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CEO BONDING: WHO POSTS PERFORMANCE BONDS AND WHY?

CEO Bonding:
Who Posts Performance Bonds and Why?

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Abstract

Despite their theoretical value in tackling principal-agent problems at low cost to firms there is almost no empirical literature on the prevalence and correlates of performance bonds posted by corporate executives. Using data for China we examine their incidence and test propositions from principal-agent theory regarding their correlates. Around one-tenth of corporations deploy performance bonds. They are sizeable relative to CEO cash compensation. Ceteris paribus, CEO's posting performance bonds are more likely than other CEO's to have their compensation linked to firm performance in other ways and the elasticity of their pay with respect to firm performance is greater. They are also more likely to hold company stock. Thus bonds appear to be complements to rather than substitutes for other forms of corporate incentive. The negative association between bonds and sales volatility is consistent with principal-agent theory. Positive associations between performance bonds and firm age, the CEOs ranking in the Communist Party, and city-level clustering in the use of bonds are all consistent with "legacy" effects dating back to the use of performance bonds in the early reform period. The only corporate governance measure that is strongly and robustly associated with an increased use of bonds is employee representation on the board of directors.

JEL Classification: G34; J31; J33; M12; M52; O16; P31

Key words: performance bonds; security deposits; executive compensation; CEO's; corporate governance; agency theory; China

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1. Introduction

The prototypical solution to the principal-agent problem is a performance bond. This bond or security deposit is an "up front" payment by a CEO to the firm, which is recoverable, with interest, conditional on good behaviour. It discourages malfeasance because the CEO puts personal wealth in jeopardy, knowing that there is some probability that the bond will not be repaid if she engages in unwanted behaviour. In principle bonds should be attractive to firms since they are costless to the firm and because the diminishing marginal utility of money makes the monetary reward required to induce good behaviour larger than the monetary penalty needed to discourage bad behaviour. Nevertheless, the principal-agent literature has focused almost exclusively on monetary rewards for good performance. Almost nothing is known about the incidence of performance bonds, the circumstances in which they are paid, the sorts of executives who pay bonds, how bonds relate to other aspects of executive compensation, and their implications for workers and firms. We are able to fill this gap in the literature using unique data on Chinese corporations which contains information on whether performance bonds are paid and the size of those bonds.

It turns out that performance bonds are relatively common, covering just over one-in-ten CEO's working in Chinese firms. Furthermore, the bonds are sizeable in value. In 2003, when our survey data were collected, their mean (median) value was equivalent to 215 (71) percent of the mean (median) wage of workers, or 14 (6) per cent of the cash compensation received by the CEO of a listed corporation. They are therefore an important but hitherto overlooked component of the way in which CEO's in China are paid.

In Section Two we present the theory and sparse empirical evidence on the use of performance bonds. Section Three describes the data and identifies the hypotheses we test. Section Four outlines our theoretical approach. Section Five presents results and Section Six concludes.

2. Theory and Empirical Evidence

Principals can choose to incentivise agents by penalizing unwanted behaviour or rewarding desirable behaviour. The bulk of the recent theoretical and empirical literature has focused on the optimal means of rewarding desirable behaviour. In the case of corporate executives this has entailed careful examination of the role of stock holding, stock options, the elasticity of bonuses with respect to firm performance, and tournament prizes (Murphy, 1999). The explicit penalisation of unwanted behaviour is manifest through the dismissal threat and the threat of merger or acquisition which often puts incumbents' jobs in jeopardy. Early agency theorists proposed a third option for penalising agents, namely a performance bond (or security deposit). Principals may require agents to put personal wealth in jeopardy, up front, as a bond which is returned, with interest, if the norm of good behaviour is attained, or seized and the worker fired if not. One of the earliest models was Becker and Stigler's (1974) model in which bonds were proposed as a means of protecting against bribing law enforcers.

Early agency theorists suggested penalties were efficient incentives for two reasons. First, if bonding is costless to the firm it is profit-maximising relative to the alternative of paying efficiency wages or incentive payments which usually entail costly and often unreliable monitoring. Second, the marginal utility of money means the monetary reward required to induce good behaviour is larger than the monetary reward required to discourage bad behaviour (Mirrlees, 1976). Another reason why a bond may have a greater incentive effect than a reward of similar size is that, as predicted in prospect theory, agents may attach greater weight to the potential downside of loss than the upside of a similar gain (Kahneman and Tversky, 1979).

Bonds may also be valued by firms if, like performance pay, they induce worker self-selection (Oyer and Schaefer, 2011: 1973). We might anticipate that, in a world where workers differ in their reliability, those posting a bond are signalling their reliability, which will be prized by the firm (Parsons, 1986: 800-802). It is also possible that more able workers will accept performance bonds if they are more confident in meeting their

contractual requirements. Yet bonds may also dissuade applicants who could be beneficial to the corporation. For example, able applicants may be credit constrained, preventing them from applying for such posts. More risk-averse workers may be concerned about moral hazard leading firms requiring bonds to renege on the agreement (Ritter and Taylor, 1994). Workers may be less likely to accept bond arrangements where firms are performing poorly and may therefore find it difficult to repay the bond. They may also fear misclassification as a shirker if monitoring is imperfect, especially if the bond is sizeable, since misclassification could lead to bond forfeiture (Harris and Raviv, 1979). Finally, if bonds attract risk-seeking executives, this may not be optimal from the firm's perspective.[2]

In emerging market economies contracting parties are liable to rely more heavily on trust-based relations for contract enforcement. In China the trusting relations underpinning social and economic transactions are known as *guanxi*. Reliance on *guanxi* to enforce contracts is only possible where economic actors can tap into pre-existing networks, either in the firm (via internal appointments), the Communist Party, the family (via family ownership) or in smaller social circles (eg. smaller firms). Performance bonds can act as a substitute for these arrangements where they are unavailable to the firm. Indeed, according to Fehr and List (2004) threats to penalise shirking via mechanisms such as bonds actually have the potential to engender trust-based relationships. In a laboratory experiment using CEO's as subjects, they find the contracts liable to generate most trust are those with a clear threat component, but one which the principal chooses not to use. The contracts generating least trust are those in which the principal resorts to the threat: these generate lower trust than contracts in which the threat component is absent. The implication is that there is value in having a bond in place, but only if the bond does not need to be retained.[3]

[2] Malmendier and Tate (2005) point to the dangers of CEO overconfidence.

[3] Becker (1968) maintains that the threat of punishment is a function of size of the fine and the probability of detection. The opportunity costs of monitoring mean it is optimal to make the bond as large as possible and the probability of detection as small as possible. Thus in Becker's (1968) set up and Fehr and List's (2004) the efficacy of bonds depends to a large extent on the probability that the bond is not retained by the principal. Unfortunately there are no data on bond retention in our survey. Indeed, the only data on bond retention by the firm we are aware of relates to Chinese SoE's in the 1980s: Shirley and Xu (2001: 173) say bonds were forfeited in 16 percent of cases.

We are aware of only four studies which present empirical data on the prevalence and correlates of executive performance bonds. All four focus on the market for corporate executives in Chinese state owned enterprises (SoEs) in the 1980s. Groves et al (1995) describe the emergence of a functioning labour market for executives in the 1980s. At the beginning of the period, what the authors call the state's "industrial bureau" operated as principal in a "classic principal-agent relationship" (p.880), acting essentially as a central human resource management structure for what are characterised as branches of a single enterprise, the state. But in the early 1980s the state introduced reforms "directed at improving the efficiency of enterprises by replacing direct control from above with managerial incentives" (p. 874). This entailed the gradual commercialisation of SoE's and their part privatization, with key innovations including multi-year managerial contracts and experimentation with the auctioning of managerial contracts. By the late 1980s, this market was quite well-established, as indicated by the relatively short average tenure of executives. The authors argue that bonds were analogous to stock options in the West "giving (executives) a stake in their firm's performance" (p.888). They are thus conceived as "substituting for other managerial incentives found in established managerial labor markets" (p. 879) and were particularly valuable in the absence of a mature market in executives which might have enabled selection on merit based on a proven track-record.

Groves et al. (1995) find the use of bonds is widespread in SoE's in the 1980s and that they are sizeable relative to executives' annual salaries. They also note anecdotal evidence that bonds were "genuinely at risk" (p. 879), thus offering a real threat to underperforming executives.[4] They find empirical support for their contention that the elasticity of pay to firm performance is lower in SoE's with bonds, and that poorly performing firms were more likely to demand larger security deposits.

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[4] Groves et al. (1995) illustrates how bonds can be perceived in different ways – as a stake in the firm, a market signalling device, or as a potential threat to earnings. Which particular aspect of the bond is emphasized in a particular setting is likely to depend on the context. Our investigation of bond use in China indicates that bond arrangements vary, not purely in terms of the size of the deposit but also repayment schedules, and the executives covered. But in all instances the bond retains the “threat” feature relevant to principal-agent theory.

Using the same sample of 769 SoEs, Mengistae and Xu (2004) note that the percentage of SoE's requiring performance bonds is 8 percent over the period 1980-1989 but fluctuates markedly. At the end of the period over one-quarter of CEO's in their sample were paying bonds with a median value equivalent to roughly three times the average wage in the SoE sector. They confirm that pay-performance sensitivity is lower in firms requiring CEO's to post performance bonds "suggesting that bonds substituted pay-performance sensitivity as an incentive instrument" (p.630).

Bai and Xu (2005) also present evidence on the incidence and role of performance bonds in China's SoE's. Their data comprise a panel of contracts for 300 CEO's in manufacturing enterprises in four provinces in China in the late 1980s. They present a theoretical framework in which they conceive of the CEO's role as consisting of multiple tasks (those to improve firm performance; those to increase unobserved firm value; and those directed at private gain) which permits incentives to be either complements or substitutes. Sixteen percent of CEO's post bonds, often several times the value of their annual salaries. Contrary to the other two papers, they find bonds are complementary to other incentives, notably pay sensitivity with respect to profitability and contract length.

Shirley and Xu (2001) is the only paper which examines the effects of bonds on firm performance. Using the SoE panel data set used by Groves et al. (1995) Mengistae and Xu (2004: 190) find bonds are crucial to the success of performance contracts for CEO's since they appear to be a precondition for the success of these contracts in increasing firm productivity. They interpret this finding as supporting a key tenet of principal-agent theory that incentive contracts are most effective when parties to the contract are able to signal their commitment to one another.

3. Data and Hypotheses

We revisit some of the issues raised above and extend the literature in a number of ways by analysing World Bank Enterprise Data from the 2003 Investment Climate Survey (www.enterprisesurveys.org). This comprises a sample of 2,400 enterprises from 18

cities, 150 from 12 cities and 100 from 6 cities. The survey is completed by the most senior manager at the establishment. In the survey the term "General Manager" is used instead of CEO because the term "Chief Executive Officer" was not in common usage in China at the time.

Having been collected in 2003, our data refer to a time point well after the initial commercialisation of SoE's in the early 1980s. An efficient labour market in executives is well-established at this point. Median tenure for CEO's in our data is 5 years and two-thirds of hires are external to the firm. The public listed sector was growing very rapidly, thus increasing demand for good executives with the general (as opposed to firm-specific) skills required to maximise corporate profits. Judging by stability in the average age and ethnicity of executives in the public listed sector[5], the pool of executives was not receiving a large influx of new entrants, so it seems reasonable to conclude that the demand for good executives was exceeding supply. In most cases, the principal was no longer the "industrial bureau" portrayed by Groves et al.. Although state ownership is still a significant factor for many firms in our data, it is not true for all. The survey covers all sectors of the economy, not just SoE's and, unlike many recent papers on CEO pay in China, it contains, but is not confined to public listed companies. The mean state ownership stake for organizations in the survey was 22 percent, ranging from 63 percent in the one-third of organizations which were SoE's, a 20 percent stake in public listed firms, one-sixth state ownership in cooperatives, and near-zero in privately held firms. Twenty-one percent of corporations were majority state-owned, 12 percent were majority foreign-owned, and the remainder were majority domestically-owned.

We focus on four aspects of the labour market for executives which may affect firms' use of performance bonds: executive compensation packages; corporate governance mechanisms; CEO individual characteristics; and firm characteristics. We discuss each in turn. A fuller description of data items, together with their means and standard deviations, are presented in Appendix Table A1.

[5] The average age of a CEO in a listed company in 2003 was 45 and only 0.7% estimated to be of foreign origin (authors' calculations based on CSMAR corporate accounts data). These figures have changed very little since the late 1990s

CEO compensation packages

If bonds and incentive payments are simply alternative mechanisms for aligning the interests of agents with those of principals we might expect them to substitute for one another. On the other hand, in a multi-task environment CEO's may focus effort on rewarded tasks to the detriment of other job tasks (Holmstrom and Milgrom, 1991). Firms may respond through the use of multiple schemes which can offset one another such that agents align their behaviour more closely with principals' objectives. Thus, whether bonds are a complement or a substitute for other CEO incentives is an empirical question.

The incentive options available to firms in China in the early 2000s differ somewhat from those used in the United States and Europe. CEO compensation in the United States is dominated by stock options. In Europe, a substantial proportion of total compensation is based on Long-term Incentive Plans (LTIPs), although share options have become increasingly important there too (Conyon et al., 2012). In China, on the other hand, firms were unable to offer stock options until 2006 and the trading of stock holdings was tightly restricted until the early 2000s. Thus, cash compensation and bonuses constitute a greater proportion of total compensation in China than they do in the USA and Europe.

As well as being asked whether the CEO posted a security deposit and, if so, the amount, the survey asks about five other aspects of the CEO's compensation package. First, it establishes whether the CEO has an incentive plan linking his income to firm performance and, if so, which measures of firm performance are used. Second, where there is an incentive plan the survey establishes the elasticity of the CEO's income with respect to firm performance. Third, it asks whether the CEO holds company stocks and, if so, what percentage of the stock is held by the CEO. Fourth, it establishes whether the CEO's wage is paid annually and is thus eligible for an annual bonus subject to good

performance (the Chinese phrase being "Nian Xin Zhi").[6] Fifth, the survey establishes the ratio between the wage (including bonus) of the CEO to that of middle managers, and the ratio of middle managers' wage (including bonus) to that of "most employees". We thus have measures of the wage distribution in the firm. The ratio of CEO to other managers' pay gives us some idea of the size of the tournament prize for making it to the top of the firm.

As noted in Section Four below, our empirical approach is to establish the unconditional and conditional correlations between bonds and other facets of CEO compensation.

Corporate governance

Acharya et al (2010) propose a model in which good corporate governance is chosen as part of an optimal incentive contract aimed at attracting and retaining talent. Good corporate governance may therefore substitute for pay-for-performance and other incentives such as performance bonds. There is empirical evidence that strong incentives are positively associated with poor governance. Acharya et al (2010) and Fahlenbrach (2009) both find that bonuses and stock options are greater in firms with weaker governance. But this result is also consistent with Jensen and Murphy's (1990) proposition that poor corporate governance allows managers to skim profits away from the firm.

One might also conceive of performance bonds as a form of good corporate governance which punishes executives when things go wrong, in which case bonds may be positively or negatively correlated with other aspects of corporate governance for the same reasons that bonds may be positively or negatively correlated with other aspects of incentive pay.

There are also a number of reasons why we might expect performance bonds to be positively correlated with other aspects of good corporate governance. First, transparent corporate governance reduces the likelihood that the principal (shareholders) will be a

[6] For an example of such a contract see http://english.peopledaily.com.cn/200308/04/eng20030804_121628.shtml

poor monitor of the agent's (CEO's) performance, thus reducing likelihood of punishment in the absence of poor performance. Second, good corporate governance can make the CEO's job easier by ensuring that inputs are converted efficiently into outputs, for example via executives' ability to monitor subordinates more effectively. Third, CEO's may have a taste, or preference, for good governance if their own reputation is bound up with the firm they run.

Although the theory and evidence on the links between governance and incentive pay do not give any clear guidance as to the likely relationship between good governance and performance bonds, we think the link is worthy of empirical investigation because governance and incentives are commonly linked in policy debates about CEO rewards. Our measures of corporate governance include whether the firm has a Board of Directors; the composition of the board and, in particular, whether it contains independent board members and members chosen to represent the employees of the firm; stockholder concentration; whether the CEO is also the Chair of the Board of Directors; and various measures of board activism, such as whether the board has ever fired an executive, and the regularity with which board meetings take place.

CEO Characteristics

Our data contain a number of items characterising the CEO including his nationality and education, his previous labour market experience, his post prior to becoming CEO, his Communist Party status, and his decision-making autonomy.[7]

If performance bonds induce positive self-selection in terms of CEO ability, one might expect observable traits which are positively correlated with ability to be more prevalent among those CEO's posting bonds. These include higher education, as indicated by graduate status, and a higher status in the Communist Party. The latter occurs because Party promotions are based on merit and ability (Li et al., 2007). Assuming foreign CEO's incur costs in moving to China, one might also surmise that they are drawn from a higher part of the ability distribution than native Chinese CEO's.

[7] CEOs in China are typically male.

If performance bonds are used by firms as a screening device in the absence of strong market signals regarding managerial talent, one might expect firms to require security deposits when there is greater uncertainty about the individual they wish to appoint. They might therefore choose to keep CEO's on what Groves et al termed a "shorter leash" if they are not Party members, where the CEO is not Chinese, and where the CEO has little previous experience as a CEO. If the Party operates as an alternative screening device, or if the executive is already well-known to the firm because he has been promoted from within, performance bonds may be less necessary.

Bonds are problematic from a principal's perspective because their value is usually exceeded many times over by the value of the corporation's assets. These risks are exacerbated if the bonded CEO has the experience to gain control of the corporation's assets (the assumption being that this attribute comes with experience), or if the CEO has a large shareholding. We might therefore anticipate a negative correlation between performance bonds and CEO experience, and a negative correlation between CEO performance bonds and the size of the CEO's shareholding. The potential loss of reputation is an important incentive for agents to meet their contractual obligations. Since, as Rosen (1990) argues, reputational loss is less damaging for older executives, this is another reason why those appointing younger and less experienced executives may be *more* likely to resort to bonds.[8]

There appear to be two clear predictions regarding links between the characteristics of the CEO's job and posting a performance bond. First, one expects a link between bonds and job tenure. In an extension of the Becker and Stigler's (1974) model, Lazear (1979, 1981) suggests that deferred compensation is akin to the gradual posting of a bond since the CEO only receives full compensation (a pension, or the return of a performance bond)

[8] As Rosen puts it (1990: 3): "Career incentives serve as better substitutes for current performance incentives at earlier stages of a career than in later stages, when a rapidly diminishing horizon reduces any incentive effects of future status on current behavior". Our data do not contain CEO age, but we do have CEO experience.

after a period of satisfactory performance.[9] Deferred compensation of this type increases the costs of quitting, so one might therefore expect bonds to increase job tenure, and for this effect to increase with the size of the bond. Second, in common with all incentive schemes, the firm is unlikely to offer - and the worker is unlikely to accept - a contract linking his compensation to firm performance if he lacks the autonomy to make the decisions affecting firm performance. Thus one might anticipate a positive association between performance bonds and CEO job autonomy.

Firm

Given the trade-off firms must make between offering incentives, on the one hand, and insurance on the other (Rosen, 1990), one suspects that, just as pay-performance sensitivity may be lower where output is hard to observe (leading to mistaken appraisal) and where exogenous shocks to performance are salient, this will also limit use of bonding (which relies on an accurate appraisal of the agent's performance). Thus, firms are less likely to offer and executives are less likely to accept bonds where firms operate in volatile or unpredictable environments. We proxy this setting with the coefficient of variance for firm sales in the three years prior to the survey. Conversely, if market competition makes firm performance more responsive to CEO effort (because the firm will fail if the CEO shirks), we might anticipate a positive relationship between the degree of competition faced by the firm and performance bonds.

Firm size may be correlated with performance bonds. For example, if performance bonds result in CEO self-selection according to merit, Rosen's (1990) proposition that the market will allocate the most talented CEO's to the largest firms implies a positive link between bonds and firm size.

Another, rather different set of considerations is suggested by a broader understanding of social, political and economic institutions in China and their links to the reform of the executive labour market. Reforms such as the introduction of managerial incentives,

[9] Lazear suggests this helps explain concave lifetime earnings profiles, something Parsons (1986: 809-810) disputes.

were rolled out in piecemeal fashion across China and with the involvement of the state and national, regional and local level, often in the form of 'local experiments' (Xu, 2011). The initial 'test-bed' for reforms was often those parts of the state corporate sector which were most in need of reform, such as SoE's harbouring substantial debt. As Groves et al. (1995) note, performance bonds were an integral part of the early reforms to SoE's. If, as seems likely, there is a "legacy" effect associated with early adoption of such policies, one might expect performance bonds to be more prevalent in firms with either direct or indirect experience of the early reforms. One might also expect substantial geographical variance in the use of performance bonds and, in particular, a greater likelihood of a firm using bonds if other firms in the city also use bonds. Older firms, around since the early reform period, might also be more habituated to the use of bonds.

The process of corporate reform was on-going in the early 2000's, so firm characteristics associated with the initial reforms could still be pertinent in our data. The state's experience in using performance bonds as an instrument for corporate reform might conceivably mean state ownership continued to be positively associated with posting bonds in our data, while firms most distant from state-inspired reforms, notably foreign owned firms, would be less likely to resort to bonds. For similar reasons firms with strong links to the Communist Party hierarchy, such as firms appointing those from the top eschelons of the Party to CEO positions, might be more inclined than others to use performance bonds as an incentive device.

4. Empirical Approach

First we present some simple descriptive statistics for the incidence of performance bonds and their size. Then we run multivariate analyses for two models. The first are probit models estimating whether a CEO posts a performance bond or security deposit. The second set of models are ordered probits estimating the probability of a CEO paying no bond, a bond with a low value (less than 10,000 yuan), a sizeable bond (at least 10,000 yuan but less than 40,000 yuan) and a large bond (40,000 yuan or more).

The models contain four blocks of variables as per the discussion in Section Three, namely those relating to the CEO's compensation package, the firm's corporate governance, individual worker characteristics and firm characteristics.

Models therefore take the following form:

$$1) \qquad PB_{if} = \beta_w Comp_{if} + \beta_x CG_f + \beta_y Ind_i + \beta_z X_f + \varepsilon_{fi}$$

where PB_{if} is a dummy identifying the payment of a performance bond by CEO i in firm f; $Comp_{if}$ is a vector of variables capturing the compensation package paid to CEO i in firm f; CG_f is a vector of corporate governance variables in firm f; Ind_i are individual CEO demographic and job attributes; and X_f are structural firm attributes; epsilon is the error term and the betas are coefficients to be estimated. In practice, the absence of panel data means that we observe only one CEO per firm and so the *i* and *f* are non-separable.

We test for the joint significance of each block of variables, as well as discussing the significance of individual variables. We assess their quantitative importance using marginal effects.

The coefficient β_w indicates whether performance bonds and other performance incentives tend to coexist. A positive coefficient may indicate that they are typically complementary. [10]

5. Results

Eleven percent of CEO's in Chinese corporations posted performance bonds in 2003. The bonds are sizeable in value. Their mean (median) value is equivalent to 215 (71)

[10] We use complementarity in the sense used by Milgrom and Roberts (1995) such that doing more of X increases the returns to doing more of Y. A second, stronger test for complementarity of practices is to establish whether the combination of bonds and other incentive mechanisms has a greater impact on firm performance than deployment of a single incentive scheme. Unfortunately we lack the panel data permitting us to investigate this proposition.

percent of the mean (median) wage of workers at the time of the survey, or 14 (6) per cent of the cash compensation received by the CEO of a listed corporation.[11]

[INSERT TABLES 1 and 2]

Table 1 contains probit models estimating the probability that a CEO pays a performance bond. The models contain four blocks of variables relating to the CEO compensation package ; the firm's corporate governance practices; the CEO's individual characteristics ; and structural features of the firm. There are four variants of the model. Model (1) is our baseline model: by dropping cases with missing data, we lose 200 observations from the total sample of 2,400 firms, including 11 cases where performance bonds are paid. Model (2) introduces two variables relating to the product market the firm operates in, namely the number of competitors it faces and the coefficient of variance in sales over the previous three years. This results in the loss of a further 70 observations due to missing data. Model (3) is identical to Model (1) except that the eighteen city dummies are replaced by a single variable which captures the mean percentage of firms in a city that require the CEO to post a bond. Model (4) is identical to Model (2) but uses the percentage of firms in each city with bonds instead of the city dummies. All models are jointly statistically significant and the Pseudo-R^2 is typically in the range 0.16-0.17.

Table 2 is identical except that it is an ordered probit where the outcome has the four ordered outcomes described in Section Four above.
We discuss each block of variables in turn.

CEO compensation
The block of five variables are jointly highly statistically significant. Having an incentive plan linking CEO income to firm performance significantly increases the likelihood that the CEO will post a performance bond. The marginal effect indicates that the effect is

[11] Average worker wages are taken from China's Statistical Yearbook. The cash compensation of CEO's is taken from CSMAR accounting data for publicly listed companies. In obtaining these comparisons we remove one outlier value for the bond in the World Bank data which is nine times larger than the next highest value.

quantitatively large, raising the probability of posting a bond by 9 percentage points. Replacing the single dummy variable for incentive plans with dummies identifying the firm performance metric used for the plan (not shown) we find the effect is driven by plans which have profitability targets. Incentive plans with sales targets are not significantly associated with posting a bond. This is sensible if bonds are part of an incentive contract rewarding CEO's engaged in multiple tasks.[12]

Where CEO's had incentive plans linking their pay to firm performance the survey asked how much their income would increase with a 1 percent increase in firm performance, and a separate question asked how much their income would fall with a 1 percent fall in firm performance. Performance bonds were associated with a higher pay-for-performance sensitivity. A 1 percent rise in the most important firm performance measure (usually profits or sales) led to a 4.2 percent rise in CEO pay where the CEO posted a bond, compared to a 3.3 percent rise where the CEO did not post a bond. Although the effect is not statistically significant at conventional levels (t=1.48), the difference is statistically significant for the second most important measure of firm performance (t=1.81). In the case of a 1 percent decline in the most important measure of firm performance the consequent declines in CEO income were 5.0 percent and 3.7 percent respectively, a difference that is statistically significant at a 93 percent confidence level.

Holding stock in the company is positively correlated with posting a performance bond, but the correlation is only statistically significant in Table 2 indicating that the association is driven by posting larger security deposits, rather than by holding a bond per se.[13]

[12] Unlike sales targets, profit targets reward output increases and cost reductions, thus balancing incentives in the way one might anticipate where workers engage in multiple tasks (Holmstrom and Milgrom, 1991).
[13] In just under 10 percent of cases the CEO owned a majority of the stock in the company. When the CEO is a majority stockholder it seems less likely that a bond is required to align the agent's interests with those of the principal. This proves to be the case, since majority stockholding is negatively associated with posting a bond, albeit weakly.

The other aspect of CEO compensation packages which is positively correlated with posting a bond is being paid annually, an arrangement which means the CEO is eligible for an annual bonus subject to good performance. In Model 1 of Table 1 this increases the likelihood of paying a bond by 3.5 percentage points.

Neither the ratio of CEO pay to middle manager pay nor middle manager pay to "most employees" pay are associated with posting a bond. If larger differentials are interpreted as an indicator of using tournament prizes to incentivize CEO's, we can conclude that they are neither complementary to - nor substitutes for - bond posting.

Corporate governance

Although the corporate governance practices are jointly statistically significant in both the probit and ordered probit models the only corporate governance practice that is statistically significant is the dummy variable identifying the presence of employee representatives on the Board of Directors.[14] This increases the likelihood that the CEO must pay a bond. There is little evidence to support the proposition that good corporate governance practices substitute for performance bonds as a means of attracting managerial talent, although those enterprises with a CEO who was also the Chair of the Board of Directors were less likely to use bonds than enterprises with no Board of Directors.[15][16]

In alternative model specifications we introduced a variable identifying how the CEO was appointed. The survey question identified 6 options: nominated by the firm with the governing government agency giving approval; a government appointment; appointed by

[14] When the corporate governance measures are entered alone without other controls having a Board of Directors is negatively associated with CEO's paying performance bonds. Further investigation revealed that this effect was driven by circumstances in which the CEO was appointed by the Board of Directors. However, these effects are not statistically significant having controlled for firm characteristics.

[15] This result is obtained by adding together the coefficients for the firm having a Board of Directors and the CEO being the Chair of the Board: in Model (1) of Table 1 this coefficient of -.03 is statistically significant at a 95 percent confidence level (t=2.05).

[16] As an alternative to the ordered probit model we ran tobit models for the size of the security deposit with left-censoring at zero. In most respects they replicate the ordered probit estimates. However, it the tobit models the corporate governance models are always jointly statistically significant. In the tobits having a board of directors is negative and statistically significant while having independent board members is positive and statistically significant. The industry dummies are not jointly significant in the tobit models.

a board of directors; decided by shareholder meeting; appointed at an employee meeting; and "other". Although bivariate analyses indicated a greater likelihood of bond posting when the government was involved in appointing the CEO, this relationship was not significant having controlled for other factors.

The CEO's individual characteristics

The models contain five personal characteristics of CEO's (ethnicity, experience, education, previous position, and Communist Party status) and one job attribute, namely the autonomy afforded the CEO in making decisions.[17] They are jointly statistically significant in both the probit and ordered probit models but the only statistically significant variables are those relating to the CEO's previous position and Communist Party status. If the CEO was previously the deputy-CEO this increases the probability that the CEO will post a performance bond by 4 percentage points. CEO's who are Party members are more likely to post bonds than non-members. Furthermore, the likelihood of posting a bond is significantly higher where the CEO is Party Secretary of Deputy Party Secretary compared to those on the Executive Committee or regular members. These findings suggest that being a "known insider", either in the firm or the Party hierarchy, does not reduce the likelihood that one may forgo the need to post a bond when being appointed as a CEO. Instead, it seems likely that these "individual characteristics" are picking up "legacy" effects, that is, settings in which performance bonds have traditionally been used by firms. Alternatively, it may be that “insiders” are the only ones with knowledge about whether their bond will be safely returned to them. As such, the risk of posting a bond is lower for “insiders” whilst “outsiders” without this information may simply avoid CEO posts requiring performance bonds. Another possibility is that CEO’s with a party background are perceived by firms as more “bureaucratic” and, as such, may be more amenable to adopting a profit maximising orientation if they have to post a bond.[18]

[17] The job autonomy measure is an additive scale running from zero to a possible maximum score of 24 (the highest observed score being 21) based on the degree of autonomy - recorded in eight banded percentages from 0-19% to 100% - on three aspects of decision making. These domains are "production decisions (output, quantity, quality, investment and so on)", "investment decisions" and "labour flexibility (hiring, firing, wages)".

[18] We thank Simon Kirby for this observation.

Firm characteristics

The final block of variables are items relating to six characteristics of the firm (industry, size, age, location, ownership and product market). They were highly statistically significant jointly and separately, with the exception of majority ownership. The positive association with firm age is consistent with "legacy effects" whereby firms around at the time of the early reforms will have experienced initial experiments with the use of performance bonds in the context of the managerial auctions described by Groves et al. (1995) and Xu (2011). Similarly, the strong location effects picked up by city dummy variables are to be expected given the importance of regional and local government in experimenting with innovations in managerial practices. What is perhaps particularly striking is the strong positive association between a firm's likelihood of using performance bonds and the proportion of firms in that city using bonds. This is consistent with managerial innovations taking root in places where initial experimentation took place.[19]

The negative association between bonds and sales volatility is consistent with principal-agent theory and the proposition that firms must compromise between offering incentives and insurance. However, the negative correlation between having a large number of domestic competitors (16 or more) and posting bonds is not consistent with principal-agent theory. Instead, it may be an indication that experimentation with managerial incentives is being tested initially in environments in which firms are less likely to suffer from competition if the experiment fails.[20]

[19] Shirley and Xu (2001: 179) give a similar rationale for the strong association between bond use at provincial level and an individual firm's likelihood of using bonds in their SoE data for the 1980s.

[20] Groves et al. (1995) argue that bonds were more likely to be used in poorer performing enterprises. Shirley and Xu (2001: 186-187) find support for this proposition among SoE's in the 1980s. To test this proposition we added lagged performance values to the right hand side of our equations. First we incorporated measures of added value per employee - the level in 1999 and change in value added over the period 2002-1999. These variables were not statistically significant. Then we estimated similar equations replacing added value with the return on capital in 2000 and change in the return on capital between 2002 and 2000. These variables were positive and, in some equations, statistically significant. So, if anything, we see bond usage in firms with improving rates of return on capital. Whether this is as a result of bonds, or whether this is a precondition leading to bond use is hard to say since we do not know when bonds were first introduced.

6. Conclusions

Performance bonds are prominent in the theoretical literature where they are considered an efficient way of tackling principal-agent problems by ensuring that the threat of personal financial loss can align agent's interests with those of the principal, and can aid in the selection of the right managerial talent. Until now, the only empirical evidence on their use comes from studies of China's state owned enterprises in the 1980s. For the first time this paper considers the role of performance bonds, or security deposits, using representative enterprise data for a whole economy. We have shown that they were still widely used in Chinese corporations at the beginning of the 21st Century and that the security deposits required by firms were sizeable relative to CEO's annual cash compensation. Contrary to claims in the early empirical literature, we find performance bonds are complementary to other means of incentivizing CEO's: those who post bonds are also more likely to have their pay linked to firm performance, the sensitivity of their pay to performance is greater, and they are more likely to be eligible for annual bonus payments. Larger bonds are also associated with CEO stockholding. In comparison, the links to corporate governance practices are more tenuous.

Positive associations between performance bonds and firm age, CEOs with a high ranking in the Communist Party, and city-level clustering in the use of bonds are all consistent with "legacy" effects dating back to the use of performance bonds in the early reform period. As the Chinese economy develops it is possible that bonds will be phased out if firms are able to rely on the market to provide clear signals about managerial talent and if the economy adopts global norms of CEO payment via stock options and long-term incentive plans. It is equally possible that bonds will continue to play an important role in the executive labour market in China for two reasons. First, it seems that bond usage is no longer confined to the SoE's where they were originally adopted, suggesting that this is a practice that is proving valuable in a variety of settings. Second, and allied to this, the trust-based relationships encapsulated in the Chinese concept of *guanxi*, often used to underpin transactions in traditional Chinese settings, are liable to come under greater pressure with the switch to a modern industrial economy and dominance of market-based relationships. Performance bonds may help substitute for the absence of *guanxi* in future.

It is apparent that performance bonds play an important role in the CEO labour market in China. It is conceivable that they also play a key role elsewhere, especially in emerging market economies where bonds can be used to help select suitable candidates in the absence of clear market signals regarding managerial talent. This might be a fruitful avenue for future research.

References

Acharya, V., Gabarro, M., Volpin, P. (2010) "Competition for Managers, Corporate Governance and Incentive Compensation", London Business School mimeo

Bai, C-E., Xu, L. C. (2005) "Incentives for CEOs with multitasks: evidence from Chinese state-owned enterprises", *Journal of Comparative Economics*, 33: 517-539

Becker, G. S. (1968) "Crime and Punishment: An Economic Approach", *Journal of Political Economy*, 76, 2: 169-217

Becker, G. S. and Stigler, G. J. (1974) "Law Enforcement, Malfeasance, and Compensation of Enforcers", *The Journal of Legal Studies*, 3, 1: 1-18

Conyon, M. J., Fernandes, N., Ferreira, M. A., Pedro, M. and Murphy K.J., (2012) "The Executive Compensation Controversy: A Transatlantic Analysis" in Boeri T., Lucifora, C. and Murphy, K. *Productivity, Profits and Pay*, Oxford University Press

Fahlenbrach, R. (2009) "Shareholder Rights, Boards, and CEO Compensation", *Review of Finance*, 13, 81-113

Fehr, E. and List, J. A. (2004) "The Hidden Costs and Returns of Incentives – Trust and Trustworthiness Among CEO's", *Journal of the European Economic Association*, 2, 5: 743-771

Groves, T., Hong, Y., McMillan, J., and Naughton, B. (1995) "China's Evolving Managerial Labor Market", *Journal of Political Economy*, 103, 4: 873-892

Harris, M. And Raviv, A. (1979) "Optimal incentive contracts with imperfect competition", *Journal of Economic Theory*, 20: 231-259

Holmström, B. and P. Milgrom (1991). "Multi-task principal-agent analyses: Incentive contracts, asset ownership, and job design", *Journal of Law, Economics, and Organization* 7, 24-52

Jensen, M. and Murphy, K. J. (1990) "Performance Pay and Top Management Incentives", *Journal of Political Economy*, 98, 225-264

Kahneman, D. and Tversky, A. (1979) "Prospect Theory: An Analysis of Decision under Risk", *Econometrica*, XLVII, 263-291

Lazear, E. (1979) "Why is there mandatory retirement?", *Journal of Political Economy*, 87: 1261-1284

Lazear, E. (1981) "Agency, earnings profiles, productivity and hours restrictions", *American Economic Review*, 71: 606-620

Lazear, E. (2000) "Performance pay and productivity", *American Economic Review*, 90, 1346-1361

Li, H., Liu, P. W., Zhang, J. and Ma, N. (2007) "Economic Returns to Communist Party Membership: Evidence from Urban Chinese Twins", *The Economic Journal*, 117: 1504-1520

Malmendier, U. and Tate, G. (2005) "CEO Overconfidence and Corporate Investment", *The Journal of Finance*, 60, 6: 2661-2700

Mengistae T. and Xu L. (2004) "Agency theory and executive compensation: the case of Chinese state-owned enterprises", *Journal of Labor Economics*, 22, 3: 615-637.

Milgrom, P. and Roberts, J. (1995) "Complementarities and fit strategy, structure and organizational change in manufacturing", *Journal of Accounting and Economics*, 19, 2-3: 179-208

Mirrlees, J. A. (1976) "The Optimal Structure of Incentives and Authority within an Organization," *Bell Journal of Economics* 7: 105-131

Murphy, K. J. (1999) "Executive Compensation", Chapter Thirty Eight in O. Ashenfelter and D. Card (eds.) *Handbook of Labor Economics Vol. 3*, Elsevier

Oyer, P. and Schaefer, S. (2011) "Personnel Economics: Hiring and Incentives", Chapter 20 in O. Ashenfelter and D. Card (eds.) *Handbook of Labor Economics Vol. 4b*, Elsevier

Parsons, D. O. (1986) "The Employment Relationship: Job Attachment, Work Effort and the Nature of Contracts", Chapter 14 in XXX (eds.) *Handbook of Labor Economics Vol. 2*, Elsevier Science

Rebitzer, J. B. and Taylor, L. J. (2011) "Extrinsic Rewards and Intrinsic Motives: Standard and Behavioral Approaches to Agency and Labor Markets", Chapter Eight in O. Ashenfelter and D. Card (eds.) *Handbook of Labor Economics Vol. 4a*, Elsevier

Ritter, J. A. and Taylor, L. A. (1994) "Workers as creditors: efficiency wages and performance bonds", *American Economic Review*, 84, 3: 694-704

Rosen, S. (1990) "Contracts and the Market for Executives", NBER Working Paper #3542

Shirley, M., and Xu, L. C (2001) "The empirical effects of performance contracts: Evidence from China", *Journal of Law, Economics and Organization* 17 (April): 168-200

Xu, C. (2011) "The Fundamental Institutions of China's Reforms and Development", *Journal of Economic Literature*, 49, 4: 1076-1151

Table 1: Probit estimates of the probability that a CEO posts a performance bond

Dependent variable: Whether CEO posts a performance bond	[1] Coeff.		[2] Coeff.		[3] Coeff.		[4] Coeff.	
CEO compensation:								
Incentive plan linking pay to performance	0.524	***	0.524	***	0.514	***	0.512	***
	[5.96]		[5.83]		[6.00]		[5.86]	
Owns company stock	0.156		0.150		0.149		0.138	
	[1.55]		[1.47]		[1.52]		[1.39]	
Paid under annual salary system	0.215	**	0.171		0.181	*	0.138	
	[2.07]		[1.61]		[1.79]		[1.33]	
Ratio of CEO wage to middle managers'	-0.005		-0.005		-0.002		-0.002	
	[-0.29]		[-0.32]		[-0.14]		[-0.15]	
Ratio of middle managers wage to 'most employees'	-0.008		-0.007		-0.011		-0.010	
	[-0.63]		[-0.56]		[-0.88]		[-0.79]	
Corporate governance:								
Firm has Board of Directors	-0.216		-0.185		-0.224		-0.192	
	[-1.53]		[-1.28]		[-1.63]		[-1.38]	
CEO is also Chair of Board	-0.086		-0.101		-0.087		-0.104	
	[-0.71]		[-0.83]		[-0.74]		[-0.87]	
Single shareholder	0.078		0.095		0.105		0.117	
	[0.69]		[0.83]		[0.96]		[1.06]	
Independent member(s) on Board	0.174		0.165		0.187		0.178	
	[1.44]		[1.34]		[1.57]		[1.48]	
Employee rep on Board	0.352	***	0.346	***	0.357	***	0.355	***
	[2.94]		[2.84]		[3.06]		[3.00]	
CEO characteristics:								
CEO experience before current post	0.015		0.015		0.014		0.014	
	[1.14]		[1.12]		[1.13]		[1.11]	
Has graduate degree	-0.070		-0.073		-0.066		-0.078	
	[-0.60]		[-0.60]		[-0.58]		[-0.67]	
Chinese	0.099		0.107		0.146		0.157	
	[0.25]		[0.27]		[0.38]		[0.41]	
Position prior to becoming CEO: Other	ref.		ref.		ref.		ref.	
Deputy CEO	0.230	***	0.233	**	0.214	**	0.214	**
	[2.59]		[2.55]		[2.45]		[2.39]	
Ordinary employee	0.135		0.151		0.145		0.160	
	[0.93]		[1.01]		[1.02]		[1.10]	

continued

Table 1 continued

Dependent variable: Whether CEO posts a performance bond	[1] Coeff.		[2] Coeff.		[3] Coeff.		[4] Coeff.	
Communist Party membership: Non-member	ref.		ref.		ref.		ref.	
Party secretary	0.518	***	0.530	***	0.527	***	0.542	***
	[4.15]		[4.17]		[4.35]		[4.39]	
Deputy Party secretary	0.683	***	0.678	***	0.667	***	0.661	***
	[4.17]		[4.01]		[4.17]		[4.00]	
Executive or committee member	0.306	**	0.308	**	0.317	**	0.317	**
	[2.12]		[2.07]		[2.24]		[2.18]	
Party member	0.296	**	0.298	**	0.305	**	0.300	**
	[2.40]		[2.35]		[2.53]		[2.43]	
Autonomy scale	-0.012		-0.008		-0.012		-0.008	
	[-1.56]		[-0.99]		[-1.60]		[-1.03]	
Firm characteristics:								
Majority owner: Domestic	ref.		ref.		ref.		ref.	
Foreign	-0.151		-0.148		-0.124		-0.119	
	[-0.59]		[-0.57]		[-0.51]		[-0.48]	
State	-0.158		-0.154		-0.140		-0.136	
	[-1.55]		[-1.47]		[-1.41]		[-1.33]	
Other	0.110		0.062		0.125		0.082	
	[0.30]		[0.17]		[0.35]		[0.23]	
Size (‘000 employees)	0.022	**	0.019		0.021	**	0.018	
	[2.11]		[1.60]		[2.05]		[1.56]	
Age (years)	0.010	***	0.009	***	0.010	***	0.009	***
	[3.41]		[3.10]		[3.44]		[3.21]	
More than 15 competitors in main business line			-0.203	**			-0.203	**
			[-2.08]				[-2.13]	
Coefficient of variance in firm's sales, last 3 years			-0.294	*			-0.254	*
			[-1.90]				[-1.69]	
Mean bond size among other firms in city					3.962	***	4.197	***
					[5.34]		[5.54]	
Constant	-1.506	***	-1.306	***	-2.510	***	-2.372	***
	[-3.12]		[-2.62]		[-5.56]		[-5.06]	
Pseudo-R2	0.173		0.178		0.152		0.156	
Obs	2200		2130		2200		2130	

Model 1: Baseline model. All models incorporate industry dummies. Models 1 and 2 include city dummies.

Model 2: M1 + product market characteristics.

Model 3: M1 + average city bond (no city dummies).

Model 4: M3 + product market characteristics.

t-statistics appear in brackets * p<0.10, ** p<0.05, *** p<0.01

Table 2: Ordered probit estimates of the size of the performance bond

Dependent variable: Size of the performance bond (ordered)	[1] Coeff.		[2] Coeff.		[3] Coeff.		[4] Coeff.	
CEO compensation:								
Incentive plan linking pay to performance	0.525	***	0.522	***	0.504	***	0.502	***
	[6.14]		[5.99]		[6.04]		[5.91]	
Owns company stock	0.225	**	0.219	**	0.208	**	0.200	**
	[2.31]		[2.21]		[2.20]		[2.08]	
Paid under annual salary system	0.200	**	0.186	*	0.183	*	0.165	*
	[1.99]		[1.81]		[1.87]		[1.65]	
Ratio of CEO wage to middle managers'	-0.002		-0.003		-0.001		-0.001	
	[-0.13]		[-0.17]		[-0.05]		[-0.06]	
Ratio of middle managers wage to 'most employees'	-0.005		-0.006		-0.007		-0.008	
	[-0.49]		[-0.49]		[-0.64]		[-0.65]	
Corporate governance:								
Firm has Board of Directors	-0.203		-0.189		-0.202		-0.192	
	[-1.47]		[-1.34]		[-1.51]		[-1.40]	
CEO is also Chair of Board	-0.103		-0.106		-0.105		-0.108	
	[-0.89]		[-0.90]		[-0.92]		[-0.94]	
Single shareholder	0.093		0.116		0.112		0.132	
	[0.85]		[1.05]		[1.06]		[1.23]	
Independent member(s) on Board	0.168		0.164		0.18		0.178	
	[1.44]		[1.39]		[1.57]		[1.53]	
Employee rep on Board	0.386	***	0.382	***	0.403	***	0.4	***
	[3.33]		[3.24]		[3.55]		[3.48]	
CEO characteristics:								
CEO experience before current post	0.016		0.015		0.016		0.015	
	[1.24]		[1.21]		[1.27]		[1.23]	
Has graduate degree	-0.090		-0.071		-0.082		-0.071	
	[-0.79]		[-0.61]		[-0.74]		[-0.63]	
Chinese	0.040		0.058		0.102		0.126	
	[0.11]		[0.16]		[0.29]		[0.35]	
Position prior to becoming CEO: Other	ref.		ref.		ref.		ref.	
Deputy CEO	0.230	***	0.252	***	0.219	**	0.238	***
	[2.65]		[2.84]		[2.56]		[2.72]	
Ordinary employee	0.174		0.198		0.187		0.210	
	[1.25]		[1.38]		[1.36]		[1.49]	

Continued

Table 2 continued

Dependent variable: Size of the performance bond (ordered)	[1] Coeff.		[2] Coeff.		[3] Coeff.		[4] Coeff.	
Communist Party membership: Non-member	ref.		ref.		ref.		ref.	
Party secretary	0.508	***	0.502	***	0.535	***	0.53	***
	[4.21]		[4.10]		[4.54]		[4.44]	
Deputy Party secretary	0.586	***	0.553	***	0.581	***	0.552	***
	[3.63]		[3.33]		[3.68]		[3.40]	
Executive or committee member	0.246	*	0.219		0.268	*	0.24	*
	[1.74]		[1.52]		[1.93]		[1.70]	
Party member	0.242	**	0.223	*	0.257	**	0.232	*
	[2.01]		[1.82]		[2.18]		[1.94]	
Autonomy scale	-0.008		-0.004		-0.008		-0.004	
	[-1.05]		[-0.48]		[-1.06]		[-0.52]	
Firm characteristics:								
Majority owner: Domestic	ref.		ref.		ref.		ref.	
Foreign	-0.176		-0.187		-0.149		-0.153	
	[-0.71]		[-0.74]		[-0.62]		[-0.62]	
State	-0.134		-0.116		-0.126		-0.106	
	[-1.34]		[-1.13]		[-1.29]		[-1.06]	
Other	0.095		0.051		0.107		0.065	
	[0.27]		[0.14]		[0.31]		[0.18]	
Size (‘000 employees)	0.016		0.013		0.016		0.014	
	[1.53]		[1.29]		[1.56]		[1.32]	
Age (years)	0.009	***	0.007	**	0.008	***	0.007	**
	[2.99]		[2.50]		[2.96]		[2.54]	
	[1]		[2]		[3]		[4]	
More than 15 competitors in main business line			-0.209	**			-0.219	**
			[-2.21]				[-2.37]	
Coefficient of variance in firm's sales, last 3 years			-0.283	*			-0.251	*
			[-1.88]				[-1.72]	
Mean bond size among other firms in city					3.300	***	3.492	***
					[4.57]		[4.74]	
Pseudo-R2	0.118		0.123		0.105		0.109	
Obs	2189		2121		2189		2121	

Model 1: Baseline model. All models incorporate industry dummies. Models 1 and 2 include city dummies

Model 2: M1 + product market characteristics.

Model 3: M1 + average city bond (no city dummies).

Model 4: M3 + product market characteristics.

t-statistics appear in brackets * p<0.10, ** p<0.05, *** p<0.01

Appendix Table A1: Descriptive statistics

	Mean	SD	Min	Max	Obs
Whether CEO posts a performance bond	0.120	0.325	0	1	2200
CEO compensation:					
Incentive plan linking pay to performance	0.286	0.452	0	1	2200
Owns company stock	0.305	0.461	0	1	2200
Paid under annual salary system	0.201	0.401	0	1	2200
Ratio of CEO wage to middle managers'	2.263	3.678	0	105	2200
Ratio of middle managers wage to 'most employees'	4.062	7.449	0	118	2200
Corporate governance:					
Firm has Board of Directors	0.511	0.500	0	1	2200
CEO is also Chair of Board	0.243	0.429	0	1	2200
Single shareholder	0.773	0.419	0	1	2200
Independent member(s) on Board	0.166	0.372	0	1	2200
Employee rep on Board	0.235	0.424	0	1	2200
CEO characteristics:					
CEO experience before current post	1.424	2.864	0	22	2200
Has graduate degree	0.836	0.370	0	1	2200
Chinese	0.959	0.198	0	1	2200
Position prior to becoming CEO: Other	0.645	0.479	0	1	2200
Deputy CEO	0.275	0.446	0	1	2200
Ordinary employee	0.081	0.273	0	1	2200
Communist Party membership: Non-member	0.339	0.473	0	1	2200
Party secretary	0.224	0.417	0	1	2200
Deputy Party secretary	0.068	0.251	0	1	2200
Executive or committee member	0.128	0.334	0	1	2200
Party member	0.241	0.428	0	1	2200
Autonomy scale	16.345	5.056	0	21	2200
Firm characteristics:					
Majority owner: Domestic	0.699	0.459	0	1	2200
Foreign	0.070	0.254	0	1	2200
State	0.218	0.413	0	1	2200
Other	0.014	0.118	0	1	2200

Continued

Table A1 continued

	Mean	SD	Min	Max	Obs
Industry sector: Clothing	0.147	0.354	0	1	2200
Food	0.029	0.168	0	1	2200
Metals and machinery	0.064	0.245	0	1	2200
Electronics	0.225	0.417	0	1	2200
Chemicals and pharmaceuticals	0.036	0.187	0	1	2200
IT services	0.084	0.278	0	1	2200
Telecommunications	0.003	0.052	0	1	2200
Accounting and finance	0.069	0.253	0	1	2200
Advertising and marketing	0.064	0.244	0	1	2200
Other services	0.112	0.315	0	1	2200
Auto and auto components	0.168	0.374	0	1	2200
Size (‘000 employees)	0.557	2.920	0	70	2200
Age (years)	14.943	14.437	2	52	2200
City: Benxi	0.045	0.206	0	1	2200
Changchun	0.067	0.251	0	1	2200
Changsha	0.067	0.251	0	1	2200
Chongqing	0.068	0.251	0	1	2200
Dalian	0.036	0.186	0	1	2200
Guiyang	0.052	0.222	0	1	2200
Haerbin	0.067	0.250	0	1	2200
Hangzhou	0.045	0.206	0	1	2200
Jiangmen	0.044	0.204	0	1	2200
Kunming	0.050	0.217	0	1	2200
Lanzhou	0.059	0.236	0	1	2200
Nanchang	0.065	0.247	0	1	2200
Nanning	0.056	0.231	0	1	2200
Shenzhen	0.035	0.183	0	1	2200
Wenzhou	0.045	0.208	0	1	2200
Wuhan	0.068	0.252	0	1	2200
Xian	0.067	0.251	0	1	2200
Zhengzhou	0.065	0.247	0	1	2200
Mean bond size among other firms in city	0.115	0.056	0	0	2200
More than 15 competitors in main business line	0.793	0.406	0	1	2146
Coefficient of variance in firm's sales, last 3 years	0.328	0.288	0	2	2184