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SAME OR DIFFERENT? THE CEO LABOUR MARKET IN CHINA'S PUBLIC LISTED COMPANIES*

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Using linked employer–employee data for all China's public listed firms over the period 2001–10, we find top executive compensation exhibits many of the traits familiar in the Western literature, although sometimes in a more muted way, and with some clear exceptions. We also find a role for managerial power in executive pay setting which may reflect the recency of the stock market and regulations underpinning corporate governance. Nevertheless, there appear to be some elements of executive compensation which transcend national economic, political and cultural differences. The implication is that the Western model is not as idiosyncratic as critics suggest.

A great deal is known about the nature and operation of executive labour markets in Western developed economies. Most of the empirical literature on the payment of chief executive officers (CEOs) and other top executives are based on markets in the US and a handful of European countries, most notably the UK (Murphy, 1999; Conyon *et al.*, 2013). These studies have identified a number of empirical regularities, such as the elasticity of executive pay with respect to firm size, which are consistent with the early work reviewed by Rosen (1990). But to what extent might we expect these findings to generalise to China, fast becoming one of the dominant forces in the global economy? The answer is unclear *a priori*. On the one hand, China is a Communist regime in which the state continues to own a substantial stake in the largest firms. Therefore, one might expect that theories about market-based economies should not apply in China. On the other hand, China is moving rapidly towards a capitalist market-oriented economy, albeit under the stewardship of the Communist Party.

We address this issue using linked employer–employee data for all China's public listed firms over the period 2001–10. We find that the compensation for top executives in China responds to market factors in much the same way as it does in Western economies, although the pay–performance elasticities are lower than those typically found in the US. Privatisation has contributed to growth in executive compensation, and there are steep gradients in executive compensation within firms which are consistent with tournament prizes. We find a role for managerial power in executive pay setting, which may reflect the relative youth of the stock market and the regulations underpinning corporate governance. Nevertheless, there appears to be something about executive jobs and how they are managed which transcends national economic, political and cultural differences.

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The remainder of this article is set out as follows. Section 1 describes the institutional background to executive compensation in China focusing on executives in public listed companies. Section 2 identifies the hypotheses that are tested with the data described in Section 3. Section 4 presents results, before we present our conclusions in Section 5.

1. Background

As Xu (2011, p. 1117) points out when describing the growth and development of the Chinese economy: 'The most important non-state sector until the mid-1990s was the Township-Village Enterprises… [which]… accounted for about four-fifths of the output of the non-state sector'. Although these collectively owned enterprises continue to play an important role in production, the public listed sector has been the engine of China's economic growth for over a decade. The number of public listed companies on China's Shanghai and Shenzhen Stock Exchanges rose from 53 in 1992 to 2,126 in 2010. In 2001, the public listed sector accounted for 14% of China's GDP. However, over the decade to 2010 the total output of the public listed sector increased nearly eightfold such that, by 2010, it accounted for 43% of China's GDP. Roughly two-fifths of this growth was accounted for by firms that were already listed in 2001, with newly listed firms accounting for the remainder (Table 1).

Table 1

Size and Characteristics of the Chinese Public Listed Sector

	2001	2010	Ratio 2010:2001
China GDP (RMB, billions, 2001 prices)	10,966	27,409	2.5
Market capitalisation of listed sector as % of GDP	40	81	2.1
All listed firms, 2001–10			
Number of firms	1,163	2,126	1.83
Total output (RMB, billions, 2001 prices)	1,543	11,860	7.68
Output as % of GDP	14	43	3.07
Percentage of firms majority owned by state	84	45	0.53
Percentage of output accounted for by state-owned firms	92	82	0.89
Percentage of employment accounted for by state-owned firms	91	73	0.80
Ever-present firms, 2001–10			
Number of firms	1,097	1,097	1.0
Total output (RMB, billions, 2001 prices)	1,460	5,808	3.98
Output as % of GDP	13	21	1.59
Percentage of firms majority owned by state	85	61	0.71
Percentage of output accounted for by state-owned firms	92	82	0.89
Percentage of employment accounted for by state-owned firms	91	70	0.77
Entrants after 2001 which are present in 2010			
Number of firms	–	1,029	
Total output (RMB, billions, 2001 prices)	–	6,052	
Percentage of firms majority owned by state	–	28	
Percentage of output accounted for by state-owned firms	–	81	
Percentage of employment accounted for by state-owned firms	–	75	

Notes. Figures are authors' calculations from the CSMAR data described in the text. The exceptions are China's GDP (source: IMF World Economic Outlook Database) and market capitalisation (source: World Bank Development Indicators). The bottom panels of the Table omit 66 firms that were present in 2001 but exited before 2010 and 5 firms that entered and exited between 2002 and 2010.

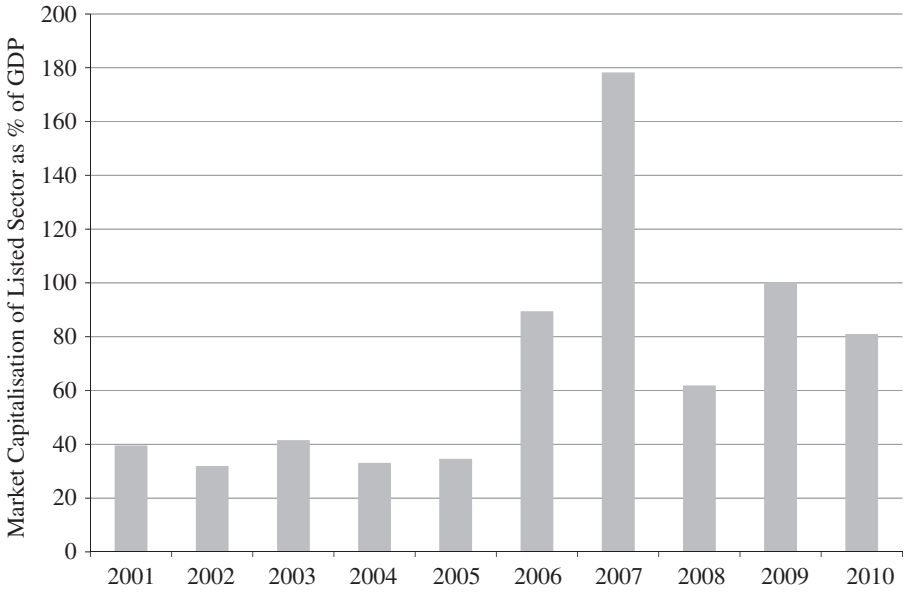

Fig. 1. *Market Capitalisation of Chinese Listed Firms, 2001–10*
Notes. Authors' calculations from data supplied by World Bank (market capitalisation) and IMF (GDP).

Market capitalisation rose from 35% of China's GDP in 2005 to 179% in 2007 (Figure 1). This was followed by a stock market crash in late 2007, at the same time as the US stock market started to falter and shortly before the onset of recession in the US.[1] Although there has been some recovery since then, the markets have not returned to their pre-crash levels. By 2010, the market capitalisation of the listed sector stood at 81% of China's total GDP.

But this is a public listed sector with distinctly non-Western features. Most importantly, almost half (45%) of listed firms were majority state owned in 2010 and these state-owned listed companies accounted for four-fifths (82%) of the output and three-quarters (73%) of employment in the sector (Table 1). They include two huge state-owned companies: China Petroleum and Chemical Corporation accounted for between 10 and 20% of annual output in the listed sector over the decade to 2010, whereas PetroChina Company, has accounted for 8–10% of the sector's total output in each year since it listed on the Shanghai Exchange in 2007. It could be said, therefore, that the state continues to control the 'commanding heights' of the economy, so that the principal–agent issues underpinning the owner–CEO relationship may differ fundamentally in China compared with those that obtained in the West, where the principal(s) are usually a disparate set of private shareholders. Furthermore, the environment in which listed firms operate is quite different from the environment facing corporations in the West. The state plays a major role in

[1] The National Bureau of Economic Research (2008) dates the onset of the US recession to December 2007.

corporate affairs, even when it is not the direct owner: as a regulator, as a major buyer of goods and services and as the chief source of capital and infrastructural investment.

Partly because of its direct ownership stakes, and partly because of its pervasive influence over corporate matters, the Communist Party is able to play an important role in the recruitment and promotion of CEOs and other top executives. It does so directly both through its position on appointment and promotion committees, and by recruiting executives to the higher echelons of the Communist Party (Li *et al.*, 2007; Cao *et al.*, 2012); it does so indirectly by setting the rules governing the compensation of executives. This last role is performed by the China Securities Regulatory Commission (CSRC). The regulator stipulates what can and cannot be done by firms in relation to the compensation methods they are allowed to adopt and the rules they must abide by in corporate governance matters.

Against this backdrop we might not expect to find much evidence of a market for executive talent in China. However, there are good reasons to suspect that there could be movement towards such a market. First, the state has embarked upon a large-scale privatisation programme which has entailed its withdrawal from large parts of the economy. This is apparent in the public listed sector where the percentage of firms in existence since 2001 that are majority owned by the state has fallen by a half (Table 1). State ownership is also in decline because majority state ownership is less common among new firms: just over one-quarter (28%) of those listed since 2001 are majority state owned. Second, the state has actively encouraged the adoption of incentive contracts for CEOs and other top executives. This began in the mid-1980s when the state began to experiment with an array of managerial incentives to accompany the gradual withdrawal of the state from its ownership of corporate enterprises (Xu, 2011). According to Groves *et al.* (1995, p. 874), the state introduced reforms 'directed at improving the efficiency of enterprises by replacing direct control from above with managerial incentives'.

The state regulator is also encouraging good practice in the public listed sector, both in terms of corporate governance and executive compensation. In doing so it has worked closely with developed Western economies; see OECD (2011) for example. To illustrate, consider the proportion of board members who are independent of the company. Independents are often considered a useful safeguard against executive malfeasance. For this reason, in 2001 the CSRC determined that one-third of the board should consist of independents (CSRC, 2001). Prior to the announcement, independents were almost unheard of: only 6% of board members were independent in 2001 but from 2003 onwards around one-third of board members were independents. The state has also paved the way for the introduction of stock options for executives. This method of executive compensation was not permitted by the regulator until 2006, after which point we have seen a gradual increase in the percentage of firms using stock options (Table 2). Stock options have been criticised recently in the West with corporations and executives 'gaming' the system (Bianchi and Freeman, 2013) but at least in principle they help bind executives' wealth to the performance of the firm, for which they are responsible.

These developments should not be overstated, however. While there is some evidence of state-sponsored moves towards the sorts of governance and incentive

Table 2

Executive Incentive Plans in China's Listed Firms, 2006–10

Percentage of firms offering:	2006	2007	2008	2009	2010
Share options	0.8	1.0	1.8	2.0	2.6
Restricted stock	0.3	0.5	0.7	0.6	1.0
Stock appreciation rights	0.1	0.1	0.2	0.2	0.2
Any incentive plan	1.2	1.5	2.5	2.6	3.6

Notes. Authors' calculations using CSMAR data.

structures that are well established in the West, the corporate governance reforms have been fairly limited. For instance, the proportion of board members who are independents has stalled at just over one-third. The figure was 35% in 2005 and 37% in 2010 (authors' calculations based on China Stock Market and Accounting Research Database (CSMAR) data). It remains well below the proportion of independents on US boards, which is around 60% (Conyon and He, 2011, p. 13).

Furthermore, the incentives offered to executives in China differ from those used in the West. In the US, a substantial percentage of CEO compensation is in the form of stock options and, more recently, restricted stock and equity grants with performance-based vesting conditions (Bizjak *et al.*, 2011). The average CEO obtains around 45% of their total compensation from stock and options (Conyon *et al.*, 2013). In Europe, long-term incentive plans (LTIPs) play an important role, although share options have become increasingly important (Conyon *et al.*, 2013). In China, on the other hand, as noted above firms were unable to offer stock options until 2006 and the trading of stock holdings was tightly restricted until the early 2000s. Fewer than 1% of top executives were being granted options in any given year between 2006 and 2010 and, for these few cases, at the median they were worth 30% of CEO cash compensation and 21% of non-CEO top executive compensation (authors' calculations based on CSMAR data and our Black–Scholes valuation of stock options). So cash compensation and bonuses constitute a greater proportion of total compensation in China than they do in the US and Europe.

In what follows we will be focusing primarily on cash compensation, that is, salary and cash bonuses, which have traditionally been the focus of the executive compensation literature. But it is important to be aware that executives often hold wealth in the form of company stock. This is clearly a potentially important way in which companies are able to align the interests of CEOs with those of the firm.[2]

[2] Over the course of the decade we examine, the state regulator liberalised rules governing the trading of stock, making it potentially easier for executives to realise some of the value locked up in their stock. In 2001 around one-third of top executives owned shares in their firm. This fell to 22% in 2006 but rose a little to 28% by 2010. CEOs tend to hold more stock than other top executives but their shareholdings exhibited similar trends, declining from 42% in 2001 to 27% in 2006 only to recover to 36% by the end of the decade (authors' calculations based on CSMAR data). Adopting Conyon's (2006, p. 31) method to estimate the value of the equity incentives for each executive, we find that, even among executives holding equity and unexpired stock, these equity incentives are small, on average, relative to cash compensation over the period 2005–9 (less than 10% of the value of cash compensation at the median). They become more valuable in 2010, largely because there was an increase in the average number of shares held by each executive who held some.

2. Hypotheses

It is against this backdrop that we test five hypotheses on the nature of executive compensation in China's public listed companies. Our aim is to establish to what extent, if any, compensation for executives in China exhibits traits which are familiar from the Western literature. The data we use to test these hypotheses are described in Section 3.

HYPOTHESIS 1. *Executive compensation is highly correlated with firm size.*

In his seminal paper 'Contracts and the Market for Executives', Rosen (1990) argues that the market will allocate the most talented executives to higher positions in larger firms because there is complementarity between executive talent and other workers' productivity. In hierarchical structures these talents are 'magnified to greater effect by spreading it over longer chains-of-command and larger scales of operations' (Rosen, 1990, p. 7). This implies a positive link between CEO compensation and firm size. Size is usually proxied with firm sales in the literature. Reviewing the literature he finds that:

> the elasticity of executive annual-salary-plus-bonus with respect to sales of the firm is in the .2 to .25 range … A firm that is 10% larger than another on average pays its top executives 2.5% more.
>
> (Rosen, 1990, pp. 8–9).

He goes on to say:

> the relative uniformity of the elasticity of executive pay with respect to scale across firms, industries, countries and periods of time is notable and puzzling because the technology which sustains control and scale should vary across these disparate units of comparison. Thus the uniformity of estimates is a little too good to be true.
>
> (Rosen, 1990, p. 9).

Even so, Baker *et al.* (1988, p. 609) referred to the cross-sectional relationship between firm size and CEO compensation as 'the best documented empirical regularity regarding levels of executive compensation'.

More recently, in seeking to explain the rise in CEO compensation in the US since the 1980s, Gabaix and Landier (2008) propound a 'size of stakes' view in which compensation is determined in a competitive talent market and reflects the size of firms affected by talent. Their empirical analysis shows that the growth in CEO compensation tracks the growth in firms. In a second study Gabaix *et al.* (2013) confirm CEO compensation fell with firm value in the Great Recession, as their theory predicts. The magnitude of the effect does not vary a great deal if one uses other size metrics such as firm sales or market capitalisation. If the market for executives operates in a similar fashion in China, we might expect to see elasticities of compensation with respect to sales that are of a similar magnitude to those described by Rosen (1990).

HYPOTHESIS 2. *Executive compensation is sensitive to firm performance.*

Sitting at the top of the corporate hierarchy, CEOs and other senior executives have the power to make decisions with profound implications for firm performance but their actions are also difficult to monitor making it hard for owners to establish whether its top executives are fully focused on maximising returns for shareholders (Bandiera *et al.*, 2012). In this setting it makes sense for the principal to devise a contract tying the agent's compensation closely to the performance of the firm such that we would expect to see executive compensation respond to variance in firm performance. However, in China the state often sets social goals for state-owned enterprises in relation to employment and worker welfare which may not be wholly consistent with profit maximisation or shareholder returns. Furthermore, executives' incentives may relate primarily to political preferment rather than short-term income gains (Cao *et al.*, 2012). For both these reasons we may observe a smaller pay–performance elasticity among Chinese executives than might be the case in the Western literature. Studies using data up to the mid-2000s indicate executive compensation in China is sensitive to firm performance (Kato and Long, 2006; Conyon and He, 2011) but provide little indication of how the elasticities may compare with those seen in Western economies.

One setting in which pay may not adjust in response to firm performance is when all firms face an exogenous shock to their performance; that is, a shock which is not attributable to executives' actions. The financial crisis of 2007/8 is such a shock. It was a crisis that hit China at the same moment as it hit the West. To the extent that shareholders viewed the crisis as an exogenous shock, we might anticipate no major adjustment to executive pay.[3] However, shareholders may be able to discriminate between the effects of a crisis that hits all firms in an industry, and the relative performance of firms within that industry. Relative performance may be reasonably attributed to the performance of top executives, in which case we can anticipate that firms' CEO compensation will adjust according to the relative performance of a firm in its industry in the period after the crisis hits.

HYPOTHESIS 3. *Firms incentivise their top executives with tournament pay structures.*

Firms may nurture talent through tournament-like promotions (Lazear and Rosen, 1981). Tournament-like pay incentives imply highly convex rewards at the top of the hierarchy. This is because lower down the hierarchy the prize for winning promotion is not only the winner's prize (compensation) at that level, but also the value of an option to compete for larger prizes at higher levels (Rosen, 1990, p. 37). This option disappears when one reaches the top. Thus, a convex wage structure among top executives is consistent with tournament prizes.

If corporations in China are equally concerned to foster and incentivise corporate talent we might expect to see similar tournament pay structures in public listed companies. Certainly China's executive labour market exhibits features akin to those in the West that are conducive to tournament prizes. In particular, executive tenure and the propensity to recruit CEOs from within mean it makes sense to incentivise

[3] However, there is evidence that CEO compensation is driven, in part, by both 'good' and 'bad' luck, suggesting that shareholders are not always in an ideal position to judge how much of firm performance is attributable to executives (Bertrand and Mullainathan, 2001).

executives with a tournament pay structure. Average executive tenure in China is similar to that in the West, the corollary being that executive turnover rates are also similar. In the early 2000s one-quarter of public listed companies in China changed CEO in a given year (27% in 2001 and 24% in 2005). This had declined to 15% in 2010 (authors' calculations based on CSMAR data). For the US, Kaplan and Minton (2012) calculate that CEO annual turnover was 26% in 2000 and 17% in 2007. Where the CEO does leave, the majority of China's public listed firms appoint their CEO from within: in 2005 three-quarters (74%) of new CEOs were appointed from within, compared with 65% in 2010 (authors' calculations based on CSMAR data). These figures are not dissimilar to those for the US. Murphy and Zabojnik (2006) show that internally hired CEOs fell as a percentage of all new CEO appointments in Forbes 800 companies from an average of 85% in the 1970s to 83% in the 1980s and 73% in the 1990s. Fernandes *et al.* (2013, Table 2) state a figure of 73% for the US in 2006 among firms with annual revenues in excess of $100 m. The counter hypothesis is that there will be much greater pay equity in firms, even at the top, due to the Communist ethos which promotes equity. Differences in cultures and norms help to explain cross-country differences in the steepness of tournament pay structures: the ratio of CEO compensation to other executives' compensation appears to be largest in the US (Burns *et al.*, 2013).

Using data through to 2002, Kato and Long (2011) find support for the proposition that the size of the tournament prize rises with the number of executive contestants. However, they are reliant on aggregate salaries for the top few executives because listed firms were not required to disclose individual executives' compensation until 2005. We focus on the period 2005–10.

Hypothesis 4. *Privatisation leads to faster growth in executive compensation.*

If it is state involvement in the running and organisation of firms that curtails the role of market forces in determining executive compensation, we might anticipate that market forces take a greater hold after full or partial privatisation of a firm. It is long established in the literature that CEO pay rises substantially after privatisation of state-owned enterprises (Wolfram, 1998 for the UK). *A priori* it remains unclear whether such findings would hold in China's public listed firms as, at least across the economy as a whole, the state often retains influence over appointments and compensation even in the absence of a majority shareholding (Bryson *et al.*, 2012*a*, *b*). Nevertheless, evidence to date suggests that the state's ownership stake is an important influence over the degree to which executives' pay is linked to firm performance. Kato and Long (2006, p. 973) found that pay–performance sensitivities among Chinese public listed companies became stronger as the percentage of stock owned by the state fell, a finding that is consistent with the proposition that state ownership acts as a potential hindrance to the operation of market forces in the executive labour market. Similarly, Firth *et al.* (2006) found larger pay–performance sensitivities in privately held as opposed to state-held publicly listed firms. Both studies cover a short period ending in 2002. Instead of examining the link between ownership and pay–performance relativities we consider the elasticity of executive pay with respect to changes in the state's ownership share, and we do so for the whole period 2001–10.

HYPOTHESIS 5. *Poor corporate governance practices permit CEOs to 'skim' profits.*

Bebchuk and Fried (2004) argued that CEOs are able to exploit their managerial power to extract rents, leading to pay that is not tightly linked to firm performance. Bertrand and Mullainathan (2001) find CEOs' ability to do this helps explain why they are able to 'skim' profits from firms, particularly when there are weak corporate governance structures in place. Recognising the shortcomings of some corporate practices and structures, the Chinese state has been keen to promote good corporate governance in public listed firms and has regulated the sector to enforce other practices, as noted earlier.[4]

One of the most remarkable changes has been the appearance of compensation committees used by boards to advise them on setting executive compensation. In 2001, less than 0.5% of the listed firms had such a committee, whereas by 2010 they were nearly universal. On this measure there is therefore convergence with US listed companies, 98% of whom had compensation committees in the first half of the 2000s (Conyon and He, 2011). However, in one-quarter of cases in China, CEOs sit on the compensation committee and are thus seemingly able to exert direct influence over the board's CEO remuneration decisions (authors' calculations based on CSMAR data). We therefore hypothesise that CEO pay will rise once the CEO starts to sit on the committee. In a similar vein, we argue that a CEO's managerial power will be greater if the CEO also becomes the chair of the board. In the early 2000s, 12% of China's public listed firms were run by a CEO who was also the chair but this had risen to 22% by 2010, largely because of an above-average rate of duality among new listings (authors' calculations based on CSMAR data).

3. Data

Our data come from the CSMAR database developed by Shenzhen GTA Information Technology Company. The database comprises information disclosed by public listed companies in China under the rules and guidelines set out by the CSRC (2007). GTA collate the information contained in these public disclosures and make it available for academic research. The data have been used extensively in previous studies (Firth *et al.*, 2006; Kato and Long, 2006; Conyon and He, 2011, 2012).

The data are a census of all the public listed companies listed on the Shanghai and Shenzhen stock exchanges. These two stock markets were re-established in 1990 and 1991, respectively. There is a third major stock exchange in China – the Hong Kong stock exchange which is the second largest in Asia behind Tokyo – but CSMAR does not cover it. Until 1997 Hong Kong was under British rule and, because it remains a special administrative region of China, its exchange is not subject to the same regulatory regime as Shanghai and Shenzhen.

The data include the firm accounting and corporate governance data and executive compensation data discussed in the previous Section. They also contain a range of items regarding the nature of each firm (such as ownership, industry, size, age and

[4] This is illustrated by the 219 articles contained in the Company Law of the People's Republic of China (2005 Revision) which came into effect on 1 January 2006.

time since listing) and its individual executives (age, sex, education, tenure, how they were appointed).[5]

The CSMAR data set starts in 1999 but we omit 1999 and 2000 from our analysis because pay data for senior executives are only observed for around one-third of cases in these years. The average compensation of the three highest-paid executives is observed almost universally from 2001 onwards, whereas the pay of individual executives is observed from 2005. CSMAR gives us a total of 14,987 firm-year observations from 2,197 firms over the period 2001–10. We have 92,949 executive-firm-year observations from 26,667 executives. These executive observations come from 14,967 firm-years.[6]

Since 2001 the number of public listed firms has grown from 1,163 to 2,126. Of these 1,097 are ever present, generating 10,970 firm-year observations, roughly two-thirds of all observations. Most (3,694) of the remainder come from the 1,029 firms that enter after 2001 and stay until 2010. There are 296 firm-year observations from 66 firms that were present in 2001 but exit before 2010 and a further 27 firm-year observations from the five firms that enter and exit over the period 2002–9. All monetary values are deflated to constant (2001) prices.

4. Results

To establish whether the influences on top executive compensation are similar or different to those identified in the literature for firms in Western economies, we present descriptive and multivariate analyses using methodologies and model specifications that are similar or identical to those in the literature. Throughout there are two dependent variables. The first is the average of the top three executives' cash compensation which is available for the whole period 2001–10. The second is CEO cash compensation which is only available for the period 2005–10.

HYPOTHESIS 1. *Executive compensation is highly correlated with firm size.*

The upper panel of Table 3 presents pay-size elasticities defined as the estimated coefficient on log lagged sales in a regression of the log of the average pay of the top three executives for each year from 2002 to 2010. The yearly estimates range between 0.24 and 0.30, with a pooled regression for all years returning an elasticity of 0.26 (SE = 0.011; $N_{\text{firm-years}}$ = 12,354; N_{firms} = 1,827). These are the sorts of numbers Rosen would have recognised for the US for the 1970s and 1980s.

The coefficients are similar when we run similar estimates for CEO cash compensation between 2005 and 2010 (Table 3, lower panel). The elasticity ranges between 0.22 and 0.28 over the years and, as with the 'top three' measure, falls to a statistically significant extent between 2007 and 2008. The elasticity for the pooled years in this case is 0.24 just as Rosen might have anticipated (SE = 0.012; $N_{\text{firm-years}}$ = 8,694;

[5] The data on executives' education are partial, however, being available for between one-third and a half of all executives, depending on the year.

[6] The discrepancy between the number of firm observations and number of executive observations is due to six firms that yield no individual executive records in a total of 20 firm-years but they do yield executive observations in other years and so are retained within the overall sample for analysis.

Table 3

Estimated Pay-size Elasticity for Pay of Top Executives in Listed Firms in China, by Year

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Average pay of three highest-paid executives									
Elasticity	0.248	0.273	0.268	0.277	0.295	0.281	0.244	0.244	0.239
	(0.021)	(0.02)	(0.018)	(0.016)	(0.016)	(0.014)	(0.014)	(0.014)	(0.012)
Observations	1,091	1,156	1,233	1,327	1,317	1,396	1,527	1,573	1,734
Pay of the CEO									
Elasticity	–	–	–	0.261	0.262	0.277	0.230	0.228	0.215
				(0.018)	(0.018)	(0.017)	(0.016)	(0.015)	(0.014)
Observations				1,265	1,246	1,347	1,485	1,523	1,680

Notes. The elasticity is the estimated coefficient on Ln(Lag Sales) in an OLS regression of Ln(Pay) on Ln(Lag Sales) and 13 industry dummies. All values are deflated to constant prices using the IMF's GDP deflator for China. Standard errors are in parentheses.

$N_{\text{firms}} = 1{,}797$). Results are similar if we use debt plus equity to proxy size, as Gabaix *et al.* (2013) prefer. Elasticities are a little higher using market capitalisation – the measure preferred by Kaplan (2012).[7] Mean CEO compensation rose by a factor of 1.94 between 2005 and 2010, whereas mean firm sales rose by a factor of 1.93, the sort of 1:1 ratio anticipated in Gabaix and Landier's (2008) 'size of stakes' proposition.

How do these pay-firm size elasticities compare with contemporary estimates for Western countries? Table 4 presents pay-size elasticities for 2008 derived in the same way as those presented in the lower panel of Table 3. Estimates for all countries other than China are taken from Conyon *et al.* (2013, Table 3.3), selecting those countries

Table 4

Estimated Pay-size Elasticity for CEOs in 2008, by Country

	Estimated pay-size elasticity	Number of firms
France	0.412	156
Germany	0.333	80
Netherlands	0.243	60
Sweden	0.346	51
UK	0.398	419
All Europe	0.348	892
US	0.377	1,426
China	0.230	1,485

Notes. The pay-size elasticity is defined as the estimated coefficient on Ln(Lag Sales) in a regression of Ln(CEO Pay) on Ln(Lag Sales) and 12 industry dummy variables (13 for China). CEO pay includes base salary and annual bonus, plus the value of option and stock grants (except in China where equity incentives are rare and we rely solely on cash compensation). Each of the estimated pay-size elasticities is statistically significant from zero at the 1% level. All estimates are from Conyon *et al.* (2013) except for the China estimate which is the authors' calculation based on CSMAR data.

[7] The elasticity for pooled years is 0.27 for debt plus equity, and ranges between 0.22 and 0.32, whereas the pooled years elasticity is 0.37 for market capitalisation and ranges between 0.33 and 0.43.

where the sample of firms is 50 or more. The elasticity for China is actually lower than the elasticities in other countries for the same year estimated in an identical fashion. But it is worth noting that there is some dispute about the size of the elasticity for the US: Gabaix *et al.* (2013, Table 1, column 4) suggest that CEO compensation elasticity with respect to lagged log sales for the period 1992–2001 is 0.36, very close to Conyon *et al.*'s estimate for 2008, whereas it is 0.21 for the US when estimated by Gabaix and Landier (2008, Table 1, column 4) for the period 1992–2004.[8] One possible reason for the lower elasticity in China may be the role of the Communist Party in allocating talent in a potentially suboptimal way.

HYPOTHESIS 2. *Executive compensation is sensitive to firm performance.*

In Table 5 we turn to the elasticity of CEO compensation with respect to firm performance estimated in first differences. The first seven rows present Conyon *et al.*'s (2013) results for other countries. The final row presents our results for China using the identical methodology to Conyon *et al.* as outlined in the notes to the Table. The first three substantive columns of the Table are separate regressions incorporating three alternative measures of performance, namely changes in log stock returns, sales and returns on assets (ROA). The final three columns present the coefficients for these three performance measures when they are included simultaneously in a single regression.

Table 5

Estimated Pay–performance Elasticities, by Country

	Number of CEO-years	Pay–performance elasticities from separate regressions for each performance measure			Pay–performance elasticities from a single regression including all three performance measures		
		Stock returns	Sales	ROA	Stock returns	Sales	ROA
France	643	0.111	0.151	1.045***	0.074	0.188	1.025***
Germany	213	0.314**	0.590***	2.136**	0.265**	0.600***	1.498*
Netherlands	279	0.120	0.225*	0.414	0.122	0.226*	0.347
Sweden	243	−0.107	0.448***	0.507	−0.193	0.464***	0.272
UK	2,082	0.096***	0.137***	0.641***	0.068***	0.134***	0.619***
All Europe	3,894	0.117***	0.067	0.651***	0.100***	0.046	0.602***
US	6,596	0.405***	0.363***	0.784***	0.358***	0.203***	0.506***
China	2,450	0.086***	0.081***	0.438***	0.059*	0.058**	0.319*

Notes. Pay–performance elasticities are calculated from a regression of ΔLn(CEO Pay) on one or all three performance measures, namely Ln(1 + Shareholder Returns), ΔLn(Sales) and ΔLn(1 + ROA). The sample period is 2003–8 for all countries except China (2006–8). Regressions include 12 industry dummies (13 in China) and year dummies. Monetary values are in constant prices. CEO pay is measured as cash compensation (base salary plus bonus) and the CEO is required to be in office in both years. Estimates for all countries except China are taken from Conyon *et al.* (2013, table 3.7). Estimates for China are authors' calculations from the CSMAR data. *, ** and *** indicate that the pay–performance elasticity is significantly different from zero at the 10%, 5% and 1% levels respectively.

[8] The Gabaix and Landier (2008) and Gabaix *et al.* (2013) estimates for the US are not directly comparable in method as well as period covered. The second article applies additional filters in the sample selection (*op. cit.*: 5). It also takes the 1,000 largest firms by value, whereas the first article took the 1,000 highest-paid CEOs (see their footnote 4).

The elasticity of CEO cash compensation with respect to performance in China is positive and significant with respect to all three performance indicators and is much higher with respect to ROA. The same pattern is apparent for the US. When all three measures are included simultaneously, all three remain large and statistically significant, with the ROA coefficient falling most. The estimated elasticities for China on stock returns and sales are similar to the 'All Europe' elasticities and are smaller than those for the US. China's ROA elasticities are smaller than those for All Europe and the US.

If one estimates CEO pay–performance elasticities in China for separate years between 2006 and 2010, it is apparent that the elasticities have been growing, suggesting a strengthening of the link between changes in firm performance and subsequent changes in CEO pay, as one might anticipate if better corporate governance was improving the way in which executives are held accountable (Table 6). It is also apparent that the elasticities for ROAs are very volatile.[9]

There is further evidence of good corporate governance in the setting of CEO pay among China's public listed firms if we decompose firm performance into that which is driven by industry performance and the firm-specific residual using the methodology of Jentner and Kanaan (2006).[10] If we do so we find that the coefficients for the firm-specific residual are nearly identical to those presented in the first three substantive columns of the final row in Table 6. For the pooled years 2006–10 the firm-specific CEO pay–performance elasticities are 0.107 for stock returns, 0.112 for sales and 0.442 for ROA, all statistically significant at the 1% level. The coefficients are largest in 2009 and 2010, which is what one might expect if firms feel better able to attribute

Table 6

Pay–performance Elasticities by Year (China only)

	Number of CEO-years	Pay–performance elasticities from separate regressions for each performance measure			Pay–performance elasticities from a single regression including all three performance measures		
		Stock returns	Sales	ROA	Stock returns	Sales	ROA
2006	752	0.088	0.100**	0.700*	0.053	0.060	0.573
2007	790	0.052	0.081	0.376	0.030	0.072	0.313
2008	908	0.102***	0.055*	0.256	0.088**	0.032	0.096
2009	984	0.147***	0.197***	0.614***	0.113***	0.173***	0.374**
2010	1,080	0.156***	0.118**	0.152	0.144***	0.102**	−0.224
2006–10	4,514	0.106***	0.114***	0.439***	0.078***	0.090***	0.265**

Notes. See notes to Table 5 for explanations and conventions. *, ** and *** indicate that the pay–performance elasticity is significantly different from zero at the 10%, 5% and 1% levels respectively.

[9] In particular, the coefficient on ROA is sensitive to the treatment of negative values, which occur in around 10% of all cases. We recover most of these by adding a small constant. This volatility might help explain why Conyon and He (2011, p. 11) find statistically small and non-significant ROA elasticities in their models for top executive cash compensation in the period through to 2005.

[10] This entails recovering predicted firm performance from a regression containing industry performance, together with the residual capturing firm-specific variance, and inserting each as a separate term into a regression of CEO compensation.

firm-specific performance to executive leadership after an exogenous shock such as the financial crisis.

HYPOTHESIS 3. *Firms incentivise their top executives with tournament pay structures.*

From 2005 onwards listed firms were required to disclose the pay of individual executives, including the CEO. During this period average (mean) pay among the top three executives nearly doubled in real terms to 388,347 yuan (Table 7), with the nominal value in 2010 (512,937 yuan) being equivalent to US$129,399 on a purchasing power parity (PPP) basis.[11] It also doubled for the CEO. There is a sizeable gap between the pay of the top three executives and other disclosed executives in the firm: mean compensation for the top three is almost twice that for the other disclosed executives, consistent with tournament prizes. The ratio between mean compensation for disclosed executives outside the top three and those in the top three rose over the period from 1.75 to 1.97.

Table 7

Top Executive Pay in China's Listed Firms, 2005–10

	2005	2010	Ratio 2010:2005
Average compensation of top three executives within the firm (*RMB, 2001 prices*)			
Mean	197,504	388,347	1.97
Median	150,155	283,648	1.89
Average compensation of disclosed executives outside top three (*RMB, 2001 prices*)			
Mean	124,853	224,860	1.80
Median	100,329	167,972	1.67
Ratio of average top three pay to average pay of all other disclosed executives in the firm			
Mean	1.75	1.97	
Median	1.47	1.61	
CEO cash compensation (*RMB, 2001 prices*)			
Mean	218,548	435,059	1.99
Median	170,243	322,363	1.89
CEO pay ranking within the firm			
Proportion of CEOs who are the highest-paid executive	0.78	0.74	
Where the CEO is the highest-paid executive:			
Ratio of CEO pay to average pay of other executives within top three			
Mean	1.44	1.48	
Median	1.30	1.30	
Ratio of CEO pay to average pay of all other disclosed executives in the firm			
Mean	1.64	1.74	
Median	1.47	1.54	

Notes. Authors' calculations based on CSMAR data. Figures are deflated to 2001 prices using the IMF's consumer price index for China.

[11] We use an implied PPP conversion rate of 3.964 for 2010 (source: IMF World Economic Outlook database).

In China the CEO is not the highest-paid employee in between one-fifth and one-quarter of firms (Table 7). This figure is roughly comparable with the US: Hallock and Torok (2010) found that of 2,108 US firms they studied, the CEO was the highest-paid executive in 81% of cases. If we confine our analysis to CEOs who are the highest-paid individuals in the firm, the convexity predicted by tournament theory is striking: by 2010 the CEO was receiving almost half again in compensation relative to the average for the next two top paid executives (Table 7, near the bottom). Table 8 presents the log compensation differentials by pay rank for the top six best paid executives. Column 1 shows the raw differentials, whereas columns 2–4 present model specifications that are very similar to those presented by Eriksson (1999). The inclusion of controls does little to alter the raw differentials which are, again, similar to those reported by Eriksson (1999, pp. 272–3) for Denmark and also similar to those reported by Burns *et al.* (2013) for their cross-country average (outside the US the CEO gets 1.56 times the mean compensation of the second to fourth ranked executives, whereas in the US it is 1.94 times).

Seen in terms of cross-country cultural differences, China scores highly in terms of its preference for fair income differences, a trait which might be expected to reduce the size of executive compensation differentials. On the other hand, it also scores highly in terms of power distance which measures the degree to which a society accepts that power is distributed unevenly (Burns *et al.*, 2013, Table A2). The latter may help explain the presence of tournament pay structures among executives in China's public listed companies.

Table 8

Estimated Log Compensation Differentials Between Senior Executives, 2005–10

Dependent variable:	(1) Ln(Total Pay)	(2) Ln(Total Pay)	(3) Ln(Total Pay)	(4) Ln(Total Pay)
Pay rank within firm in year t				
1st	Ref.	Ref.	Ref.	Ref.
2nd	−0.257	−0.257	−0.227	−0.245
	(−9.99)	(−10.19)	(−9.24)	(−11.75)
3rd	−0.345	−0.346	−0.319	−0.333
	(−13.66)	(−13.91)	(−13.13)	(−16.33)
4th	−0.411	−0.412	−0.377	−0.398
	(−16.34)	(−16.67)	(−15.67)	(−19.59)
5th	−0.503	−0.503	−0.465	−0.491
	(−19.69)	(−20.01)	(−18.98)	(−23.68)
6th	−0.631	−0.630	−0.591	−0.622
	(−23.80)	(−24.08)	(−23.12)	(−28.72)
Year dummies	No	Yes	Yes	Yes
CEO characteristics	No	No	Yes	Yes
Firm characteristics	No	No	No	Yes
Adj-R^2	0.053	0.113	0.158	0.392
Observations	26,191	26,191	26,191	26,191

Notes. Standard errors account for the clustering of observations by executive. Each of the coefficients is statistically significant at the 0.1% level (t-statistics in parentheses). CEO characteristics: age; education; tenure. Firm characteristics: industry; log of number of employees; log of sales. Nominal pay rates are deflated to 2001 prices using the IMF's consumer price index for China. Firm sales are deflated using the IMF's GDP deflator for China.

Table 9

Impact of Ownership and Corporate Governance on Top Executive Pay in China

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Ln(Top 3 Pay)		Ln(CEO Pay)	Ln(Top 3 Pay)		Ln(CEO Pay)
Years	2002–10	2005–10	2005–10	2002–10	2005–10	2005–10
Percentage of shares owned by bodies other than the state	0.0184	−0.0567	−0.0852	–	–	–
	(0.61)	(−1.65)	(−1.88)	–	–	–
Not state owned	–	–	–	0.0522**	0.0273	0.0175
	–	–	–	(2.79)	(1.26)	(0.61)
Chair/CEO duality	0.0457*	0.0658**	0.102***	0.0513**	0.0660**	0.102***
	(2.39)	(2.89)	(3.35)	(2.68)	(2.90)	(3.36)
Compensation committee						
No committee	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
CEO not a member	0.0368*	0.0156	0.00248	0.0366*	0.0181	0.00527
	(2.38)	(0.91)	(0.11)	(2.36)	(1.05)	(0.23)
CEO is a member	0.0895***	0.0582**	0.111***	0.0905***	0.0584**	0.113***
	(4.65)	(2.78)	(4.02)	(4.70)	(2.78)	(4.07)
R^2	0.422	0.335	0.219	0.422	0.335	0.219
Rho	0.695	0.766	0.677	0.697	0.765	0.675
Observations	10,803	7,360	7,360	10,733	7,336	7,336
Number of firms	1,575	1,565	1,565	1,573	1,563	1,563

Notes. t-statistics in parentheses * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$. All models include: firm fixed effects; year dummies; current and lagged values of Ln(Sales), Ln(Stock Returns) and Ln(ROA); special treatment or particular transfer designation marker; log(number of employees in the firm); CEO age, education and tenure.

HYPOTHESIS 4. *Privatisation leads to faster growth in executive compensation.*

Table 9 presents firm fixed-effects models estimating the influence of changes in corporate ownership and corporate governance on the remuneration of the firm's top three executives and the CEO. We estimate two models using the 'top three' measure: one for the longest period possible in our data (2002–10) and another for the shorter period 2005–10. The latter provides a direct comparison with a third model, estimated on the pay of individual CEOs (where data are only available from 2005). As predicted, corporate ownership plays a role in the way top executives are remunerated. Shifts in the percentage of the firm owned by bodies other than the State are not significant (Table 9, row 1, columns 1–3). Instead what matters is a switch in majority ownership: switching from state to private ownership results in an increase of around 5% in top executives' cash compensation (Table 9, row 2, column 4). However, the effect appears to be strongest in the early part of the decade, as it is smaller and not statistically significant in the 'top three' model for 2005–10 (column 5) and in the model of CEO pay which is only available for 2005–10 (column 6).

HYPOTHESIS 5. *Poor corporate governance practices permit CEOs to 'skim' profits.*

Executive compensation rises when a CEO also takes on the role of chair. It results in a compensation hike of around 5–6% for the top three executives, and a 10% rise for CEOs (Table 9, row 3). Pay also rises when a compensation committee is introduced,

especially if the CEO starts to sit on the compensation committee (Table 9, rows 4–6). The compensation premium associated with the CEO beginning to sit on a compensation committee is twice as large for the CEO as it is for the top three executives. These findings suggest that CEOs are capable of capturing governance arrangements such that they are able to 'skim' profits from the firm in the way described by Bertrand and Mullainathan (2001).

5. Conclusions

Despite differences between China and the West in the composition of the public listed sector and the governance of market relations, its executive labour market resembles executive markets elsewhere. Using panel data for all China's public listed firms over the period 2001–10 we show that executive compensation responds to market factors in much the same way as it does in Western economies. The similarity between the pay-size elasticities with those discussed by Rosen (1990) for the US over two decades ago is particularly striking. CEO pay is sensitive to firm performance, although the elasticities are lower than for the US. There are steep gradients in executive compensation within firms which are consistent with tournament prizes. Privatisation has contributed to growth in executive compensation. We also find a role for managerial power in executive pay setting, most notably with respect to the compensation premium CEOs earn when becoming the chair and when they sit on the compensation committee determining their rewards. The role for managerial power may reflect the recency of the stock market and the regulations underpinning corporate governance. The 'China puzzle' by which China achieves remarkable economic growth despite apparently weak institutions is a well-known phenomenon (Xu, 2011, p. 1080). Nevertheless, there appears to be something about executive jobs and how they are managed which transcends national economic, political and cultural differences. The implication is that the Western model is not as unique nor indeed dysfunctional as critics suggest.

The recency of the stock market crash of 2007/8 means we may not have seen the full extent of the market's adjustment to that crash: It may have bigger effects on executive compensation than those that we have yet been able to observe. We found no dramatic response to the stock market crash of 2007/8: although the elasticity of pay to ROA was volatile, the elasticities with respect to sales and stock returns remained stable or strengthened. However, we also found the elasticity of CEO pay with respect to firm size fell between 2007 and 2008 during the market crash and remained at that level in 2009 and 2010. This structural break is not what is expected in the literature which tends to assume a constant elasticity over time (Gabaix *et al.*, 2013). Existing studies for the West do not test for changes in the elasticity over time and, in particular, with respect to the recent financial crash, so we do not know whether a similar phenomenon is apparent elsewhere. This could be a fruitful area to explore in the future.

There are two important limitations to our study. First, we benchmark our estimates for China against those in the literature, including Conyon *et al.*'s (2013) study for Western industrialised economies. We maintain comparability with those other studies by deploying similar or identical estimation procedures and model specifications. Nevertheless, this approach means it is hard to formally test for cross-country

differences in results, or to discount the possibility that some of the results may reflect differences in the way data were collected or analysed. The solution to this issue is for researchers to construct and analyse cross-country data using identical routines and procedures. In such a setting it is possible to pool country data sets to test hypotheses more formally. The recent availability of high-quality accounts data for public listed companies, such as the CSMAR data used in this study, means the sort of comparative analysis undertaken by Conyon *et al.* (2013) for Western economies can be extended to include countries in the developing world.

The second limitation relates to the methods deployed to test our hypotheses. Although the methods are standard in the literature, they are insufficient if one wishes to move beyond simple conditional correlations to make stronger causal inferences about the determinants of executive compensation. This is an important challenge for the executive compensation literature, one which may require analysts to adopt the sorts of identification strategies that are more common in other strands of economics.

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Additional Supporting Information may be found in the online version of this article:

Appendix A. Data Appendix.
Data S1.

References

Baker, G., Jensen, M. and Murphy, K. (1988). 'Compensation and incentives: practice vs. theory', *Journal of Finance*, vol. 43(3), pp. 593–616.
Bandiera, O., Guiso, L., Prat, A. and Sadun, R. (2012). 'What do CEO's do?', Working Paper No. 1145, London School of Economics and Political Science.
Bebchuk, L. and Fried, J. (2004). *Pay without Performance: The Unfulfilled Promise of Executive Compensation*. Cambridge, MA: Harvard University Press.
Bertrand, M. and Mullainathan, S. (2001). 'Are CEOs rewarded for luck? The ones without principals are', *Quarterly Journal of Economics*, vol. 116(3), pp. 901–32.
Bianchi, J. and Freeman, R.B. (2013). 'Are executive stock options effective incentives or effective rent-sharing?', mimeo, National Bureau of Economic Research.
Bizjak, J., Lemmon, M.L. and Nguyen, T. (2011). 'Are all CEO's above average? An empirical examination of compensation peer groups and pay design', *Journal of Financial Economics*, vol. 100(3), pp. 538–55.
Bryson, A., Forth, J. and Zhou, M. (2012*a*). 'CEO bonding: who posts performance bonds and why?', Working Paper No. 389, National Institute of Economic and Social Research.
Bryson, A., Forth, J. and Zhou, M. (2012*b*). 'What do we know about China's CEO's? Evidence from across the whole economy', Working Paper No. 397, National Institute of Economic and Social Research.
Burns, N., Minnick, K. and Starks, L. (2013). 'CEO tournaments: a cross-country analysis of causes, cultural influences and consequences', Working Paper, University of Texas at San Antonio.
Cao, J., Lemmon, M., Pan, X., Qian, M. and Tian, G. (2012). 'Political promotion, CEO incentives, and the relationship between pay and performance', Working Paper, University of Wollongong.
Conyon, M.J. (2006). 'Executive compensation and incentives', *Academy of Management Perspectives*, vol. 20(1), pp. 25–44.
Conyon, M.J. and He, L. (2011). 'Executive compensation and corporate governance in China', *Journal of Corporate Finance*, vol. 17(4), pp. 1158–75.

Conyon, M.J. and He, L. (2012). 'CEO turnover in China: the role of market-based and accounting performance measures', *European Journal of Finance*, doi: 10.1080/1351847X.2012.676559.
Conyon, M.J., Fernandes, N., Ferreira, M.A., Pedro, M. and Murphy, K.J. (2013). 'The executive compensation controversy: a transatlantic analysis', in (T. Boeri, C. Lucifora and K.J. Murphy, eds.), *Executive Remuneration and Employee Performance-related Pay: A Transatlantic Perspective*, pp. 1–137, Oxford: Oxford University Press.
CSRC. (2001). *Guiding Opinion on the Establishment of Independent Director Systems by Listed Companies*, Issued 16 August, China Securities Regulatory Commission.
CSRC. (2007). *Notice of the China Securities Regulatory Commission on Promulgating the Standards Concerning the Contents and Formats of Information Disclosure by Companies Offering Securities to the Public No.2 — Contents and Formats of Annual Reports (2007 Revision)*, Issued 17 December, China Securities Regulatory Commission.
Eriksson, T. (1999). 'Executive compensation and tournament theory: empirical tests on Danish data', *Journal of Labor Economics*, vol. 17(2), pp. 262–80.
Fernandes, N., Ferreira, M.A., Matos, P. and Murphy, K.J. (2013). 'Are US CEOs paid more? New international evidence', *Review of Financial Studies*, vol. 26(2), pp. 323–67.
Firth, M., Fung, P.M.Y. and Rui, O.M. (2006). 'Corporate performance and CEO compensation in China', *Journal of Corporate Finance*, vol. 12(4), pp. 693–714.
Gabaix, X. and Landier, A. (2008). 'Why has CEO pay increased so much?', *Quarterly Journal of Economics*, vol. 121(1), pp. 49–100.
Gabaix, X., Landier, A. and Sauvagnat, J. (2013). 'CEO pay and firm size: an update after the crisis', Working Paper No. 19078, National Bureau of Economic Research.
Groves, T., Hong, Y., McMillan, J. and Naughton, B. (1995). 'China's evolving managerial labor market', *Journal of Political Economy*, vol. 103(4), pp. 873–92.
Hallock, K. and Torok, J. (2010). *Top Executive Compensation in 2009*. New York: The Conference Board.
Jentner, D. and Kanaan, F. (2006). 'CEO turnover and relative performance evaluation', Working Paper No. 12068, National Bureau of Economic Research.
Kaplan, S.N. (2012). 'Executive compensation and corporate governance in the US: perceptions, facts and challenges', Working Paper No. 18395, National Bureau of Economic Research.
Kaplan, S.N. and Minton, B.A. (2012). 'How has CEO turnover changed?', *International Review of Finance*, vol. 12(1), pp. 57–87.
Kato, T. and Long, C. (2006). 'Executive compensation, firm performance, and corporate governance in China: evidence from firms listed in the Shanghai and Shenzhen stock exchanges', *Economic Development and Cultural Change*, vol. 54(4), pp. 945–83.
Kato, T. and Long, C. (2011). 'Tournaments and managerial incentives in China's listed firms: new evidence', *China Economic Review*, vol. 22(1), pp. 1–10.
Lazear, E. and Rosen, S. (1981). 'Rank-order tournaments as optimum labor contracts', *Journal of Political Economy*, vol. 89(5), pp. 841–64.
Li, H., Liu, P.W., Zhang, J. and Ma, N. (2007). 'Economic returns to communist party membership: evidence from urban Chinese twins', Economic Journal, vol. 117(523), pp. 1504–20.
Murphy, K.J. (1999). 'Executive compensation', in (O. Ashenfelter and D. Card, eds.), *Handbook of Labor Economics*, vol. 3(3), pp. 2485–563, Amsterdam: Elsevier.
Murphy, K.J. and Zabojnik, J. (2006). 'Managerial capital and the market for CEOs', Working Paper No. 1110, Queen's University, Kingston.
National Bureau of Economic Research. (2008) 'Determination of the December 2007 peak in economic activity', Report of the NBER Business Cycle Dating Committee, 1 December 2008, available at: http://www.nber.org/cycles/dec2008.html (last accessed: 17 October 2013).
Organization for Economic Co-operation and Development. (2011). *Governance of Listed Companies in China*, Paris: OECD.
Rosen, S. (1990). 'Contracts and the market for executives', Working Paper No. 3542, National Bureau of Economic Research.
Wolfram, C.D. (1998). 'Increases in executive pay following privatization', *Journal of Economics and Management Strategy*, vol. 7(3), pp. 327–61.
Xu, C. (2011). 'The fundamental institutions of China's reforms and development', *Journal of Economic Literature*, vol. 49(4), pp. 1076–151.