are negative for all performance measures across both partitions, consistent with smaller firms being more profitable and enjoying more growth opportunities than larger firms. The coefficient for *Adjusted returns*$_{t-1,t}$ is positive for all tests, consistent with market participants impounding good news into prices before that information is reflected in accounting reports. In sum, the results do not provide support for sociological theories that predict a negative relation between pay gap and performance.

Our results for US firms are largely consistent with results for our primary Chinese sample. *Firm pay gap* is positively related to performance, and this effect appears to be primarily driven by compensation premiums for executive talent.

CONCLUSION

We investigate an issue that has received much recent attention in the media and has been the subject of political scrutiny leading to new reporting requirements under the Dodd–Frank Act. Popular press articles argue the pay gap between executives and employees in a firm is excessive, resulting in a detrimental effect on a firm's performance. We specifically focus on the relation between the pay gap and firm performance and test competing theories about executive and employee pay that can explain the pay gap–performance relation. On one hand, the pay gap may be higher due to wage premiums for talented executives who can generate relatively better firm performance, consistent with economic theories of matching (Mortensen and Pissarides, 1994; Pissarides, 2000) and managerial talent (Rosen, 1982). Alternatively, the pay gap may be lower due to wage premiums for skilled human capital at lower levels of the organization, consistent with efficiency wage theory (Lazear and Rosen, 1981; Raff and Summers, 1987), in which case the pay gap is negatively related to performance. If higher wages are unrelated to employee skills and ability, it would imply that employees are overpaid and the pay gap–performance relation would be the opposite. On balance, economic theories predict a positive relation between pay gap and performance when executive talent is scarce and employee labour is abundant. In contrast, sociological theories of equity and relative deprivation suggest that larger pay gaps lead to decreased levels of employee morale and motivation, reducing productivity and firm performance.

In this paper, we test the contrasting theories that explain the pay gap–performance relation using a sample of Chinese firms. China's socialist background and the cultural importance placed on social equity provides us with a setting that is

likely to provide strong support for the theoretical arguments in sociology underlying social equity and fairness that predict a negative relation between pay gap and performance. At the same time, the high growth opportunities in China also create a strong demand for scarce executive talent, supporting the assumptions of the economic theories that predict a positive relation.

Our empirical results provide strong evidence that the wage premiums for talented executives, rather than for employees, drive the pay gap–performance relation. This result is surprising given China's social and political climate demands a smaller pay gap but is consistent with China's rapid commercial and economic growth that creates a scarcity of executive talent. We find no evidence that wage premiums for employees (which reduces the pay gap) improves performance for firms in China. In additional robustness tests, we consider whether industry- or province-level effects could drive our results and find that our principal results hold for all sub-samples of manufacturing or other firms and coastal or interior Chinese locations. We also find our results are robust to the use of an alternative approach to examine the performance and pay gap relation, which relies on the estimation of deviations from expected pay gap values, as well as the inclusion of governance quality variables for a sub-sample of firms with available data. Finally, we replicate our main tests using a sample of US firms for which we can obtain employee pay data. We find evidence once again in support of economics-based arguments that explain the positive relation between pay gap and performance relation.

Our study is one of the first to provide empirical evidence on how pay gap positively affects performance, and how economic theory can explain the positive relation between pay gap and performance. Our findings suggest that media and business press reports about the adverse effects of pay gap are unfounded, and from an economic efficiency viewpoint, economic theories are validated by empirical tests. We note, however, that researchers need to carefully consider the impact of both cultural and economic factors and the implications of these factors in the choice of research setting, theoretical predictions, and design of empirical tests.

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APPENDIX A

VARIABLE DEFINITIONS

Variable Name	Definition
Firm pay gap$_t$	Calculated as (*Meanexecpay* / *Meanemppay*) where *Meanexecpay* is the sum of salary, bonus, and all other compensation for all executives in firm *i* during year *t* divided by the total number of executives for the firm during year *t*, and calculated as (CSMAR Y1501a$_{i,t}$ / (Y1101a$_{i,t}$ – Y1101b$_{i,t}$ + Y1201a$_{i,t}$ + Y1301b$_{i,t}$)). Mean employee expense is the sum of total salary expense net of executive compensation scaled by total employees, net of executives and directors, measured as [(CSMAR # ((A002112000$_{i,t}$ – A002112000$_{i,t-1}$) + ((C001020000$_{i,t}$ – Y1501a$_{i,t}$) / (Y0601b$_{i,t}$ – Y1101a$_{i,t}$ + Y1201a$_{i,t}$ + Y1301b$_{i,t}$ – Y1101b$_{i,t}$))].
Executive pay premium$_t$	Calculated as *Meanexecpay* for a firm relative to the median of corresponding mean values of *Meanexecpay* measured across all firms in its industry.
Employee pay premium$_t$	Calculated as *Meanemppay* for a firm relative to the median of corresponding mean values of *Meanemppay* measured across all firms in its industry.
Industry pay gap$_t$	Calculated as the ratio of the industry median *Meanexecpay* and industry median *Meanemppay*.
Total assets$_t$ ($m RMB)	(CSMAR # A001000000).
Book-to-market$_t$	Calculated as book value of equity divided by the market value of equity, both calculated in year *t* and measured as (CSMAR # T61701).
Annual return$_{t-1,\ t}$	Calculated as a firm's stock return from *t*–1 to *t* less the value-weighted market return over the same period.
SOE_Dummy$_t$	An indicator variable set to 1 if the firm is classified as state-owned or controlled and 0 otherwise.
Foreign_Dummy$_t$	An indicator variable set to one if the firm has foreign ownership, and zero otherwise.
ROA$_t$	Calculated as net income scaled by total assets (CSMAR # B002000000 / A001000000).
Margin$_t$	Calculated as net income scaled by total sales (CSMAR # B002000000 / B001101000).
Growth$_t$	Calculated as the sum of asset growth and sales growth from *t* to *t* + 1, and calculated as [((((CSMAR A001000000 / A001000000) – 1) + ((B001101000 / B001101000)) – 1)].