The moderating effect of environmental uncertainty on executive shareholding and firms' investment decisions

Richard B. Nyuur*

Newcastle Business School,
Northumbria University,
City Campus East 1, Newcastle upon Tyne, NE1-8ST, UK
Email: richard.nyuur@northumbria.ac.uk
*Corresponding author

Hao Wu

Retail Financial Department,
Industrial Bank Co. Ltd.,
No. 399 Weiyang Road, Yangzhou, Jiangsu Province, China
Email: 970265086@qq.com

Yaw A. Debrah

School of Management,
Swansea University,
Bay Campus,
Fabian Way, Swansea, SA2-8PP, UK
Email: y.a.debrah@swansea.ac.uk

Abstract: This study investigates the relationship between executive shareholding and firm investment decisions (FID) under circumstances of environmental uncertainty (EU). We posit that the implementation of equity incentive plans for executives could influence their decision-making behaviour towards underinvestment or overinvestment. Using data from a sample of 400 listed Chinese firms from 2009–2012, we find that the relationship between executive shareholding (ES) and FID is inverted U-shaped. Further, we find a negative relationship between environmental uncertainty and FID, but no evidence of a moderating effect of environmental uncertainty on the association between executive shareholding and investment decisions. We, therefore, outline the implications of these findings and advance a theory based on these findings.

Keywords: executive shareholding; firm investment decisions; FID; corporate performance; environmental uncertainty; China.

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Biographical notes: Richard B. Nyuur is an Associate Professor (reader) of Strategic Management and International Business at the Northumbria University, UK. His research interests are strategy and international business. He has published in many journals such as *Thunderbird International Business Review*, *Journal of International Management*, *International Marketing Review*, *Journal of Business Research*, *Journal of Small Business Management*, *International Journal of HRM*, *International Journal of Business Governance and Ethics*, and *Journal of Strategy and Management*. He is on the editorial boards of a number of journals.

Hao Wu is a Product Manager at the China Industrial Bank. He holds a Postgraduate (MSc) in Business with Financial Management from the Northumbria University, UK. He research interest is broadly in business strategy and corporate governance, with particular focus on top management investment decision-making in the Chinese business environment.

Yaw A. Debrah is a Professor of Human Resource and International Management at the Swansea University, UK. He has held academic positions at the Cardiff University, Brunel University and Nanyang Technological University, Singapore. He also worked in Africa, Canada and the USA. He has published numerous articles on human resource management (HRM) in Asia and HRM and international business/management in Africa. He is also on the editorial boards of several journals.

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1 Introduction

The separation of control and ownership of the firm presents the possibility of managers choosing to pursue their own interests, which may deviate from those of shareholders (Daily, 1996; Kaczmarek and Nyuur, 2016; Hoskisson et al., 2018). The potential for divergent interests between owners and executives is perceived as an inherent hazard of corporate optimum investments (Nyberg et al., 2010; Tosi and Gomez-Mejia, 1994). Incentivising agents to make optimum and unbiased investment decisions is central to achieving and sustaining competitive advantage (Hoskisson et al., 2018). Executive compensation contracts constitute one of the most prominent protection mechanisms used by organisations, to align managerial interests with those of shareholders and thus, confront the agency cost resulting from this separation (Carver et al., 2013). Corporate governance scholars have argued that the inclusion of stock ownership in executive compensation packages is the most explicit alignment mechanism that can alleviate executive opportunistic behaviour which tends to deviate from shareholders' interests (Martin et al., 2013; Sanders, 2001). Moreover, environmental uncertainty (EU) is suggested as an essential component in the design of top management compensation packages (Barkema and Gomez-Mejia, 1998). The established wisdom is that the inclusion of stock ownership in compensation packages can effectively align managerial preferences and actions with those of the shareholders (Nyberg et al., 2010; Hoskisson et

al., 2018). This view has seen an expanded use of equity-related compensation packages for executives since the 1980s (Hall and Liebman, 1998; Hall, 2003).

Nevertheless, scholars have called into question the ability of such packages to effectively align shareholders' and executives' interests (Chen et al., 2010). Moreover, studies have not yet explicitly examined the role of executive shareholding (ES) and firm investment decisions (FID), as well as the moderating role of EU in the ES and FID association. Most empirical studies and meta-analyses on the effectiveness of stock ownership to align managerial and shareholders' interests have also consistently not yielded convincing results (Barkema and Gomez-Mejia, 1998; Nyberg et al., 2010). Extant research has, however, thrown some light on the role of stock ownership and stock options in the decision-making of management (Sanders and Hambrick, 2007). The opportunistic argument suggests that stock ownership may affect the risk-related behaviour of the executive, causing them to make either riskier or less risky decisions than is optimal from the shareholders' perspective (Nyberg et al., 2010).

This indicates that under such compensation packages, executives are likely to sub-optimally invest in order to boost short-term performance and cash in on their stock ownership (Bushee, 1998). This may particularly be the case when executives have higher levels of shareholding in the company, which accord them more power and freedom to pursue more of their own interests without worrying about the decrease of firm value. Based on different executive-shareholding levels, the agency problem could therefore distort investment decisions, leading to various decision-making behaviours such as underinvestment or overinvestment (Cho, 1998; Currim et al., 2012).

Moreover, while EU or complexity is suggested as an influencing factor in the design of top management compensation packages (Barkema and Gomez-Mejia, 1998), EU is also considered as a relevant factor that affects executives' behaviour and investment decision-making in a firm. This notion of EU being influential in executives' investment decisions has become salient since the global financial crisis in 2008, when enterprises in many countries faced turbulent economic uncertainty because of the sudden tightening of commercial credit and the rapid fall in customer's confidence around the world, which in turn decreased their spending (Yang and Inklaar, 2012). Extreme EU may influence executives' investment decision-making behaviour towards that which is sub-optimal.

Accordingly, executive stock ownership may also influence managers to make decisions that are more or less risky but less profitable than what shareholders would prefer (Sanders and Hambrick, 2007; Hoskisson et al., 2018). Nyberg et al. (2010) further underscore that the inclusion of high levels of stock ownership in management compensation packages could influence them to make decisions that are riskier than is optimal. This is suggestive that equity incentive plans for executives could influence their decision-making behaviour differently at different levels of shareholding towards underinvestment or overinvestment especially in an uncertain business environment. It is also unclear whether there is an optimum level of ES whereby their behaviour and decision-making would align with that of the shareholders.

This article attempts to fill this lacuna in the literature by moving beyond the tired testing of only the relationship between executive compensation and firm performance (CP), to specifically examine:

1 the impact of ES on FID and CP

2 the impact of ES levels and EU on FID

3 the optimal level of ES at which top management investment decisions would be more aligned with shareholder interests

4 the moderating effect of EU on ES and FID.

Through the lens of the principal-agency theory and the optimal contracting theory, these issues are examined using a sample of 400 publicly listed Chinese companies on both the Shanghai and Shenzhen Stock Exchange in China from 2009–2012. This represents a different sample in a different and complex context from many existing studies on executive compensation with the exception of few (Conyon and He, 2011; Chen et al., 2010). However, while Chen et al. (2010) examined the effects of insider control on Chinese executive compensation, Conyon and He (2011), on the other hand, investigated the association between executive pay and firm performance in China's publicly traded firms from 2001 to 2005.

The findings of the study reveal that the relationship between ES and FID is an inverted U-shape. Specifically, the study establishes that when ES is low, top management team investment decisions will be positive and aligned to the interests of the shareholders. However, when ES is high, then a significant and negative impact will be observed on the FID. Significantly, this study fails to find evidence supporting the moderating effect of EU on the relationship between ES and FID. The results of the study further show that ES does not significantly influence CP. These findings are significant and have enhanced our understanding of the impact of ES and EU on firms' investment decisions making. Furthermore, the study adds to the growing scholarly work in this context on executive compensation. The rest of the paper proceeds as follows. The next section reviews the literature and theoretical underpinnings on ES, EU and FID. This is followed by the methodology, analysis and findings. The results are subsequently discussed and implications for both theory and practice are set out.

2 Theory and hypotheses

Principal-agency theory is the dominant paradigm and foundation on which scholars examine the mechanisms that firms use to solve moral hazards, enhance monitoring quality and align managerial interest to those of shareholders (Barkema and Gomez-Mejia, 1998; Kaczmarek and Nyuur, 2016). The principal-agency theory focuses on the contradiction that the principal (shareholders) and agent (executives) are committed to the same goal (Jensen and Meckling, 1976). The theory provides that the agents may elect to pursue their own interests, which may diverge from those of the principals due to the separation of control and ownership of the firm (Eisenhardt, 1989). The optimal contracting theory, which proceeds directly from the agency theory, further provides specifically that managers are self-serving and that compensation packages are vital mechanisms for aligning the interests of both principal and agents, in order to mitigate the agency problem (Carver et al., 2013; Gillan, 2006). The principal-agent theory thus concentrates mainly on the issues about designing an effective incentive package that aligns managerial preferences and actions and also stimulate the agents to create maximum profits for their principals (Ross, 1973).

Mitnick (2006) observed that under the principal-agency theory, both the principal and agent have problems. The principal problem relates to how to better stimulate the

agent to work towards the same goals as the principal. The agent's problem, on the other hand, involves how to effectively balance their own interest with that of the principal in the process of making decisions, especially when their interests diverge (Mitnick, 2006). Incentives mechanisms which incur costs to the principal help reduce these problems (Barkema and Gomez-Mejia, 1998). Thus, while a supervision mechanism is used to limit the scope of the agent's discretion, especially for some vital decisions and specific tasks, incentives mechanisms supply the agents with various rewards depending on the principal's expected goals, such as promotion, increased salary and extra dividends (Mitnick, 2006). The expectation is that an effective incentives mechanism would motivate top management to direct their behaviour, attention, decisions, preferences and efforts towards those actions that would benefit them and the owners in the same measure (Nyberg et al., 2010).

The problem, however, is that policing and incentives mechanisms tend to produce costs paid by the principals. Notwithstanding, such mechanisms are suggested to be particularly desirable when it is difficult or costly to monitor executive behaviour or decisions about the benefit of certain actions (Jensen and Meckling, 1976). However, it has been concluded that agency costs are inescapable when ownership and control are separated, and could only be seen as 'inefficiencies' when compared with an 'ideal world' where the principal and agent could work toward the same interests without agency costs (Mitnick, 2006). It is therefore arguable to suggest that developing policing and incentive mechanisms and bringing them into force is reasonable when the incremental value to the principal's target exceeds the cost produced by policing and incentives. The most explicit incentive mechanism usually employed to counter managerial mischief in this alignment effort is the use of ES (Nyberg et al., 2010).

2.1 ES and corporate performance

The relationship between ES and CP has been studied by several scholars using the agency theoretical lens with conflicting results. For instance, Jensen and Mecking (1976) found that an increase of ES will reduce the agency cost and improve CP. Demsetz and Lehn (1985), on the other hand, found no association between ES and CP. However, Stulz (1988) later established that when executives have a high level of ownership, they will be stable in their managerial positions and that will induce a negative correlation between ES and enterprise valuation. Furthermore, McConnell and Servaes (1990) noted that CP increases with a low percentage of ES and declines with a high percentage of ES. Meanwhile, Hermalin and Weisbach (1991) found a nonlinear relationship between CP (using Tobin's Q as a proxy) and the proportion of executive ownership.

Recent empirical analyses still do not present a conclusive view about the association between ES and CP. Some studies demonstrate that ES is positively related to CP. Larcker and Core (2002), for instance, test a sample comprising firms that employ 'target ownership plans', under which executives should acquire a certain amount of stock. After the increase of managerial ownership within two years, the excess accounting return and stock price became higher than before indicating improvements in corporate performance. Additionally, Guo and Chen (2003) collected data from 123 companies in Japan from 1987 to 1995 and investigated the correlation between ES and enterprise valuation and found that the interests of shareholders and managers tend to be aligned with an increase in executive ownership. Others find that the correlation between ES and CP tends to be positive up to a certain level where it then begins to decrease (Anderson

and Reeb, 2003; Florackis and Kostakis, 2009; McConnell and Servaes, 2008; Santos and Adams, 2006). Florackis and Kostakis (2009), for instance, show a positive association between CP and ES at the level below 15%, but no strong relationship between the two when managerial ownership is at the medium and high levels.

However, it has been identified that the explanation of a positive relationship between ES and CP ignores potential endogeneity issues (Benson and Davidson, 2009). Demsetz (1983) pointed out that the observed positive correlation between ES and CP is not acceptable, but influenced more by market forces. Hanson and Song (2000) further demonstrated that an increase of ES will give executives more leverage to negotiate with shareholders, which will produce the negative cooperative effect and reduce performance. Iqbal and French (2007) also showed that managers with a higher percentage of ownership will always separate their incentives from the goal to maximise shareholders' wealth. Jahmani and Ansari (2006) examined the influence of ES on risk-taking and CP using data from four different industries in four single sectors and found no obvious correlation between these variables for the overall sample. We argue that, in weak institutional and regulatory contexts, executives will have fewer checks on them. Therefore, including a high level of equity options in their compensation packages will give managers more freedom and power to pursue their interests to the detriment of the overall long-term performance of the firm.

We, therefore, expect the relationship between the level of ES in their compensation packages and CP to be asymptotic. This means the impact will be positive and increase until managerial influence on performance outcomes reaches an optimal level. Beyond this optimal upper limit, any increase in ES will do little to enhance firm performance and diminishing returns will begin to occur (Tosi and Gomez-Mejia, 1994). Also, beyond this optimal level, executives may be excessively cautious in their strategic decisions, especially regarding risky issues which may lead to sub-optimal performance of the firm (Tosi and Gomez-Mejia, 1994). This means that the impact of ES will begin to diminish after a certain level. Based on the above discussion, we hypothesise that:

H1a A low level of ES is positively related to corporate performance.

H1b A high level of ES is negatively related to corporate performance.

2.2 ES and firm investment decision

Investment decision-making is another vital role of firms' top management. Haleblian and Finkelstein (1993) state that top managers require strong information-processing abilities that are combined with the effectiveness of the firm's strategic decision-making in order to influence CP. The problem of principal and agency could, however, influence the decisions of executives towards underinvestment or overinvestment (Nyberg et al., 2010; Tosi and Gomez-Mejia, 1994). It is argued that managers generally prefer to reduce workload and additional investment would require them to spend more time to supervise the activities, which could influence them to also underinvest (Christensen, 1981). Additionally, if executives do not have ownership interest, they may not be willing to promote innovation in combination with risk-taking decisions (Wright et al., 1996). Executives may prefer to support activities that can improve their own wealth and seek short-term goals rather than long-term development of the firm and the overall interests of shareholders. Jensen (1986) notes that due to the agency problem executives tend to

invest in negative net present investment (NPI) program, in order to achieve more personal benefits from acquiring more assets, which is considered as overinvestment. In addition, some positive net present value (NPV) investment program which may benefit shareholders could be abandoned as extra investments would produce private costs on them in the short run.

Managerial ownership could serve as an incentive for executives to align their investment decisions and behaviour with the interest of the owners and in reducing the agency problem (Jensen and Meckling, 1976). Accordingly, a high level of ES means that shareholding wealth rests upon the firm's long-term performance. This stimulates executives to make optimal investment decisions that increase the competitive forces of firms over the long haul (Zahra et al., 2000). However, Fama and Jensen (1983) posit that managers may become entrenched under such circumstances and pursue their own interests rather than the goals of all shareholders. Cosh et al. (2006) find that managerial entrenchment is combined with firm innovation, which is incredibly risky, but good for their long-term performance. Jelinek et al. (1990) further propose that innovation should be supported by consistent investment in R&D in order to maintain firms' innovative ability. Powerful managerial support is thus required to be successful in innovation, especially when program are unprofitable during the first several years of innovation (Nam and Tatum, 1997; Starr et al., 1993). Papadakis and Barwise (2002) therefore suggest that managers' attitude towards innovation and willingness to bear risk will influence executive's decision-making behaviour.

Most studies suggest that managerial ownership positively influences firms' innovative activities (Lerner and Wulf, 2007; Ryan and Wiggins, 2002). Ryan and Wiggins (2002), for instance, concluded that ES and R&D expenditures are positively correlated, while restricted stock ownership is negatively correlated with R&D expenses. Lerner and Wulf (2007) examined listed US firms and found that with regard to centralised R&D firms, long-range incentives, for instance stock options, will produce more heavily cited patents of better originality. This finding is supported by Dechow (1991) who argues that firms implementing equity incentive mechanisms for senior executives will see an increase in innovation and R&D expenditure. Sanders and Hambrick (2007) further underscore that stock options affect executive strategic behaviour and high levels of stock ownership tend to motivate top management to take big risks. ES could therefore decrease underinvestment behaviour, which will be beneficial for innovation and the further development of the firm.

However, when the level of share ownership is high, managers may be discouraged by the potential risk of innovating and cut back on investments in innovation or research and development. Furthermore, they may be extremely cautious with risky projects in their strategic decisions to the extent that attractive business opportunities are missed (Tosi and Gomez-Mejia, 1994). They stand to lose a great deal if their actions or decisions lead to the failure of their company (Sanders and Hambrick, 2007). For instance, Cosh et al. (2012) tested a sample of British enterprises and found that ES influences innovative efficiency positively when their ownership is at a low level until it reaches approximately 65% to 68%, at which point it turns negative. This means that at high levels of ES, executives may try to reduce their exposure to risk, which may tilt their strategic investment decisions or choices away from risky but optimal options that many shareholders may prefer (Tosi and Gomez-Mejia, 1994). At such high levels of ES, executives would have significant concern for potential failure or losses and such

concerns are likely to prevent them from taking the needed risks (Sanders and Hambrick, 2007).

This reasoning is based on the conventional wisdom that shareholders are more risk-neutral than executives because of the generally diversified nature of their holdings and tend to prefer risks that can generate large or maximum returns (Sanders and Hambrick, 2007). Notwithstanding, other scholars suggest that the level of ES may influence top management risk preferences, causing them to make either riskier or less risky decisions than is optimal from the shareholders' perspective (Nyberg et al., 2010; Tosi and Gomez-Mejia, 1994). In line with this reasoning, we expect that high levels of ES would reduce the alignment of shareholders' and managerial interests leading to a reduction in the quality of FID. Based on the above discussion, we hypothesise that:

H2a A low level of ES is positively related to FID.

H2b A higher level of ES is negatively related to FID.

2.3 EU and investment decision

EU is defined as the lack of pivotal information coupled with the unpredictability of conditions, trends and overall nature of the firms' business environment in the short, medium to long-term (Aldag and Storey, 1979). It indicates the inability of managers to understand and anticipate possible changes or critical elements in the overall environment. It is claimed that EU has an influence on the behaviour, actions and strategic investment decisions of firms' top management (Schwark, 2009). According to Cukierman (1980), risk-neutral executives of enterprises tend to reduce their investments in times of higher uncertainty. Such enterprises tend to think it is profitable to try to postpone one investment decision to gather more relevant information. Bernanke (1983) argues how prospective uncertainty can decrease when information has been collected. However, the consequence of delaying an investment decision would be the 'opportunity cost' of not investing, considered as the 'cost of waiting' (Myers, 1977). The impact of EU on FID is significantly based on the indeterminate factors that the executives can perceive. Because their business environment is more complicated and dynamic, executives facing more EU may be more cautious when making investment decisions.

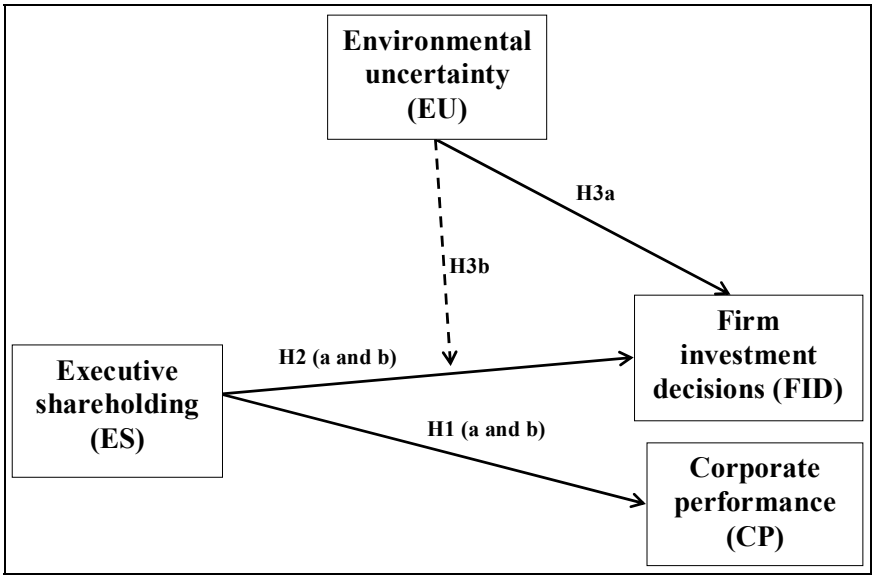
Li and Simerly (1998) point out that firms that perform well in complicated business environments are likely to be managed by senior executives with ownership. This demonstrates that share ownership as part of executive compensation packages could encourage managers to work towards a common objective, whereas those management teams without share ownership packages may tend to work for their own interests. It means that EU really influences the structure of ownership, and in an uncertain business environment, FID is influenced by executives, especially when they are at the optimal level of ownership. Top management also have to contend with the issue of risk under EU. We expect that executives' exposure to risk under such conditions would likely skew their strategic investment decisions away from optimal choices (Nyberg et al., 2010; Sanders and Hambrick, 2007; Tosi and Gomez-Mejia, 1994). Consequently, it is likely to produce the phenomenon of overinvestment or underinvestment decisions by top management. In line with the above reasoning, we expect that EU will moderate the relation between ES and FID. Thus, we hypothesise:

H3a There is a negative relationship between EU and optimal FID.

H3b Environment uncertainty has a moderating effect on the relationship between ES and FID.

Figure 1 is the resulting proposed conceptual model highlighting the hypotheses developed from the extensive literature review. As depicted by the model, we test the impact of low and high levels of ES and FID as well as CP. In addition, we test the relationship between EU and FID. Furthermore, we test whether EU moderates the relationship between ES and FID.

Figure 1 Moderating effect of EU on ES – FID relationship proposed model



3 Methodology

3.1 Sample and data collection

This study uses mainly accounting data of all publicly listed Chinese companies on both the two domestic stock exchanges (Shanghai and Shenzhen Stock Exchanges) in China. Over the years, China has adopted series of corporate governance principles which reflects the Anglo-Saxon corporate governance models (Mutlu et al., 2018). For instance, the codes of corporate governance issued by the Securities Regulatory Commission stipulates the separation of the role of chief executive officer (CEO) and chairperson, the inclusion of independent directors, as well as other best practices of corporate governance (Conyon and He, 2011). In China, company shares can be owned by individuals, institutions, private businesses, or the state through state-controlled agencies or legal persons (Conyon and He, 2011). State-controlled shares are normally non-tradable; however, our study focuses on firms with tradable shares on the stock exchanges. The data of these companies were therefore collected from Bloomberg and CSMAR

databases. The reputation of Bloomberg ensures the validity of the raw data collected. CSMAR is also one of the main providers of valid and reliable Chinese economic data. Moreover, we used the official websites of both Shanghai and Shenzhen Stock Exchange centres to complement and validate the data we collected through Bloomberg and CSMAR databases.

In 2008, the Chinese stock market fell rapidly (Ruan et al., 2009) due to the global financial crisis. As a result of the potential impact of the 2008 global financial crisis and the high uncertainty throughout that year, we considered that year to be an unusual year and therefore excluded the data from 2008 in this research. This was to eliminate any potential bias of the data on the results. The sample period was therefore from 2009 fiscal year to 2012 fiscal year. In addition, firms that were labelled as 'special treatment' (ST) and 'particular transfer' (PT) companies, where the investors' interests were protected by the China Securities Regulatory Commission (CSRC), were also excluded. These firms suffered consistent negative profits and were in danger of delisting. Since the focus of this research was on listed firms where executives had stock ownership; we considered it appropriate to exclude these companies as well. After eliminating these companies, we arrived at 400 listed Chinese companies constituting our valid sample for data capture and analysis.

3.2 Measures

3.2.1 Dependent variables

Corporate performance (CP)

We selected one market-based measure of CP, Tobin's Q, as the dependent variable. As a market-based measure, Tobin's Q has been employed to represent criteria for CP, which is the market value of the firm over its replacement cost. Since it is possible to learn about a company by means of the market's valuation of its securities, and grasp the enduring influences of corporate actions, the value of Tobin's Q is an appropriate substitution for corporate valuation as adopted in previous studies (Bhagat and Bolton, 2008; Guest, 2009). However, Demsetz and Villalonga (2001) point out that Tobin's Q misinterprets the comparisons of CP, because the denominator (replacement cost) reflects only the tangible assets of firms, while the numerator (market value) reflects both tangible and intangible assets. Therefore, many researchers have employed the depreciated book value of total assets as the substitution of replacement cost when calculating Tobin's Q. This approach was also adopted in this study.

Firm investment decision (FID)

Firm's investment activities were measured as capital expenditures in one fiscal year divided by start-of-year book assets for the purposes of this study and this technique is widely adopted by researchers (Baker et al., 2003; Fung and Tsai, 2012). In contrast with previous literature, such as Fazzari et al. (1988) and Kaplan and Zingales (1997), where the denominator is net real estate assets, the measures of investment are scaled by book assets. Since the sample in this research includes non-manufacturing corporations with modest fixed assets, intangible assets are included in this measure.

3.2.2 Independent variables

Executive shareholding

To examine the influence of ES on CP, we define executives as individuals that hold the authority to draw up policy and implement strategic decisions of the company (Chen and Yu, 2012). Some researchers also refer to a manager as the CEO of any corporation and argue that the authority for making strategic decisions belongs to the CEO (Goranova et al., 2007; Hall and Liebman, 1998). It is acknowledged that CEOs' actions and decisions can impact corporate culture, business strategy and the behaviour of other senior executives significantly (Mansi and Anderson, 2003). Consequently, based on the agency theory, CEO ownership could produce the strongest and most direct measure of ES. Nevertheless, other scholars argue that other top executives are also equipped with capability and motivation to be stewards of corporate resources (Dalton et al., 2003). Bhagat and Bolton (2008) further mention that the whole corporate board can make, or at least impact, all vital financial policies, and that it is reasonable to supply them with proper equity ownership that would increase their motivation to monitor corporate decisions effectively. Hence, this research adopted the equity ownership of all board members as a proxy of ES, which is calculated as the percentage of total shares. Moreover, to enable us to examine the nonlinear relationship between ES and firm performance, as well as FID as hypothesised in H1a, H1b, H2a and H2b, ES was squared and entered into the regression analyses as another independent variable (ES^2).

Environmental uncertainty (EU)

Alexander (1991) shows that uncertainty in product markets is one major source of uncertainty in a business environment, especially for executives of multidivisional firms. Dess and Beard (1984) define the product-market uncertainty, which develop over a period, as fluctuations in net sales of every company when analysing SIC industries. This measure makes it possible to evaluate the changes in a persistent variable that discloses a source of EU for most firms. Following Bergh (1998), we measured the degree of EU as changes in the net sales over a constant period, which is four fiscal years in this paper. The volatility was the standard deviation of net sales over the four-year period divided by the mean of net sales. Smaller values mean lower degree of uncertainty in the environment.

3.2.3 Control variables

Following Maury (2006) and Su and Cheng (2012), a number of firm-specific variables that are related to corporate performance were controlled. First, *FIRM SIZE* was controlled and represented as the natural logarithm of the company's total sales. Ng (2005) considers it to have a positive impact on corporate performance due to the flexibility of large firms to acquire external financing and achieve economies of scale. Furthermore, it has been suggested that larger firms may have more diverse project portfolios and greater motivations to conduct innovative activities because of positional advantages (Scherer et al., 1992; Mezias, 1992). Second, we controlled for *CASH FLOW*, which is represented as the proportion of net cash flows to start-of-year book assets

(Panousi and Papanikolaou, 2012). It has been shown that cash flows have significant extra explanatory power indicating strong financial constraints.

There are also some liquidity constraints that were adopted. *FIRM LEVERAGE* measured as the ratio of total debts to total assets was controlled as it is considered to be negatively related to corporate performance (Su and Cheng, 2012). We also controlled for *GROWTH* in net sales, which is calculated as the growth rate of sales per fiscal year. Growth is considered to have a positive relationship with CP (Morck et al., 1988). Finally, we controlled for FIRM AGE, which is explained as the natural log of firm age, and calculated as the years after the date of initial public offering (IPO), showing the firm life-cycle effects on investment decisions.

4 Analysis and results

For the purpose of examining the research hypotheses, the data collected were analysed using correlation and regression analysis. Table 1 demonstrates the descriptive statistics of these variables applied to examine the connection between ES and CP as well as FID. The mean of ES is 10.33% with a maximum of 70.6% and a minimum of 0%. On average, the percentage of shareholding that executives have has improved compared with that reported in Ruan et al. (2009) (mean of 9.3% with a civilian-run Chinese-listed firms sample period of 2002–2007). This can be attributed to the implementation of equity incentive plans. However, the proportion of ES is still at a low level, indicating that the promotion penetration of the equity incentive plans is low in the research context. The value of Tobin's Q in 2009 to 2012 ranges from 0.474 to 13.323 with a mean of 2.24. It is still shown that the companies in this sample have an average of 9.23 in firm size, 24.25% in financial leverage, 30.83% in sales growth, 0.60 in cash and 1.02 in age.

The correlation analysis also enabled us to examine the extent of multicollinearity among the variables which is simplified considerably as almost all coefficients are negatively correlated. The results of the correlation analysis support the regression analysis. To prevent potential complications from other factors on the CP and FID, five control variables, namely SIZE, AGE, CASH, LEVERAGE and GROWTH, were added to the regression analyses as shown in models 1 to 4 of Tables 2 and 3. The R^2 value in model 1 of Table 2, which illustrates the explanatory power of the control variable, is 0.302, suggesting that 30.2% of the variation in CP is explained by the control variables. Firm SIZE ($\beta = -0.227$, $P < 0.01$), AGE ($\beta = -0.190$, $P < 0.01$) and LEVERAGE ($\beta = -0.310$, $P < 0.01$) are negatively and significantly associated with CP, while no significant relationship is observed between CASH ($\beta = -0.067$, $P > 0.05$), GROWTH ($\beta = 0.044$, $P > 0.05$) and CP.

To test Hypotheses H1a and H1b, the direct effects of ES and its squared term ES^2 (for high levels of ES) on CP and FID were examined and shown in model 2 and model 4 of Table 2, respectively. The squared term of ES (ES^2) was entered into both models 2 and 4 to test the nonlinear relationship between ES and CP as well as FID. The results show that firm SIZE ($\beta = -0.233$, $P < 0.01$), AGE ($\beta = -0.231$, $P < 0.01$) and LEVERAGE ratio ($\beta = -0.316$, $P < 0.01$) are significantly and negatively related to CP (Tobin's Q). However, ES is positive but not significantly ($\beta = 0.056$, $P > 0.05$)

associated with CP (Tobin's Q), while ES^2 ($\beta = -0.118$, $P > 0.05$) is negatively but also not significantly associated with CP. These results are in the direction as hypothesised but not significant. Thus, H1a, which suggests that low ES is positively and significantly related to CP, is not supported. H1b, which also posits that higher level of ES is negatively and significantly related to CP, is rejected.

Moreover, in model 4 of Table 2, the coefficients of ES ($\beta = 0.508$, $P < 0.01$) and ES^2 ($\beta = -0.375$, $P < 0.01$) are both significantly related to FID. The results show that low ES positively enhances FID in alignment with shareholders' interests and high ES will negatively impact the FID towards underinvestment or overinvestment. These results show strong support for H2a and H2b. The results imply that ES-CP and ES-FID curves both slope upward up to a certain high level of ES and then slope downwards. It confirms that low ES is positively related to firms' FID; but when ES is high, a significant and negative impact will be observed on FID.

We further probed the impact of EU on FID as hypothesised in H3a. The results of only the controlled variables in model 1 of Table 3 indicate that LEVERAGE ($\beta = -0.373$, $P < 0.01$), AGE ($\beta = 0.239$, $P < 0.01$) and SIZE ($\beta = -0.176$, $P < 0.01$) are significantly related to firms' investment decisions. In contrast, GROWTH ($\beta = -0.052$, P = ns) and CASH ($\beta = 0.063$, P = ns) do not have a significant relationship with FID. The control variables together explain 18.5% of the variation in FID ($R^2 = 0.185$, adjusted $R^2 = 0.174$, F change = 17.837). The direct effects of EU and ES on FID are shown in model 2. The results indicate that the direct effect of EU on FID ($\beta = -0.155$, $P < 0.01$) is negative and significant. The model variables explain 21.2% of the variation in FID ($R^2 = 0.212$, adjusted $R^2 = 0.198$, F change = 6.842). Since EU is negatively related to FID ($\beta = -0.155$, $P < 0.01$), our Hypothesis H3a, which suggest that a negative relationship exist between EU and FID, is supported. The results of the five control variables in model 2 show that LEVERAGE ($\beta = -0.354$, $P < 0.01$), SIZE ($\beta = -0.158$, $P < 0.01$) and AGE ($\beta = 0.276$, $P < 0.01$) are significantly related to FID. These results demonstrate that EU has a significant impact on FID with or without the presence of the control variables.

Arnold (1982) argues that moderated regression analysis is the most direct way to examine hypotheses where an interaction is implied. Interaction effects can be tested to be significant if they can represent a substantial increase in the variance in the dependent variable compared with other independent variables. Aryee et al. (2016) suggest that in social science literature, interactions normally account for about 1% to 3% of the variance. Huang et al. (2010) further reveal that a change in the R^2 value of 0.02 as a result of including the interaction terms is considered to be an acceptable cut-off point confirming the presence of moderating effects. The results of the moderating effect of EU on ES-FID relationship is presented in model 3 of Table 3. In this study, the change of the R^2 value (that is 0.032 increase) is higher than the threshold figure of 0.02, demonstrating a reasonable interaction effect of EU on the ES-FID. However, the coefficient of the interacting term ES*EU is not significant ($\beta = 0.15$, $P > 0.01$), thus not fully supporting H3b, suggesting that EU has a moderating effect on ES and FID.

Table 1 Means standard deviations, correlations and coefficients for variables in all data

Variables	*Max.*	*Min.*	*Mean*	*S.D.*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1 SIZE	11.06	7.91	9.23	.590	1									
2 AGE	1.36	.700	1.02	.226	.438**	1								
3 GROWTH	32.82	–.524	.308	1.66	–.029	–.078	1							
4 LEVERAGE	.790	.000	.243	.172	.375**	.339**	–.053	1						
5 CASH	6.08	.029	.598	.558	–.084	–.400**	.124*	–.223**	1					
6 Tobins Q	13.32	.474	2.24	1.36	–.422**	–.371**	.073	–.447**	.103*	1				
7 Firm investment decisions	–.001	–.958	–.169	.152	–.215**	.014	–.038	–.369**	.059	.099*	1			
8 Executive shareholding (ES)	.706	.000	.103	.160	–.385**	–.691**	.184**	–.336**	.358**	.273**	.091	1		
9 Environmental uncertainty	1.37	.019	.266	.168	.034	–.122*	.145**	.020	.201**	.165**	–.186**	.065	1	
10 ES^2	.499	.000	.036	.081	–.307**	–.521**	.277**	–.288**	.333**	.201**	.064	.935**	.052	1

Notes: N = 400.
*Correlation is significant at the 0.05 level (two-tailed).
**Correlation is significant at the 0.01 level (two-tailed).

Table 2 Results of regression analyses for the effects of ES on CP and FID

Variables	*Corporate performance (Tobins Q)*				*Firm investment decisions (FID)*			
	Model 1		*Model 2*		*Model 1*		*Model 2*	
Hypotheses			*H1a and H1b*				*H2a and H2b*	
	β	*(SE)*	*β*	*(SE)*	*β*	*(SE)*	*β*	*(SE)*
Intercept	8.83***	(0.945)	9.38***	(1.020)	0.156	(0.114)	0.000	(0.127)
Control variables								
SIZE	–.227***	(0.113)	–.233***	(0.114)	–.176**	(0.014)	–.165**	(0.014)
LEV	–.310***	(0.371)	–.316***	(0.373)	–.373***	(0.045)	–.363***	(0.045)
GROWTH	.044	(0.035)	.052	(0.035)	–.052	(0.004)	-.029	(0.004)
AGE	–.190***	(0.312)	–.231***	(0.377)	.239***	(0.038)	.387***	(0.051)
CASH	–.067	(0.114)	–.061	(0.115)	.063	(0.014)	.067	(0.014)
Main effects								
ES			.056	(1.406)			.504**	(0.168)
ES^2			–.118	(2.397)			–.375*	(0.286)
R^2	0.302		0.304		0.185		0.202	
Adjusted R^2	0.293		0.293		0.174		0.187	
F change	34.016***		1.364		17.837***		4.212*	
Durbin Watson	1.974		1.962		2.045		2.037	

Notes: N = 400 listed Chinese firms.
*p < 0.05, **p < 0.01 and ***p < 0.001.

Table 3 Results of regression analyses for the main and moderating effects of EU on FID and ES-FID relationship

Variables	*Firm investment decisions (FID)*					
	Model 1		*Model 2*		*Model 3*	
Hypotheses			*H3a*		*H3b*	
	β	*(SE)*	*β*	*(SE)*	*β*	*(SE)*
Intercept	0.156	(0.114)	0.108	(0.121)	0.118	(0.121)
Control variables						
SIZE	–.176**	(0.014)	–.158**	(0.014)	–0.158**	(0.014)
LEV	–.373***	(0.045)	–.354***	(0.044)	–0.355***	(0.044)
GROWTH	–.052	(0.004)	–.044	(0.004)	–0.052	(0.004)
AGE	.239***	(0.038)	.276***	(0.045)	0.275***	(0.045)
CASH	.063	(0.014)	.082	(0.014)	0.085	(0.014)
Main effects						
ES			.090	(0.061)	–0.45	(0.104)
EU			–.155**	(0.042)	–0.200***	(0.050)
Interaction terms						
ES*EU					0.161	(0.298)
R^2	0.185		0.212		0.217	
Adjusted R^2	0.174		0.198		0.201	
ΔR^2	–		0.028**		0.032**	
F change	17.837***		6.842**		5.360**	
Durbin Watson	2.045		2.110		2.100	

Notes: N = 400 listed Chinese firms.
*p < 0.05, **p < 0.01 and ***p < 0.001.

5 Discussion and conclusions

This study was motivated by the desire to unpack and clarify the impact of ES and EU on FID and CP. Building on the executive-shareholding literature based on agency theory, we proposed and examined a model of ES influence on CP and FID under EU. Specifically, we examined how low and high levels of ES affect CP as well as top management investment decisions. We further examined the moderating effect of EU on FID. Based on hierarchical regression analysis, our results reveal five main findings:

1 ES does not significantly influence CP

2 low ES positively influences the quality of FID towards optimal options that are in line with shareholder interests

3 high ES negatively influences the quality of FID in ways that deviate from the optimal business outcome and that of shareholders' interests

4 EU reduces the quality of management's investment decisions

5 the interaction between EU and ES was not significant, depicting that EU does not moderate the relationships between ES-FID.

These findings have several theoretical and managerial implications. We discuss the implications of these findings in the succeeding paragraphs.

5.1 Theoretical implications

Theoretically, the study has made a number of contributions to the executive compensation mechanism literature. First, the study extends the growing literature on EU and firms' performance since the global financial crisis in 2008 (Yang and Inklaar, 2012). Specifically, the finding that top management investment decisions tend to deviate from optimal options during EU is very instructive. This implies that executives usually gravitate towards underinvestment or overinvestment during periods of high uncertainty in the business environment. It validates the assertion that executives' reputations and economic wherewithal are tied to their firms, and they stand to lose a great deal, including their careers, during such periods (Sanders and Hambrick, 2007). As a result, they become more conservative with risky investment decisions which may diverge from the optimum business investment or the interest of shareholders.

Second, research has documented the role of executive share ownership on top management's actions and behaviour in the developed economies (Nyberg et al., 2010; Sanders and Hambrick, 2007; Tosi and Gomez-Mejia, 1994). But researchers have generally stopped short of examining whether share ownership aligns the principal and agents' interests or rather promotes top management investment decisions that depart from the interests of shareholders. By examining this issue from an emerging country's context, this study adds a novel perspective to the literature by revealing that low ES would align the strategic investment decisions of top management with shareholder interests. High executive-share ownership, on the other hand, will lead to investment options that are not optimally aligned with shareholder interests. Moreover, by proposing and testing the interaction effects of ES and EU on top management investment decisions, this study adds a nuanced perspective and extends previous research.

Finally, there has been conflicting findings on the impact of share ownership on firm performance. Some empirical studies found no positive impact (Guo and Chen, 2003; Larcker and Core, 2002) whilst others found negative or no obvious impact (Hanson and Song, 2000; Iqbal and French, 2007; Jahmani and Ansari, 2006). Others found different levels of impact on CP at different levels of ES (Anderson and Reeb, 2003; Florackis and Kostakis, 2009; McConnell and Servaes, 2008; Santos and Adams, 2006). This study, although from a different context, found no significant impact on CP and emphasises that ES alone is not enough to enhance CP. The finding thus confirms Benson and Davidson's (2009) view that other endogenous or exogenous factors may better explain CP than share ownership per se. Therefore, this paper has enhanced understanding of the impact of ES on CP, especially from a different and a very important context.

5.2 Practical implications

Our results demonstrate that low ES will yield the intended and positive results than high or excessive ES as part of executive incentive packages. Thus, incentive plans with low and moderate stock options should be encouraged in such contexts. Although they may not directly translate to superior CP, they would yield desired results in terms of encouraging management to make optimal strategic investment decisions. Moreover, that would enhance the quality of corporate governance practices and reduce agency cost to listed firms within the research context. Additionally, the finding that EU negatively affects FID implies that firms could put in place mechanisms to improve their information-processing abilities in order to reduce the risk of EU. The CSRC could refine the Code of Corporate Governance practices to ensure that executive-shareholding packages are design to maximise the benefit for all stakeholders and not solely the executives. The state-controlled firms in the research context could consider adopting appropriate executive-shareholding packages to enhance and ensure the optimum performance of state-controlled firms. Finally, the board of directors system and independent director system should be encouraged to enhance quality oversight duties.

5.3 Limitations and future research

This study is not without limitations. First, we used capital expenditures in one fiscal year divided by start-of-year book assets, as widely adopted by researchers to measure FID. Notwithstanding the justification provided in this study regarding the use of capital expenditure, it limits the generalisability of the findings. It would be useful for future studies to ensure a more comprehensive measurement of executive strategic investment decisions. Further, measuring EU is complicated and future research could look to using a more fine-grained measure than in this study. Second, the ownership structure of listed firms in China is quite different from those in developed western countries. Even though private control of firms tends to be more generalised in China, the majority of share ownership is controlled by the state. Moreover, firms in the sample operate in different markets and industries that may have distinct ownership structural requirements to satisfy their objectives. These could have impacted the results and reduced the generalisability of the findings in this study. Future studies can therefore explore how these factors will vary in different contexts. Finally, the results of this study are based on data from 2008–2012, which may not have the same relevance at different time periods. Scholars can therefore

endeavour to include a longer period of time in future studies. Considering that local, cultural and other contextual factors could influence executive decision-making in the research context, future studies could employ path dependency theory, managerial and class hegemony, as well as political theory (see Roe, 2003) as fertile theoretical lenses to examine the relationship between ES and FID.

In conclusion, this study has enhanced our understanding of the role ES plays in firms' investment decision-making, particularly in the fluid transition economy of China in which the establishment and enforcement of corporate governance legislation are currently insufficient (Yiu et al., 2019). These findings highlight the role of executive share ownership levels in aligning the interests of principals and agents. They also present important insights and implications for developing appropriate incentive packages for top management teams in the research context.

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