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# Documents de Treball

**AGENCY COST OF GOVERNMENT  
OWNERSHIP: A STUDY OF VOLUNTARY  
AUDIT COMMITTEE FORMATION IN CHINA**

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**Document de Treball núm. 09/3**

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Edita / Publisher:

Departament d'Economia de l'Empresa

<http://selene.uab.es/dep-economia-empresa/>

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**ISSN:**

1988-7736. Documents de Treball (Departament d'Economia de l'Empresa, Universitat Autònoma de Barcelona)

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First Draft: April 2008  
This Draft: February 2009  
Comments welcome

## **Agency Costs of Government Ownership: A Study of Voluntary Audit Committee Formation in China**

CHARLIE X. CAI, DAVID HILLIER, GAOLIANG TIAN, QINGHUA WU

### *Abstract*

In this paper, we investigate the agency costs of government ownership and their impact on corporate governance and firm value. China is used as a laboratory because of the prevalent state shareholdings in exchange-listed firms. In this context, we specifically consider the trade-offs involved in the voluntary formation of an audit committee when the controlling shareholder is the state. The decision to improve corporate governance (in this case, introduce an audit committee) is shown to be value relevant and a function of existing agency relationships and non-trivial implementation costs. Our findings are robust to the level of pyramid groups, the ownership-control wedge, and financial leverage. The research adds to the debate regarding the effect of government shareholdings on corporate culture and performance - a topic that has taken on renewed importance in recent times.

JEL classification: G15; G18; G30

*Keywords:* Government Owned Enterprises; Corporate Governance; Auditing; Audit Committee; Pyramid Groups.

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## **Introduction**

Since Jensen and Meckling's (1976) discussion of the implicit and explicit contracts between owners and managers, research has improved our understanding of the agency costs relating to separation of ownership and control. However, it is documented in a global context that the diffused shareholdings that underlie Jensen and Meckling's (1976) theory are not the norm in most countries. Instead, concentrated, pyramidal, and government ownership structures are far more common (La Porta, et al (1999), Claessens, et al (2002)). This imposes another set of agency relationships on firms, particularly between the controlling shareholder (government or non-government) and minority shareholders.

The influence of state ownership and its interaction with other corporate governance mechanisms is not well understood. Theoretical debate on the reason for state ownership in listed corporations falls into one of three camps. The first view is that governments invest when there has been some form of market failure (see Atkinson and Stiglitz (1980)), and state ownership has social benefits that the free market is unwilling to fund. The part nationalization of the banking sector in 2008 and 2009 by several governments lends strong credence to this hypothesis.

Another view is that government-controlled organizations are simply vehicles for politically linked individuals to gain power or wealth as a reward for supporting the incumbent government party. Government appointed executives may not have the requisite skills to run a large company and, collectively, a board consisting of several such individuals is likely to be inefficient. state-owned organizations have been shown to have suboptimal investment policies and are undervalued by market participants (see Shleifer (1998)).

The third perspective combines the first and second view by arguing that governments invest in firms out of a social need. However, because of inefficient bureaucracy and indirect political agendas, managers have a tendency to become

entrenched and lack accountability (see Tirole (1994), Banerjee (1997), and Hart et al. (1997)).

In this paper, we examine the effect of government ownership and control on corporate governance through the propensity of firms to improve their accountability to outside shareholders. We focus on the *voluntary* formation of an audit committee since financial reporting quality is one of the main building blocks of good governance.

In accounting research, arguments for improving transparency and accountability are based on reducing information asymmetry and mitigating the agency costs of the organizational form. In general, stakeholders demand high quality reporting, which allows them to effectively and efficiently monitor the performance of management. Controlling for the heterogeneous agency relationships that exist in today's modern corporation, the main way to reduce the information gap between management and external stakeholders is through high quality financial disclosure.

The optimal level of disclosure in a firm is determined by the trade-off between the outside demand for information and management's private benefit associated with knowledge of the firm's daily operations. Moreover, this trade-off is implicitly influenced by the firm's ownership and capital structure, as well as the costs of implementing new governance systems.

In most firms, some form of monitoring or bonding mechanism may be introduced to limit the potential for wealth to be diverted from stakeholders (Jensen and Meckling, 1976). One approach is to voluntarily form an audit committee to improve the quality of financial disclosure. Literature has shown that audit committees enhance managerial accountability and are an effective component of corporate governance (see, E.g., Wild (1994)). Since audit committees provide better quality assurance, their usefulness should increase in response to the level of agency problems within a firm.

Whereas in most developed markets, an audit committee is necessary for stock exchange listing, in China audit committees are optional. By examining the determinants of audit committee formation and separately analyzing the impact of government control, we are able to disentangle the agency costs of state ownership and its effect on corporate value. This is an important objective given the newly energized call for government ownership in major industries, such as the banking and automobile sectors.

Our study makes four main contributions to the literature. First, we consider the effect of government ownership on the agency relationships within a firm. We investigate how corporate governance is influenced by the presence of a dominant state shareholder and whether it complements or substitutes other governance mechanisms. In particular, we compare the agency costs of controlling ownership, where the dominant shareholder is the government or a private institution or family.

Second, we complement the work of Fan and Wong (2005) by examining the role of the audit function in corporate governance. Whereas Fan and Wong (2005) consider the role of an external auditor in closely held firms, we examine whether the formation of an audit committee, with its concomitant costs, mitigates the potentially severe agency costs in closely held firms and whether these differ between private and government-dominated ownership structures. Such a direct study on the role of government ownership in corporate governance informs policy decisions on privatization and part-nationalization.

Third, we develop an extension of the standard logit analysis to directly and intuitively illustrate the impact of corporate governance variables on managerial accountability. We show that standard interpretations and comparisons of regression results are flawed without deriving the marginal effects of the estimated coefficients. Through the non-linear characteristics of marginal effects, we concisely and intuitively show that voluntary audit committee formation is a



nonlinear function of the control rights of the dominant shareholder. Moreover, we adopt a model with interactive variables to investigate whether there are competing agency relationships in government and privately controlled corporations at different levels of share ownership.

Finally, we contribute to the growing literature on emerging market corporate governance by studying China, the largest and most vibrant emerging economy in the world. La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000) argue that the protection of shareholders and creditors by the legal system is central to understanding the patterns of corporate finance in different countries. The high levels of state ownership in listed firms are a special feature of Chinese financial markets and representative of most emerging economies. Understanding the effect of state shareholdings on corporate governance is crucial for investors and regulators in countries where state ownership is common or of increasing importance.

The paper's main testable propositions are theoretically founded on the two main sources of agency conflicts, as presented by Ali, Chen, and Radhakrishnan (2007). Specifically, we consider the relationship between management and shareholders (Type I) and between controlling and non-controlling shareholders (Type II). In widely held firms, Type I agency relationships are dominant whereas in closely held firms, the majority shareholder has significant capability to expropriate wealth from minority shareholders (Type II).

Agency relationships in government controlled firms are very different from companies with a private controlling shareholder. We propose different agency cost functions for private and government controlled firms. In corporations with only private shareholders, the pressure to form an audit committee at high and low levels of ownership concentration is severe. In government controlled firms, Type I agency costs are expected to be higher at all levels of ownership concentration due to inefficient compensation and governance structures, as well as

the contrasting objectives of the state as main shareholder. Given that no one individual can personally benefit from any rent seeking activities in government controlled firms, Type II agency costs will be less important. Moreover, the Type II agency cost function of government owned firms is predicted to be invariant to controlling shareholder ownership levels.

Our core empirical analysis provides strong support for the theoretical propositions. The probability of audit committee formation is higher at extreme levels (high and low) of private controlling ownership, in contrast to government controlled firms where it is shown to be invariant. In addition, at moderate levels of controlling owner shareholdings, (between 25 and 40 percent), privately owned firms are less likely to have voluntarily formed audit committees.

We further document that audit committees have value relevance. Without an audit committee, the relative value (Tobin's Q) of privately-controlled firms is significantly more than comparable government-controlled firms at shareholdings of between 25 and 40 percent. Audit committees appear to mitigate the detrimental valuation effects of state shareholdings at all investment levels, since state-owned firms with audit committees have similar relative values to their privately controlled counterparts.

Keeping the source of control (government or private) constant, audit committees complement other types of good corporate governance. Audit committees are more likely to be found in companies that have split the role of chairman and chief executive, have more non-executive directors, more frequent board meetings, and larger boards.

Overall, our results support the view that the agency costs of controlling ownership are very different in government controlled organizations. Most research in corporate governance assumes that shareholder objectives are homogenous, and focused on maximizing shareholder wealth. However, government objectives are very different and this has a crucial impact on the way

managers behave. The research contributes valuable insights to the debate on strategic state support and the part nationalization of financially distressed corporations, a topic that has had increasing relevance in recent times.

The rest of the paper is organized as follows. Section 1 develops our central hypotheses. Section 2 describes the Chinese institutional environment. Section 3 presents details of the sample and research design, and Section 4 reports our main results and presents some robustness checks. Section 5 offers some conclusions.

## **1. Hypotheses Development**

Ali, Chen, and Radhakrishnan (2007) propose two main agency relationships within exchange-listed corporations. A Type I agency relationship concerns shareholders and management whereas a Type II agency relationship involves majority and minority shareholders. In each case, conflicts between the two parties lead to costs that reduce the value of the firm. However, in corporations with some form of state ownership, these relationships have a different nature because of the politically motivated objectives of management and government. In the following sections we discuss how they differ between firms with private and government shareholders.

### **1.1 Conflicts between managers and shareholders**

There are several reasons why managers in state-owned firms may be less motivated to maximize shareholder wealth. A government shareholder has other objectives not necessarily driven by a value-maximization paradigm. For example, political agendas will be an important driver of managerial behavior, whether they relate to a capping of profits, a targeted investment strategy or positive employment practices. In addition, government shareholders are unlikely to have a specialized knowledge of a firm's operations, allowing managers some scope in pursuing their personal objectives. Executive turnover and bonuses also tend to be less in firms with state shareholdings (see, for example, Boycko, Shleifer and Vishny, 1996; and

Dewenter and Malatesta, 2001). Collectively, these characteristics can impose a significant cost to corporations with any form of state ownership.

While the negative effect of state ownership has been well documented, there are some positive aspects. Jensen and Meckling (1976) argue that where the manager has less than a controlling interest in a firm, the agency costs associated with managerial entrenchment will also depend upon the external labor market. Competition from other potential managers limits the costs of obtaining managerial services. For state-controlled enterprises, the senior management is often appointed through a political process and the external labor market is largely non-existent. Although the potential for managerial entrenchment is high, the relationship between managers and government shareholders will naturally have a longer-term focus, and this will mitigate the myopic behavior of management.

## **1.2 Conflicts between controlling and non-controlling shareholders**

In firms with a concentrated ownership structure, controlling shareholders have the power to ensure that managers pursue objectives at the cost of minority shareholders. For example, controlling shareholders may vote sympathetic directors on to the board or make their company engage in related party transactions. Research has shown that agency costs resulting from controlling shareholders can be significant (see, e.g., Shleifer and Vishny, 1997).

When the controlling shareholder is the state, the conflict is effectively that of the government's objective of social welfare maximization against the firm's objective of profit maximization. Börs (1991) shows that these two objectives are complementary in a perfectly competitive environment. However, when the environment is not perfectly competitive, the government has an incentive to monitor managers and act as an internal regulator. In sum, unlike privately

controlled firms, it is not in the government's interests to exploit the inherent weaknesses of non-controlling shareholders.

### **1.3 Demand for External and Internal Monitoring**

Given the different agency cost functions of private and government controlled firms, it is natural that their demand functions for external and internal monitoring will also be different. The introduction of any governance system incurs a finite cost and firms will adopt a new governance structure (e.g. voluntary audit formation, appointment of non-executive directors, etc.) only if the benefits outweigh the costs. Since the costs of implementation are likely to be fixed, any observed variation in corporate governance systems across firms will be related to the benefits associated with each structure and the extent to which they mitigate Type I and Type II agency costs. The main implication is that firms with better corporate governance will be those where monitoring is most required and Type I and Type II agency costs are at their most severe.

Figure 1a presents the Type I and Type II agency costs in privately controlled firms as a function of the cash flow rights of the controlling owner. At low levels of controlling ownership, where the separation of ownership and control is significant, Type I agency costs dominate. Managers have little incentive to pursue shareholder objectives and, as a result, there is a need for stronger corporate governance. When a firm is closely held, Type II agency costs are significantly more important and the desire to improve accountability and reduce the probability of rent-seeking behavior by controlling owners will be strong.

New corporate governance structures will only be introduced when their benefit is greater than the cost of implementation and this is represented in Figure 1a by the shaded region at both extremes of the graph. This leads to proposition 1.

*Proposition 1: When a firm has a private controlling shareholder, stronger corporate governance will be observed in widely and closely held firms.*

Figure 1b presents a similar function for firms where the government is the controlling shareholder. The figure has the same scale as in Figure 1a. In government controlled firms, Type I agency costs always dominate. This is because managerial entrenchment is a problem at all levels of government shareholdings. In widely held firms, government and privately controlled firms have similar Type I agency costs. However, whereas they decrease in privately controlled firms as controlling ownership grows, in government controlled firms they stay constant. Type II agency relationships are not important in government controlled firms because the state has no need to expropriate wealth from minority shareholders. Governments can use other methods to more efficiently extract wealth from firms and shareholders, most notably through the tax system.

As can be seen in Figure 1b, the level of corporate governance in government-controlled firms will be invariant to the level of controlling ownership. This leads to proposition 2.

*Proposition 2: When a firm has a government controlling shareholder, the strength of corporate governance will be invariant to the level of controlling ownership.*

## **1.4 Value Relevance of Corporate Governance**

Propositions 1 and 2 provide insights into the valuation effects of corporate governance. If corporate governance innovations are introduced to mitigate the effect of Type I and Type II agency costs, firms with better corporate governance will have a higher value than comparable firms with similar agency costs but with weak corporate governance. This is because any new governance system will only be introduced when the benefits are greater than the costs of implementation.

*Proposition 3: Firms with stronger corporate governance will have higher value than comparable firms with similar agency costs but with weak corporate governance.*

Whereas proposition 3 relates to the valuation effects of corporate governance across similar types of firms (privately owned or government owned), it says nothing about the valuation effects of corporate governance across different levels of controlling shareholdings within the same firm. For any level of controlling ownership, the observed value of a firm (ignoring the effect of corporate governance) will be equal to

$$V^{Obs} = V^{True} - C^{Type I} - C^{Type II} \quad (1)$$

Where  $V^{True}$  is the value of the firm without any agency costs, and  $C^{Type I}$  and  $C^{Type II}$  are the Type I and Type II agency costs, respectively. Note that the probability of introducing new corporate governance structures is not related to the maximization of firm value, but instead is a function of the level of extreme values of individual Type I and Type II agency costs. Moreover, while the reason for introducing corporate governance will be related to either one of Type I or Type II agency costs, its effect will mitigate both costs. This leads us to Equation 2, which presents the observed value of a firm with corporate governance.

$$V^{Obs} = V^{True} - C^{CG} \quad (2)$$

where  $C^{CG}$  is the cost of introducing Corporate Governance. Thus, the variation in the value of a firm as ownership concentration increases is totally dependent on the combination of Type I and II agency costs and the costs of implementing better corporate governance. In any rational equilibrium, new corporate governance systems will be introduced as soon as it is beneficial to do so and this will occur when  $C^{CG}$  is less than  $C^{Type I}$  or  $C^{Type II}$ .

In privately owned firms,  $C^{CG}$  is less than  $C^{Type I}$  and  $C^{Type II}$  when ownership concentration is very low and very high, respectively. At moderate controlling

shareholdings,  $C^{Type I}$  and  $C^{Type II}$  are individually no greater than  $C^{CG}$  and stronger corporate governance is not required. However, the combined agency costs,  $C^{Type I}$  and  $C^{Type II}$ , will likely be higher than the implementation costs of new governance systems. Taking these factors together, the value of privately owned firms will be less at moderate controlling shareholdings than at the extreme.

As Figure 1b shows, the Type I agency costs in government controlled firms are invariant to shareholder concentration and will always be greater than the costs of introducing new corporate governance. It is thus optimal for government controlled firms to have enhanced monitoring at all levels of government shareholdings and, as a result, the value of government controlled firms will be equal to Equation 2, irrespective of shareholder concentration.

*Proposition 4a: Without corporate governance, the value of privately controlled firms will be a function of the Type I and Type II agency costs, which vary with shareholder concentration.*

*Proposition 4b: Without corporate governance, the value of government controlled firms will be invariant to shareholder concentration.*

*Proposition 5a: With corporate governance, the value of privately controlled firms will be less at moderate levels of shareholder concentration.*

*Proposition 5b: With corporate governance, the value of government controlled firms will be invariant to shareholder concentration.*

In our empirical tests, we consider voluntary audit committees in Chinese firms and use them as a proxy for improved corporate governance. Clearly, the presence of other governance systems or structures could also be considered, since there is a plethora of innovations a firm can make with respect to improving corporate governance. However, the audit function is directly related to improving transparency and disclosure in a firm and is most likely to be associated with information quality and value – significantly more so than governance changes relating to board structure.



## **2. The Chinese Institutional Environment**

In 2008, China marked its thirtieth anniversary of economic reforms. An important component of the change in Chinese economic development was the 1990 establishment of two stock exchanges, Shanghai and Shenzhen, which brought capital markets to the forefront of economic development in the country.

The initial motivation for vibrant stock exchanges was to facilitate reform in state owned enterprises and to foster a more effective corporate management system through the development of a competitive capital market. Given this history, share ownership in China has unique characteristics. A familiarization of the ownership structure of publicly listed Chinese corporations is key to understanding corporate governance practice in China.

Common stock in Chinese firms can be classified as state-held shares, legal-person shares, and tradable shares. Each category accounts for approximately one-third of the total shares issued (Xu and Wang, 1999). All Shares carry the same voting and cash flow rights and government owned shares are held by public agencies such as the Bureau of state Assets Management. Legal-person shares can be held by state owned enterprises (SOEs), collectively owned enterprises, township and village enterprises, domestic private companies, and foreign investors. Both state-held and legal-person shares cannot be traded in the secondary market and can only be transferred between domestic institutions subject to approval from the Ministry of Finance and the China Securities Regulatory Commission (CSRC)<sup>1</sup>. Tradable shares are freely transferable in the two secondary markets.

High state ownership is often regarded as the main reason for ineffective corporate governance in China. Prior research has investigated the relationship between state ownership and firm performance in the country and the main finding

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<sup>1</sup> In 2005, a new policy was introduced to change the status of non-tradable state and non-state shares into tradable A-shares. Over time all shares will be tradable and potentially transferred to foreign and domestic private sector investors.

is that performance is negatively related to the level of direct state ownership (Xu and Wang, 1999; Qi et al. 2000; Hovey et al. 2003).

In order to improve the quality of listed companies and establish a modern corporate governance culture in China, the Chinese Security Regulation Commission (CSRC) and the National Economic and Trade Commission (NETC) have issued a number of regulations and guidelines on corporate governance. The most important document is the “Code for Corporate Governance of Listed Companies” issued by the CSRC and the NETC in January 2002. The Code covers key issues in corporate governance such as the board of directors, shareholder rights, the role of the controlling shareholder, the supervisory board, management incentives, related party transactions, and information disclosure<sup>2</sup>.

In order to improve supervision and to assist decision making in the key functions of the board, the Code recommends the voluntary formation of committees for strategy, audit, remuneration, and nomination. Enhancing financial reporting quality and transparency is seen as the main route to improving the protection of minority shareholders. Whilst there is considerable evidence documenting the effectiveness of audit committees in developed economies, there is very little work on the determinants and their effectiveness in developing markets, such as China, especially in the context of high government ownership.

### **3. Sample and Research Design**

This section describes the selection criteria and resultant sample of companies. It also presents the data construction process, key sample statistics, and the methodology used for our empirical tests.

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<sup>2</sup> The Chinese corporate governance system consists of both a board of directors and supervisory board. However, the two boards are parallel to each other, more similar in structure to Japan than the continental European two-tier system that exists in Germany and The Netherlands. The nominations of both boards are proposed through the annual shareholders’ meeting. The effectiveness of the supervisory board tends to be very limited in practice. As regulatory emphasis has focused on the role of independent directors in monitoring, it has been that the supervisory board be removed from the code of practice or made voluntary (China Corporate Governance Report, SHSE, 2003).

### **3.1 Sample**

The initial sample consists of all listed Chinese firms for the period 2002 to 2004. In January 2002, Chinese regulators recommended the voluntary formation of audit committees. In addition, data requirements also necessitated a 2002 start date since information on ultimate controlling shareholders was only disclosed from financial years beginning in 2001.

Table 1 presents a detailed breakdown of the final sample, which necessitated a number of filters to ensure data consistency. First, firms with cross-listed shares and financial firms were excluded because they are subject to more stringent regulatory governance requirements. Second, we omit firms that are traded on the Small and Medium Enterprise (SME) Board. The SME Board was introduced by the Shenzhen Stock Exchange in 2004 and requires significantly less regulation than the main exchange. Third, we drop any firm where information on the ultimate controlling shareholder is not available<sup>3</sup>. Finally, companies without sufficient data are also dropped from the analysis. This sampling procedure resulted in a final sample of 3,217 firm years. The distribution of firms across years is stable and the proportion of firms dropped according to each filter rule remained fairly constant throughout the time period under study.

### **3.2 Measurements and Data**

The Audit Committee formation data is manually abstracted from the “Corporate Governance” or “Board Report” section in corporate annual reports. The annual reports of listed companies are downloaded from the CSRC designated information disclosure website - Giant Tidal Information Network.<sup>4</sup>

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<sup>3</sup> Some companies did not disclose the proportion of shares in the pyramidal chain. Missing information in any chains leads to great difficulty in measuring the separation of control and cash flow rights.

<sup>4</sup> <http://www.cninfo.com.cn>

The concept of “ultimate control” is introduced by La Porta et al. (1999) who study investor protection and ownership structure in a global context. This has been further developed within an agency cost framework by Claessens et al., 2002; Faccio and Lang, 2002; Lemmon & Lins, 2003; and Fan & Wong, 2002, 2005.

The length of the ultimate controlling shareholder’s pyramid chain is used as a proxy measure for agency costs between the ultimate controlling shareholder and the management team. We follow La porta et al.’s (1999) method in constructing these two variables. However, a major difference in our measure is that both listed and non-listed firms are used to identify the length of pyramidal chains. Information on the ultimate controlling shareholder is manually extracted from each firm’s annual reports. Agency chains are measured by the number of layers between the ultimate controller and the listed company. If there are many chains of control, the shortest is taken as the pyramidal chain length.

The type of ultimate controlling shareholder is identified as follows: (1) If the ultimate controlling shareholder is a natural person, private enterprise, Employee Stock Ownership Plan (ESOP), collective enterprise, township government department, or foreign-funded enterprise, it is categorized as a non-state or privately held firm. (2) If the ultimate controlling shareholder is a central government agency, local government institution, or state university, it is regarded as a state-controlled firm.

Board structure and corporate finance variables are drawn from the CSMAR corporate governance and financial reporting database. If missing data is encountered, the financial accounts are manually examined to supplement the information in the sample. Variable definitions are summarized in Table 2.

Table 3 reports audit committee formation by ownership type and year. It is clear that audit committees became more prevalent as the sample period progressed. Given that the first year of the sample coincided with the start of governance reforms in China, it is to be expected that most firms would not have

introduced audit committees in 2002. state-owned firms were more responsive to the recommendations of governance reforms and by the end of the sample period, more state-owned firms had audit committees than did not. This is in contrast to privately owned firms, where the opposite is the case.

### **3.3 Sample statistics**

We report the distribution of ultimate control by ownership type in Table 4. Share ownership of Chinese firms is highly concentrated. Ninety-nine percent of corporations have a controlling shareholder at the 10 percent cut-off level of control rights. When the cut-off point is between 20 and 40 percent, naturally more corporations are classified as widely-held. However, the percentages are still very high at the 20 percent threshold. Even for the 40 percent threshold, more than 50 percent of companies are controlled by a single ultimate owner.

Compared with Claessens et al (2002), Chinese firms have a similar level of ownership concentration to firms in Hong Kong, Indonesia, Singapore and Thailand when the 10 and 20 percent threshold is applied. For the 40 percent ownership threshold, China has the highest concentration level. Moreover, the state ultimately controls around half of all listed companies in China's stock markets when the 40 percent control right threshold is used.

Descriptive statistics of the variables are reported in Table 5. The characteristics of state-owned and privately-controlled firms are economically very similar with government firms tending to be larger in size and having lower Q ratios. The debt-to-asset ratios are also similar at approximately fifty percent for both firm ownership categories.

Salient differences relate to ownership and control. Government firms have more concentrated ownership and control than their private counterparts, with control and cash flow rights of 47.12 percent and 42.59 percent compared to 36.10 percent and 21.11 percent, respectively. The ownership-control wedge in Chinese firms is highly variable, particularly in privately-owned firms, which have an average

voting-cash flow rights ratio of 3.23 with a standard deviation of 5.50. This compares with government controlled firms, where the mean voting-cash flow rights ratio is 1.34 with a standard deviation of 1.55. The length of pyramid chains is similar at approximately two companies.

An interesting difference between Chinese firms and companies in developed countries is the use of the big four auditing firms. In China, this figure is exceptionally low and only about five percent of firms in our sample employ the big four auditors. Instead, local Chinese auditors are given the task of auditing firms. Board structures in privately-owned and state-owned firms are very similar. The average board consists of approximately ten members with a mean of three independent directors. Only ten percent of firms combine the role of Chairman and CEO and, on average, boards meet eight times a year.

### **3.4 Empirical Research Design**

#### **3.4.1 Audit Committee Formation**

To investigate the determinants of audit committee formation, we use a logit regression analysis. In this section, we first discuss the specification of the model and then review methods for interpreting and presenting the logit regression results, especially when the relationship between variables is nonlinear. The following general model is used.

$$P(y = 1 | \mathbf{x}) = G(\mathbf{x}\boldsymbol{\beta}) \equiv \exp(\mathbf{x}\boldsymbol{\beta}) / [1 + \exp(\mathbf{x}\boldsymbol{\beta})] \quad (3)$$

where  $y = 1$  when an audit committee exists and  $y = 0$  otherwise;  $\mathbf{x}$  is a vector of explanatory variables and  $\boldsymbol{\beta}$  is a vector of coefficients to be estimated.

$G(\mathbf{x}\boldsymbol{\beta}) \equiv \exp(\mathbf{x}\boldsymbol{\beta}) / [1 + \exp(\mathbf{x}\boldsymbol{\beta})]$  is the logistic mapping function that maps the  $\mathbf{x}\boldsymbol{\beta}$  matrix onto the response probability  $P(y = 1 | \mathbf{x})$ . The specification of  $\mathbf{x}$  is as follows:

$\mathbf{X} = \{gov, gov\_c, gov\_csq, gov\_vc, gov\_pyramid, gov\_debt, gov\_dirs, gov\_dirssq, C, Csq, VC, Pyramid, Debt, DirS, DirSsq, Big4, BordSize, BoardInd, Combine, NumBoardMeet, TotAsset, FixAssToTass, year03, year04\}$

Definitions of the variables are given in Table 2. We specify the empirical model with the following considerations. First, in order to study the effect of state ownership, we create a set of interactive variables to incorporate cross-group variance. This is better than studying subsamples of the data, which is only valid when the two sample error vectors are independent. Variables with a prefix of ‘*gov\_*’ are interactive variables constructed by multiplying the ‘*gov*’ variable with a target variable. The interactive variables are directly related to our hypotheses, in that there will be differences between state and non-state controlled firms.

Second, in studying the effect of voting and cash flow rights of the ultimate controlling shareholder, previous literature often includes both cash flow and voting rights in the same equation. However, this creates a potential multicollinearity problem in the estimation. For example, cash flow and voting rights have a correlation coefficient of 0.81 in our sample. Multicollinearity inflates standard errors making empirical results sensitive to small changes in sample construction or model specification.

We therefore use only one of the variables in our equation to measure the level of ownership, while having the other variable capture the degree of separation in voting and cash flow rights. Since  $\{C, V-C\}$  is a linear combination of  $\{C, V\}$ , we use the ratio of the two variables and an indicative dummy variable to differentiate between high and low (zero) degrees of separation. Alternative specifications are considered in robustness checks and are discussed in section 4.3.

Finally, we include control variables for size, asset utilization, and sample period. Pooled regression results are reported. We also perform the analysis for each individual year, which produces similar evidence to that reported here.

### 3.4.2 Marginal Effects and Standard Errors of Logit Regressions

Apart from their signs, it is not a simple task to directly interpret the coefficients of logit models. One way, which also facilitates comparisons across models, is to consider the partial derivative of the probability that  $y$  equals one with respect to a continuous explanatory variable,  $x_i$ . This gives the marginal effect of  $x_i$  on  $P(y = 1 | \mathbf{x})$ . The formula is as follows:

$$\frac{\partial G(\mathbf{x}\boldsymbol{\beta})}{\partial x_i} = g(\mathbf{x}\boldsymbol{\beta})\beta_i \equiv \frac{\exp(\mathbf{x}\boldsymbol{\beta})}{[1 + \exp(\mathbf{x}\boldsymbol{\beta})]^2} \beta_i \quad (4)$$

The effect of a change in  $x_i$  depends on the other variables in  $\mathbf{x}$  through  $g(\mathbf{x}\boldsymbol{\beta})$ .

As in the standard logit model,  $g(\mathbf{x}\boldsymbol{\beta}) \equiv \frac{\exp(\mathbf{x}\boldsymbol{\beta})}{[1 + \exp(\mathbf{x}\boldsymbol{\beta})]^2}$  is always greater than

zero, and the sign of the effect of a change in  $x_i$  corresponds to the sign of its coefficient,  $\beta_i$ . The relative effects of two independent variables,  $x_i$  and  $x_j$ , do not

depend on  $\mathbf{x}$  since  $\frac{\partial G(\mathbf{x}\boldsymbol{\beta}) / \partial x_i}{\partial G(\mathbf{x}\boldsymbol{\beta}) / \partial x_j} = \beta_i / \beta_j$ . Therefore, the beta coefficient is

meaningful in relative comparisons.

If the functional form has a nonlinear term, equation 3 can be rewritten as follows:

$$P(y = 1 | \mathbf{x}) = G(\mathbf{x}\boldsymbol{\beta}) \equiv G(\beta_0 + \beta_{1,1}x_1 + \beta_{1,2}x_1^2 + \dots + \beta_k x_k) \quad (5)$$

The partial effect of  $x_1$  on  $P(y = 1)$  can then be evaluated as

$$\frac{\partial G(\mathbf{x}\boldsymbol{\beta})}{\partial x_1} = g(\mathbf{x}\boldsymbol{\beta})(\beta_{1,1} + 2\beta_{1,2}x_1) \equiv \frac{\exp(\mathbf{x}\boldsymbol{\beta})}{[1 + \exp(\mathbf{x}\boldsymbol{\beta})]^2} (\beta_{1,1} + 2\beta_{1,2}x_1) \quad (6)$$

In this case, Equation (6) shows that the partial effect of  $x_1$  on  $P(y = 1)$  will also depend on the level of  $x_1$ . It thus follows that there will be a U shape in the response probability, with a turning point at  $x_1 = -\beta_{1,1}/2\beta_{1,2}$ .

In order to evaluate equations (4) and (6), the level of  $\mathbf{x}$  is required to estimate the value of  $g(\mathbf{x}\boldsymbol{\beta})$ . The natural choice for this value is the sample mean, which is



often used in programmes, such as STATA. However, adjustments need to be made when there are dummy variables and interactions in the regression equation. In the context of the current research, we use dummy variables to separate the effect of state vs non-state control firms. Instead of taking the mean of the dummy variable, we evaluate the equation separately since the dummy variable is equal to 1 and 0.

For the nonlinear effect in equation (6), we estimate the marginal effect of  $x_1$  for different levels of  $x_1$ , holding all other variables at their means. Since the  $x_1$  vector measures ownership, we evaluate the effect at every 5 percent interval range between 0 to 100 percent. The standard errors of the marginal effects in equations (4) and (6) are obtained using the delta method (See Wooldridge, 2003 : Chapter 15).

In summarizing our empirical tests, we graphically present the effect of changes in  $x_1$  on the predicted probability of audit committee formation, the marginal effects and their confidence intervals.

Finally, to test whether there is a difference in agency costs between state and non-state controlled companies, we construct the predicted probability of audit committee formation for these two types of company and test for a statistical difference. This is equivalent to testing the significance of the marginal effect of the dummy variable ‘*gov*’. The measure is constructed as follows.

$$Diff_{gov_c} = P(y = 1 | \bar{\mathbf{x}}_{gov=1,c}) - P(y = 1 | \bar{\mathbf{x}}_{gov=0,c}) \quad (7)$$

Where  $\bar{\mathbf{x}}_{gov=1,c}$  is a vector of the sample means when *gov* is set to be 1, the interactive terms (*gov\_vc*, *gov\_pyramid*, *gov\_debt*, *gov\_dirs*) are constructed using the sample means of the original variable, (*c*, *csq*, *vc*, *pyramid*, *debt*, *dirs*) are incremented from 5 percent to 100 percent, and (*gov\_c*, *gov\_csq*) and  $\bar{\mathbf{x}}_{gov=0,c}$  is a vector of the sample means with the *gov* and other interactive variables set to zero. The standard error of this measure is obtained using the delta method.

### 3.4.3 Value Relevance analysis

In studying the valuation effects of audit committees, we adopt a variant of the Tobin's Q measure to capture firm value. The following empirical specification is used to test our empirical hypotheses.

$$Q = \mathbf{x}\beta \quad (8)$$

where  $Q$  is the sum of the market value of equity and book value of debt divided by the book value of total assets, and  $\mathbf{x}$  is the vector of explanatory variables. The specification of  $\mathbf{x}$  is as follows.

$$\mathbf{x} = \{gov, gov\_c, gov\_csq, gov\_vc, gov\_pyramid, gov\_debt, gov\_dirs, C, Csq, VC, Pyramid, Debt, DirS, Big4, BordSize, BoardInd, Combine, NumBoardMeet, TotInvestment, TotAsset, year03, year04, pri\_pd\_ac, gov\_pd\_ac, industry\_dummy\}$$

Definitions of the variables are given in Table 2. We specify the empirical model with the following considerations. First, we control for the effect of investment on firm value by introducing total long-term investment as an explanatory variable. Second, in order to study the value relevance of audit committees we include an audit committee dummy variable for both private and government controlled firms. To control for endogeneity in the relationship between audit committee formation and firm value, we carry out a simultaneous equations analysis using two-stage least squares. The probability of audit committee formation is estimated using equation (3) and the predicted value of the audit committee variable for each firm is included in the second stage regression (the  $Q$  equation).

After estimating model (8), we then investigate how firm value varies with the level of controlling ownership by predicting  $Q$  with all explanatory variables held at their means and varying the level of cash flow right, ( $c, csq$ ). The value relevance of audit committees is estimated by calculating the predicted  $Q$ , setting  $pri\_pd\_ac$  and  $gov\_pd\_ac$  to zero, and comparing them to the predicted  $Q$  when  $pri\_pd\_ac$  and  $gov\_pd\_ac$  are set at their predicted level.

## **4. Empirical Results**

This section reports the empirical results and discusses their implications. The results for audit committee formation and its value relevance are presented in the following two subsections. These are followed by discussions of our robustness checks.

### **4.1 Agency costs and the demand for audit committees**

We examine propositions 1 and 2 through our logit model estimation and post-estimation tests. Although the original coefficients are presented in Table 6, we focus most of our discussion around the marginal effect of each variable. Table 6 reports the maximum likelihood estimation results for equation (3). The p-value column shows that many coefficients are statistically significant, with an overall Pseudo R<sup>2</sup> of 6 percent.

The marginal effects and standard errors of the controlling ownership variables are summarized in Figure 2 respectively. Since the relationship between cash flow rights and audit committee formation is nonlinear, marginal effects allow us to correctly measure the impact of each unit change in cash flow rights on the predicted probability of audit committee formation, conditional on the existing level of cash flow rights.

Our results provide strong support for propositions 1 and 2. Figure 2a shows that, for private firms, the marginal effect of controlling ownership on the probability of audit committee formation falls and then increases. In contrast, the probability of audit committee formation is invariant to controlling cash flow rights in government firms (Figure 2b). While the trend in marginal effects differ across ownership levels, they are insignificantly different from zero at the 10 percent level.

In Figure 3, we compare the predicted probability of audit committee formation between private and government controlled firms. Holding everything else constant, government controlled firms are significantly more likely to form an

audit committee when their holdings are between 25 and 45 percent, and they are significantly less likely than private firms to form an audit committee when their holding is greater than 80 percent. This is again consistent with proposition 1 and 2.

The marginal effects and standard errors of the linear explanatory variables are summarized in Table 7. The results show that the only variable which influences the probability of audit committee formation is the cash flow/voting rights wedge. The larger the ownership-control wedge, the greater the demand for an audit committee. This is especially true for government controlled firms. Furthermore, keeping the source of control (government or private) constant, Table 7 shows that larger, active, and more independent boards are likely to establish audit committees. In addition, where the CEO and Chairman roles are combined there is a greater need to have an audit committee to control for reporting quality. This suggests that audit committees complement other forms of good corporate governance.

## **4.2 Value relevance of audit committees**

Table 8 reports the 2SLS regression results for the value relevance equation (8). The coefficients of interest are *pri\_pd\_ac* and *gov\_pd\_ac*, and both are positive with only *gov\_pd\_ac* statistically significant. These results suggest that audit committees enhance the value of government-controlled firms but not for companies with a non-state controlling owner.

The valuation effects of audit committees are further illustrated in Figures 4 and 5. Figure 4 presents the predicted  $Q$  for private and government controlled firms with different levels of cash flow rights, without taking the effect of audit committees into consideration. The predicted  $Q$ s are calculated using the estimation results reported in Table 8, holding all variables at their mean level and setting the predicted audit committee dummy for private (*pri\_pd\_ac*) and state

controlled (*gov\_pd\_ac*) firms to zero. Interactive dummy variables involving the private and government indicator variables are changed accordingly.

Figure 4 should be compared to Figure 5, where the predicted  $Q$  ratios for private and government controlled firms are calculated with the same empirical specification, except that the predicted audit committee dummy for private (*pri\_pd\_ac*) and state controlled (*gov\_pd\_ac*) firms is now equal to one. Both figures present the  $Q$  ratio – cash flow rights relationship, conditional on the existence (Figure 5) or non-existence (Figure 4) of an audit committee in the firm.

The results in Figures 4 and 5 show that audit committees improve the performance of firms that have state controlling shareholders. Ignoring the impact of audit committees, for controlling shareholdings of between 25 and 45 percent, the performance of state-owned firms is significantly lower than their privately-held counterparts. This difference disappears once the effect of audit committees is introduced.

Our results strongly support propositions 3, 4, and 5, regarding the value relevance of audit committees. Moreover, they demonstrate the differential effect of audit committees in private and government controlled firms. Specifically, audit committees appear to mitigate the inferior market valuations of state shareholdings at all investment levels.

There are a number of additional insights from Table 8. First, a high level of separation in voting and cash flow rights has a negative impact on firm value in general. Both *vc* and the recovered *gov\_vc* coefficient are negative, with the recovered *gov\_vc* coefficient significant at the 10 percent level.

Second, the length of pyramidal chain has different effects in privately controlled firms compared to government controlled firms. The longer the pyramidal chain, the lower the firm value for privately controlled firms although the coefficient is not significant. In contrast, the longer the pyramidal chain, the

higher the firm value for government controlled firms. The difference between the two ownership categories is statistically significant.

Fan, Wong and Zhang (2005) argue that the main incentive for the state to use corporate pyramids in executing their control rights is the incentive to decentralize power. Additional layers in the control chain are associated with higher bureaucratic costs should the government intervene in corporate decision making. Our results support the Fan et al. (2005) findings and suggest that pyramidal ownership structures are used by the state to decentralize decision making and increase firm value.

### **4.3 Robustness Tests**

The pooled regressions with year dummies show, not surprisingly, that the prevalence of audit committees across Chinese firms is increasing over time. We also perform a sub-sample analysis for each year and the results are consistent with our findings for the full sample, although the effect of the explanatory variables is less significant in general for the sub-sample analysis.

We also apply alternative specifications of the regression equations by replacing cash flow rights with voting rights as a measure of controlling ownership. The results are very similar to what have been reported in the main results section. The only difference is that the turning point of the nonlinear effect for voting rights is about 5 percent higher than that of cash flow rights. This is to be expected, since, for a given firm, the ultimate controlling shareholder's voting rights would be greater or equal to their cash flow rights.

We also examine the robustness of our results to alternative measures of separation in voting and cash flow rights. The overall results are the same.

## 5. Conclusions

We study the importance of agency issues in the context of government ownership using a sample of voluntary audit committee formations in China. Agency considerations are different when the controlling shareholder is the government or a private institution or individual, and this is primarily due to the fundamentally different objectives of the two investor groups. Whereas private shareholders are characterized by personal wealth maximization behavior, government investors consider wider, non-pecuniary targets that are flavored by political considerations. The dichotomies of agendas critically affect management behavior and the perception of outside investors regarding the firm. Corporate governance intersects these issues and mitigates the valuation effect of the differing objectives.

We document that the ownership structure in Chinese listed companies is highly concentrated and the identity of the ultimate controlling shareholder is an important determinant of agency costs. Agency costs are higher in state-controlled firms than in privately-controlled firms, primarily because of the potentially severe lack of convergence in objectives between management and the owner.

In privately-controlled firms, the fundamental agency problem is not the conflict between outside investors and managers, but rather that between minority and controlling shareholders. We find that the agency cost arising from the relationship between the ultimate largest shareholder and minority shareholders is one of the key determinants in the voluntary introduction of audit committees. As the cash flow and voting rights become concentrated in one individual, the pressure to form an audit committee in privately-controlled firms grows significantly. However, in government-controlled firms, the pattern is very different. At moderate levels of state shareholdings, (between 25 and 40 percent), the need for enhanced financial disclosure and an audit committee is significantly higher than in private firms. When the government owns more than 80 percent

of an exchange-listed company's shares, audit committees become less prevalent. This is strongly indicative of the countervailing agency costs of governmental holdings at different levels of state ownership.

Audit committees have value relevance for firms with moderate government stakes. Without an audit committee, the relative value (Tobin's Q) of government-controlled firms is significantly less than comparable privately-controlled firms at shareholdings of between 25 and 40 percent. Audit committees appear to mitigate the detrimental effects of state shareholdings at these investment levels since state-owned firms with audit committees have similar relative values to their privately controlled counterparts.

We also document that the use of pyramidal chains has a different effect on the value of private and government controlling firms. Firm performance is worse the longer the pyramidal chain between an ultimate private controlling shareholder and the company. On the other hand, consistent with Fan et al. (2005), when the controlling shareholder is the government, pyramidal chains have a positive effect on firm performance.

Keeping the source of control (government or private) constant, audit committees complement other types of good corporate governance. Audit committees are more likely to be found in companies that have split the role of chairman and chief executive, have more non-executive directors, more frequent board meetings and larger boards.

Overall, our results support the view that the agency costs of controlling ownership are very different in government-controlled organizations. Although such firms require increased monitoring when the government holds moderate stakes, the benefits of state shareholdings provide other non-pecuniary benefits. With respect to the current study, the agency relationship between controlling government shareholders and minority shareholders is not as severe as in privately controlled firms at ownership concentration levels. This is possibly because the



ability to expropriate wealth from minority shareholders is significantly reduced when the controlling shareholder is the state.

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### **Table 1 Sample Selection Process**

This table presents a detailed breakdown of the final sample by year.

	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>Total</b>
Total number of listed firms at the end of the year	1224	1287	1377	3888
Companies with dual class B or H shares	139	140	142	421
Financial Firms	9	10	10	29
Companies on SME board.	0	0	39	39
Ownership information is not available	56	37	30	123
Companies with insufficient data	10	19	30	59
Final sample	1010	1081	1126	3217

## Table 2 Variable Definitions

This table summarizes the definitions of variables used in the analysis.

Variable	Definition
AC	A dummy variable that is equal to 1 when an audit committee exists during the reporting year and 0 otherwise.
Q	Tobin's Q measure calculated as (market value of equity + book value of debt)/ total assets.
Gov	A dummy variable that is equal to 1 if the ultimate largest shareholder of the company is the state and 0 otherwise.
V	Proportion of voting rights of the largest shareholder
C	Proportion of cash flow rights of the largest shareholder
V_C	Voting rights less cash flow rights
VC	Voting rights divided by cash flow rights
Pyramid	Length of pyramidal chain
Debt	Total debt over total assets
DirS	Percentage director shareholdings
Big4	A dummy variable that is equal to 1 when the company's auditor is one of the big 4 accountancy firms and 0 otherwise.
BordSize	The total number of directors on the board.
BoardInd	The percentage of independent directors on the board.
Combine	A dummy variable that is equal to 1 when the Role of CEO and Chairman is combined and 0 otherwise.
NumBoardMeet	The number of board meetings in a year
TotInvestment	Total long-term investment
TotAsset	Total assets
FixAssTotAss	Fixed assets over total assets

**Table 3 Presence of Audit Committees by Ownership Type and Year**

This table reports the prevalence of audit committees in Chinese firms by ownership type and year.

<b>Year</b>	<b>Audit Committee</b>	<b>Non-state Owned</b>	<b>state Owned</b>	<b>All</b>
2002	No	183	532	715
	Yes	70	225	295
2003	No	189	433	622
	Yes	119	340	459
2004	No	168	372	540
	Yes	153	433	586
All Years	No	540	1337	1877
	Yes	342	998	1340
Total		882	2335	3217

**Table 4 Control by Ownership Type and Year**

This table reports the distribution of ultimate control by ownership type and year.

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Year	Number of Firms in Sample	Percentage of Firms With Dispersed Control	Percentage of firms with Ultimate Control	
			Non-state Owned	state Owned
10 percent cut-off for effective control of the largest shareholder				
2002	1010	0.20	24.85	74.95
2003	1081	0.09	28.40	71.51
2004	1126	0.09	28.42	71.49
20 percent cut-off for effective control of the largest shareholder				
2002	1010	6.04	23.07	70.89
2003	1081	5.46	26.18	68.36
2004	1126	5.33	26.29	68.38
40 percent cut-off for effective control of the largest shareholder				
2002	1010	45.15	8.51	46.34
2003	1081	46.07	9.16	44.77
2004	1126	46.09	9.50	44.40
60 percent cut-off for effective control of the largest shareholder				
2002	1010	78.32	2.08	19.60
2003	1081	78.82	2.50	18.69
2004	1126	79.04	2.40	18.56

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## Table 5 Basic Statistics

This table reports the descriptive statistics of the variables by ownership type.

	Firm	Firm years	Mean	Q1	Median	Q3	Std
<b>Private</b>							
Q	294	882	2.0566	1.4013	1.7398	2.3472	1.0461
V	294	882	0.3610	0.2643	0.2958	0.4500	0.1542
C	294	882	0.2111	0.1026	0.1812	0.2699	0.1573
V_C	294	882	0.1499	0.0519	0.1356	0.2213	0.1224
VC	294	882	3.2322	1.1896	1.8182	3.1069	5.4957
Pyramid	294	882	2.4342	2.0000	2.0000	3.0000	0.8607
Debt	294	882	0.5002	0.3734	0.5065	0.6300	0.1843
DirS	294	882	0.0177	0.0000	0.0001	0.0003	0.1065
Big4	294	882	0.0374	0.0000	0.0000	0.0000	0.1899
BordSize	294	882	9.3016	8.0000	9.0000	11.0000	2.0208
BoardInd	294	882	0.3182	0.2727	0.3333	0.3636	0.0831
Combine	294	882	0.1474	0.0000	0.0000	0.0000	0.3547
NumBoardMeet	294	882	8.2653	6.0000	8.0000	10.0000	3.3182
TotAsset	294	882	1.4800	7.0100	1.1000	1.7800	1.3200
FixAssTotAss	294	882	0.3159	0.1903	0.3011	0.4291	0.1741
<b>Government</b>							
Q	778	2334	1.9276	1.3570	1.6786	2.2071	1.0280
V	778	2334	0.4719	0.3324	0.4749	0.6039	0.1654
C	778	2334	0.4259	0.2909	0.4209	0.5760	0.1801
V_C	778	2334	0.0460	0.0000	0.0000	0.0084	0.0972
VC	778	2334	1.3426	1.0000	1.0000	1.0236	1.5482
Pyramid	778	2334	2.3002	2.0000	2.0000	3.0000	0.7100
Debt	778	2334	0.4605	0.3332	0.4608	0.5916	0.1792
DirS	778	2334	0.0008	0.0000	0.0001	0.0002	0.0078
Big4	778	2334	0.0510	0.0000	0.0000	0.0000	0.2200
BordSize	778	2334	10.1126	9.0000	9.0000	11.0000	2.3394
BoardInd	778	2334	0.2984	0.2308	0.3333	0.3333	0.0850
Combine	778	2334	0.0908	0.0000	0.0000	0.0000	0.2874
NumBoardMeet	778	2334	7.4822	6.0000	7.0000	9.0000	2.9981
TotAsset	778	2334	2.6400	0.9150	1.5200	2.7600	6.3100
FixAssTotAss	778	2334	0.3755	0.2183	0.3568	0.5299	0.2019

## Table 6 Probability of Audit Committee Formation

This table reports the estimation results of the following logit model.

$$P(y = 1 | \mathbf{x}) = G(\mathbf{x}\boldsymbol{\beta}) \equiv \exp(\mathbf{x}\boldsymbol{\beta}) / [1 + \exp(\mathbf{x}\boldsymbol{\beta})]$$

where  $y = 1$  when an audit committee exists and  $y = 0$  otherwise.

$\mathbf{X} = \{gov, gov\_c, gov\_csq, gov\_vc, gov\_pyramid, gov\_debt, gov\_dirs, gov\_dirssq, C, Csq, VC, Pyramid, Debt, DirS, DirSsq, Big4, BordSize, BoardInd, Combine, NumBoardMeet, TotAsset, FixAssToTass, year03, year04\}$

Variables	Coef.	Std.	z	P>z
gov	-0.0486	0.54	-0.09	0.93
gov_c	4.1195	2.00	2.06	0.04
gov_csq	-6.1040	2.53	-2.41	0.02
gov_vc	0.0494	0.04	1.23	0.22
gov_pyramid	-0.1766	0.11	-1.55	0.12
gov_debt	0.3040	0.48	0.64	0.52
gov_dirs	1.9060	2.41	0.79	0.43
C	-2.9428	1.52	-1.93	0.05
Csq	4.6889	2.08	2.25	0.02
Vc	0.0090	0.02	0.56	0.58
Pyramid	0.1148	0.09	1.22	0.22
Debt	-0.2039	0.41	-0.49	0.62
DirS	-0.0634	0.66	-0.10	0.92
Big4	-0.0647	0.18	-0.36	0.72
BordSize	0.0986	0.02	5.38	0.00
BoardInd	4.8638	0.59	8.27	0.00
Combine	0.3033	0.14	2.09	0.04
NumBoardMeet	0.0481	0.01	3.85	0.00
TotAsset	0.0088	0.05	0.18	0.86
FixAssTotAss	0.2789	0.20	1.41	0.16
year03	0.2243	0.11	2.08	0.04
year04	0.5824	0.11	5.34	0.00
Intercept	-3.9674	1.08	-3.67	0.00
Log likelihood	-2059.57		Pseudo R2	0.0573



**Table 7 Marginal Effects and Standard Errors of Logit Model**

This Table reports the post estimation tests of the audit committee formation logit model. It reports the marginal effects and standard errors of the linear explanatory variables.

$$\frac{\partial G(\mathbf{x}\boldsymbol{\beta})}{\partial x_i} = g(\mathbf{x}\boldsymbol{\beta})\beta_i \equiv \frac{\exp(\mathbf{x}\boldsymbol{\beta})}{[1 + \exp(\mathbf{x}\boldsymbol{\beta})]^2} \beta_i \quad (2)$$

$\mathbf{X} = \{gov, gov\_c, gov\_csq, gov\_vc, gov\_pyramid, gov\_debt, gov\_dirs, gov\_dirsq, C, Csq, VC, Pyramid, Debt, DirS, DirSq, Big4, BordSize, BoardInd, Combine, NumBoardMeet, TotAsset, FixAssToTass, year03, year04\}$

Marginal effects for the non-state (state) controlling companies are evaluated at the mean of all explanatory variables setting  $gov=0$  ( $gov=1$ ). Common variables for both state and non-state control companies and their marginal effects are evaluated at the mean of all explanatory variables. Z and  $p > |z|$  columns report the test statistics and the p-value. Variables prefixed with *diff\_* report the tests on the difference between the marginal effect of the variables for state and non-state controlled companies.

Variables	Margina	Std. Err	z	P>  z
Dirs	-0.0148	0.15	-0.10	0.92
Vc	0.0021	0.00	0.56	0.58
Pyramid	0.0269	0.02	1.22	0.22
Debt	-0.0477	0.10	-0.49	0.62
gov_dirs	0.4497	0.60	0.75	0.46
gov_vc	0.0142	0.01	1.58	0.11
gov_pyramid	-0.0151	0.02	-0.95	0.34
gov_debt	0.0245	0.06	0.39	0.69
diff_dirs	0.4497	0.60	0.75	0.46
diff_vc	0.0142	0.01	1.58	0.11
diff_pyramid	-0.0151	0.02	-0.95	0.34
diff_debt	0.0245	0.06	0.39	0.69
Big4	-0.0151	0.04	-0.36	0.72
BordSize	0.0231	0.00	5.38	0.00
BoardInd	1.1391	0.14	8.27	0.00
Combine	0.0710	0.03	2.09	0.04
NumBoardMeet	0.0113	0.00	3.85	0.00
TotAsset	0.0021	0.01	0.18	0.86
FixAssTotAss	0.0653	0.05	1.41	0.16

**Table 8 2SLS Estimation Results for Tobin's Q**

This table reports the 2SLS Estimation Results for Tobin's Q. The following specification of the model is estimated.

$$Q = \mathbf{x}\beta$$

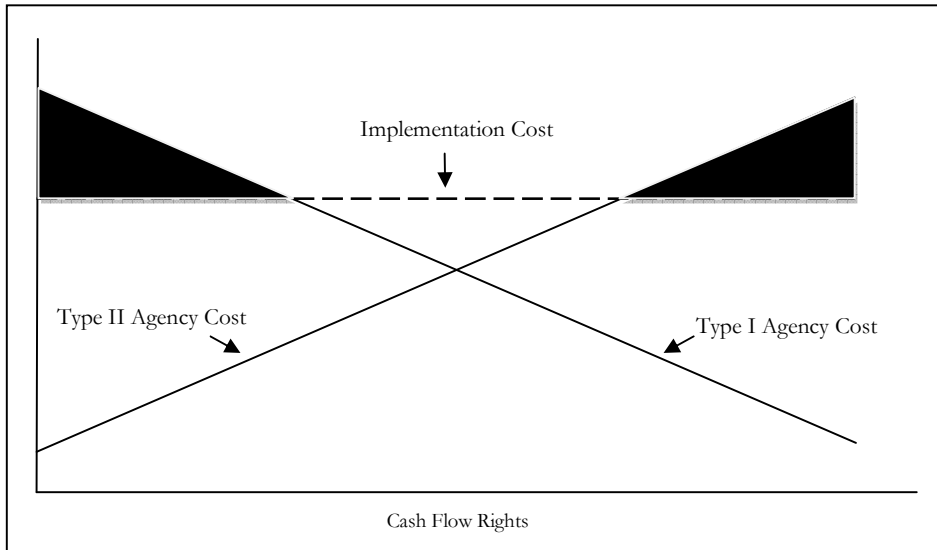
where  $Q$  is calculated as the sum of market value of equity and book value of debt, divided by book value of total assets,

$\mathbf{x} = \{gov, gov\_c, gov\_csq, gov\_vc, gov\_pyramid, gov\_debt, gov\_dirs, C, Csq, VC, Pyramid, Debt, DirS, Big4, BordSize, BoardInd, Combine, NumBoardMeet, TotInvestment, TotAsset, year03, year04, pri\_pd\_ac, gov\_pd\_ac, industry\_dummy\}$

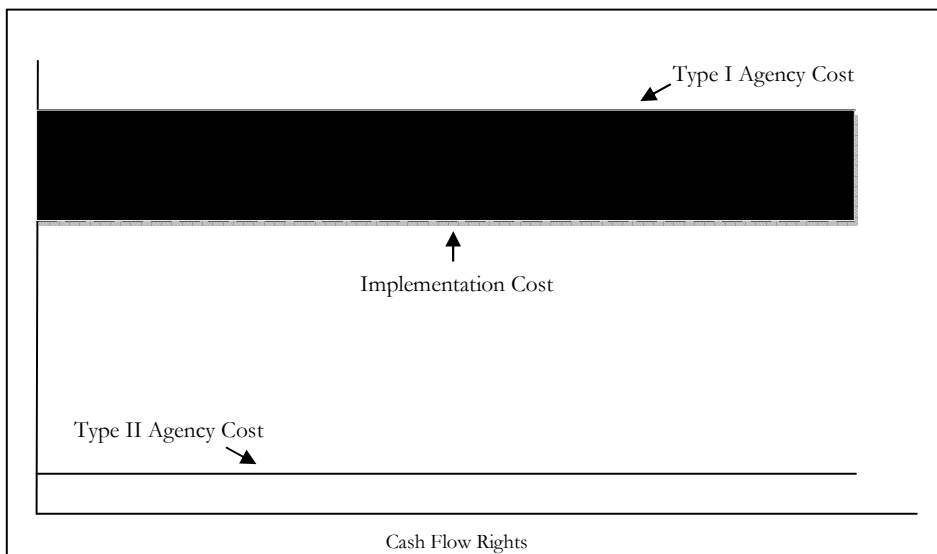
<b>Q</b>	<b>Coef.</b>	<b>Robust</b>	<b>t</b>	<b>P&gt;t</b>
Gov	-0.5142	0.2082	-2.47	0.01
gov_c	-1.1733	0.9591	-1.22	0.22
gov_csq	1.6687	1.2919	1.29	0.20
gov_vc	-0.0261	0.0140	-1.87	0.06
gov_pyramid	0.2925	0.0698	4.19	0.00
gov_debt	-0.3395	0.2009	-1.69	0.09
gov_dirs	-0.3984	0.4146	-0.96	0.34
C	0.4062	0.7229	0.56	0.57
Csq	-0.3325	1.0404	-0.32	0.75
VV	-0.0030	0.0038	-0.79	0.43
Pyramid	-0.0397	0.0391	-1.02	0.31
Debt	-0.0017	0.1661	-0.01	0.99
DirS	0.2083	0.1520	1.37	0.17
Big4	0.3670	0.0654	5.61	0.00
BordSize	-0.0146	0.0160	-0.91	0.36
BoardInd	-1.2124	0.9122	-1.33	0.18
Combine	0.0608	0.0942	0.64	0.52
TotInvestment	-0.0047	0.0036	-1.30	0.19
TotAsset	-0.6158	0.0370	-16.66	0.00
year03	-0.4468	0.0454	-9.85	0.00
year04	-0.7175	0.0787	-9.11	0.00
pri_pd_ac	0.9004	0.7481	1.20	0.23
gov_pd_ac	1.2700	0.6308	2.01	0.04
Intercept	15.7875	0.9540	16.55	0.00
Industry_dummy	Yes			
Adj R-squared	0.365			
<b>Recovered Coefficients</b>				
gov_cons	15.2733	0.9304	16.42	0.00
gov_vc	-0.0291	0.0147	-1.97	0.05
gov_pyramid	0.2528	0.0450	5.62	0.00
gov_debt	-0.3412	0.1139	-2.99	0.00

# Figure 1 Agency Cost Function of Controlling Ownership

## Figure 1a -Private Firms



## Figure 1b -Government Firms



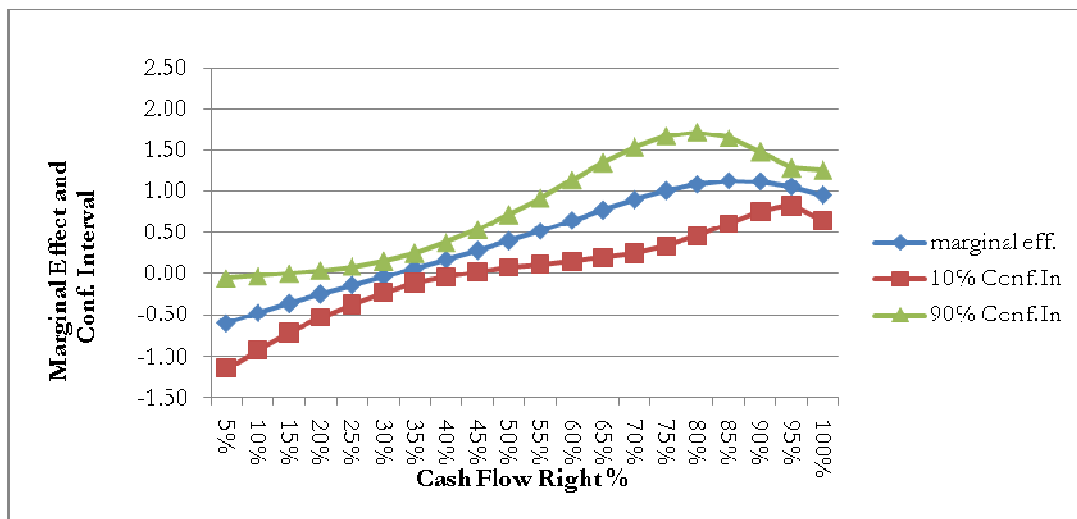
## Figure 2 Marginal Effects of Cash Flow Rights on the Probability of Audit Committee Formation

This figure reports the marginal effects and confidence interval for the cash flow rights on the probability of audit committee formation.

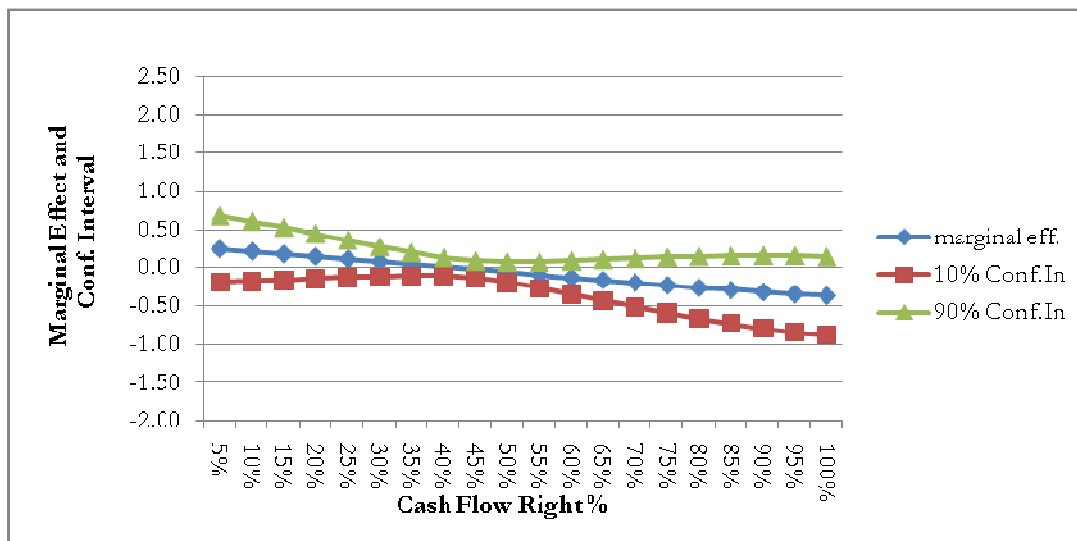
$$\frac{\partial G(\mathbf{x}\beta)}{\partial x_1} = g(\mathbf{x}\beta)(\beta_{1,1} + 2\beta_{1,2}x_1) \equiv \frac{\exp(\mathbf{x}\beta)}{[1 + \exp(\mathbf{x}\beta)]^2} (\beta_{1,1} + 2\beta_{1,2}x_1) \quad (4)$$

Marginal effects for private (government) controlled firms are evaluated at the mean of all explanatory variables setting  $gov=0$  ( $gov=1$ ). Different levels of cash flow rights are tested by varying cash flow rights (C) from 5 percent to 100 percent in 5 percent intervals.

### Figure 2a Private Firms



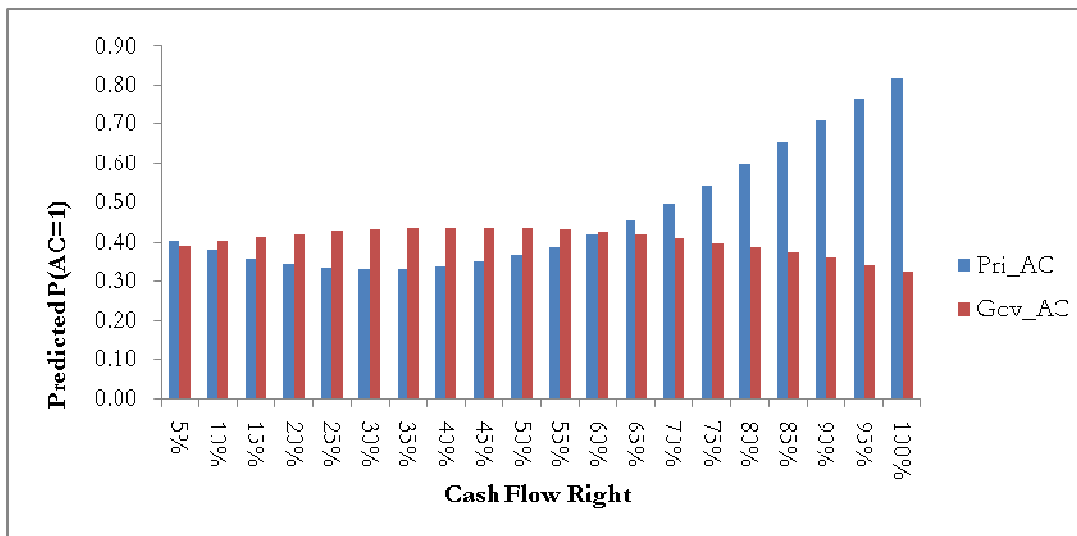
### Figure 2b Government Firms



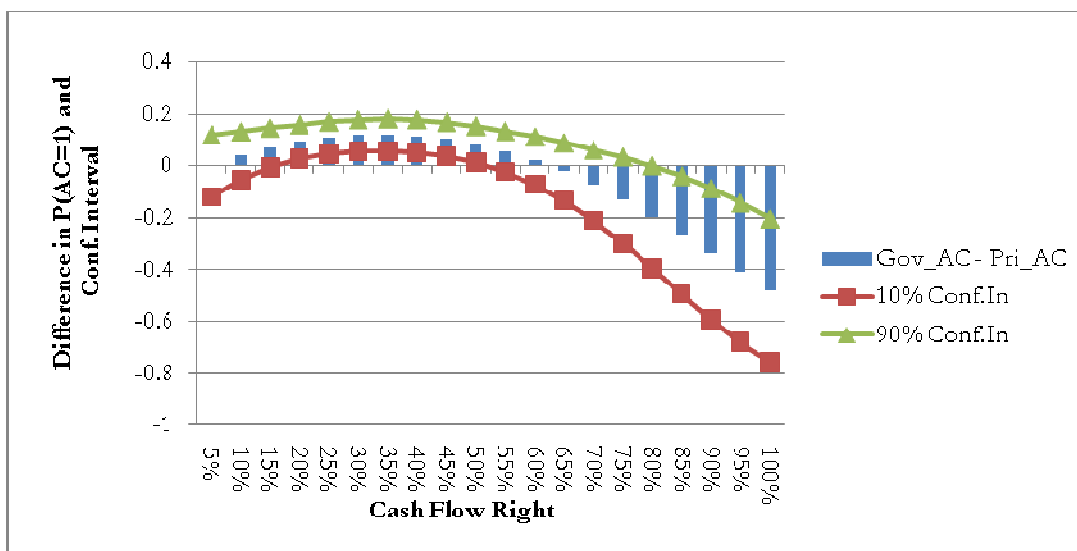
### Figure 3 Predicted Probability of Audit Committee Formation for Private and Government Controlled Firms

This Figure reports the effects of government control and the level cash flow rights on the predicted probability of audit committee formation. The predicted probability  $P(AC=1)$  are calculated using the estimation results reported in Table 6 holding all variables at their mean level except for the level of cash flow rights and setting the indicator variable  $gov=1$  ( $gov=0$ ) and other interactive variables ( $gov\_c$ ,  $gov\_csq$ ,  $gov\_vc$ ,  $gov\_pyramid$ ,  $gov\_debt$ ,  $gov\_dirs$ ) accordingly for government (private) controlled firms. Figure 3a reports the predicted  $P(AC=1)$  and Figure 3b reports differences in the predicted probability and the 90 percent confidence intervals between private and government controlled firms.

#### Figure 3a Predicted Probability of Audit Committee Formation for Private and Government Controlled Firms



#### Figure 3b Difference in Predicted Probability of Audit Committee Formation between Private and Government Controlled Firms



### Figure 4 Effect of Government Control and Cash Flow Rights on predicted Q when Firms do not Have an Audit Committee

This figure presents the predicted  $Q$  for private and government controlled firms with different levels of cash flow rights. The predicted  $Q$ s are calculated using the estimation results reported in Table 8 holding all variables at their mean level, setting the predicted audit committee variables ( $pri\_pd\_ac$ ,  $gov\_pd\_ac$ ) equal to zero, and setting the indicator variables  $gov=1$  ( $gov=0$ ) and other interactive variables ( $gov\_c$ ,  $gov\_csq$ ,  $gov\_vc$ ,  $gov\_pyramid$ ,  $gov\_debt$ ,  $gov\_divs$ ) accordingly for government (private) controlled firms. Figure 4a reports the predicted  $Q$ s while Figure 4b reports the differences in the predicted  $Q$ s and the 90% confidence intervals between private and government controlled firms.

Figure 4a Predicted Q for Private and Government Controlled Firms

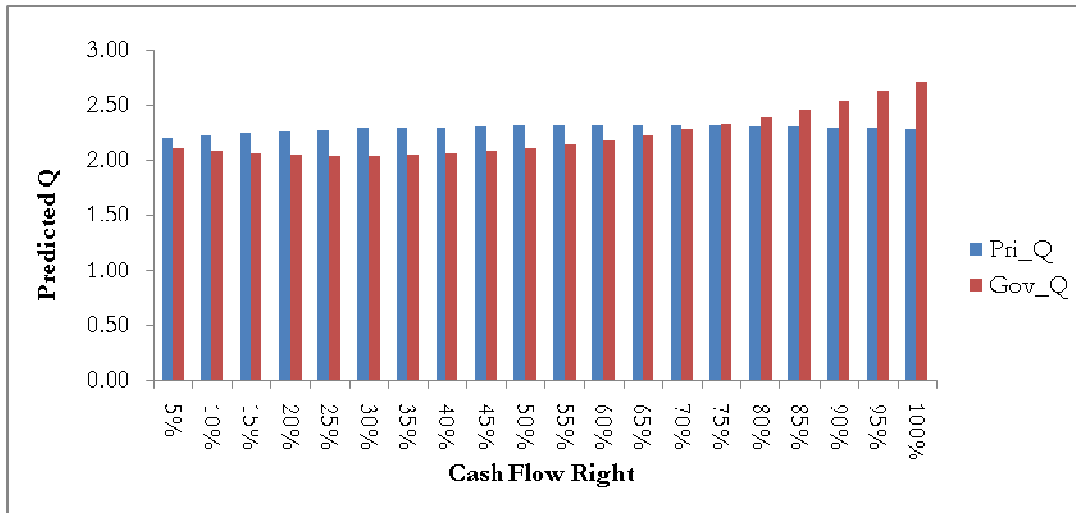
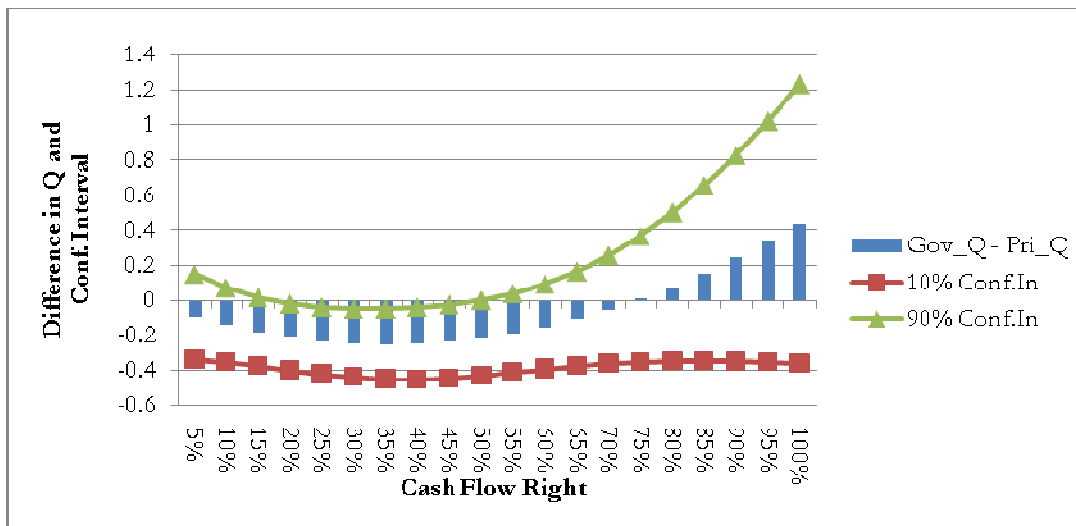


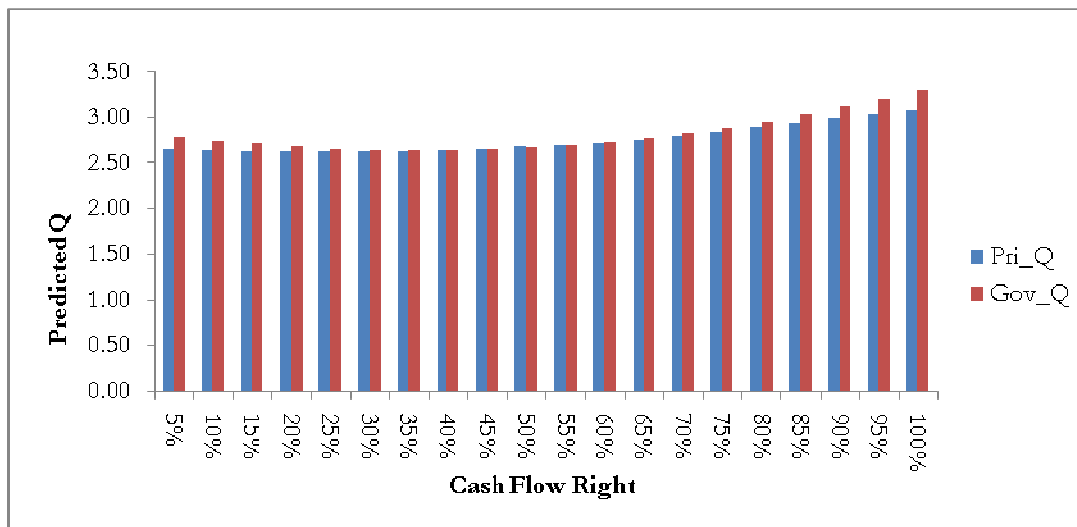
Figure 4b Difference in Predicted Q between Private and Government Controlled Firms



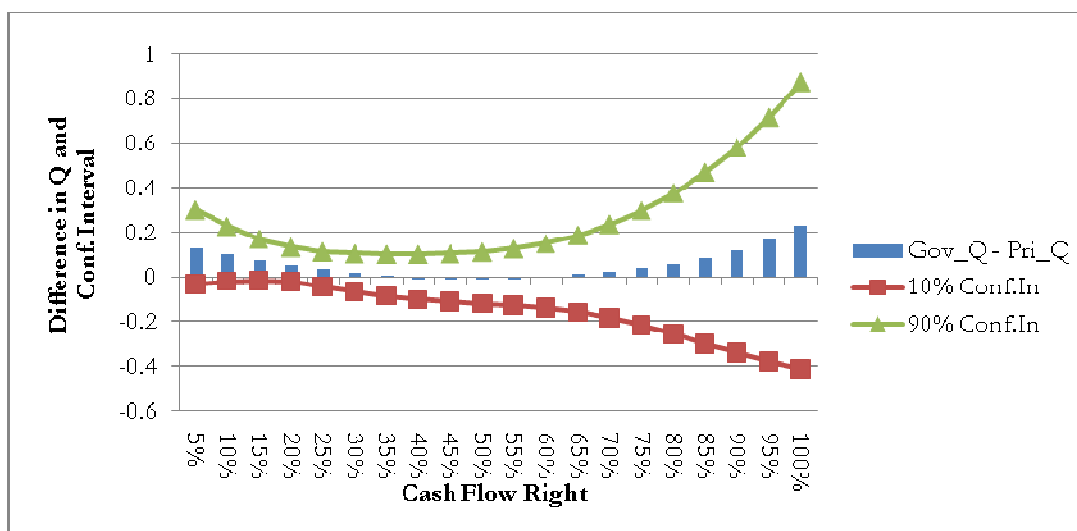
## Figure 5 Effect of Predicted Probability of Audit Committee Formation on predicted Q

This figure presents the predicted  $Q_s$  for private and government controlled firms with different levels of cash flow rights taking into consideration the variations in the predicted audit committee formation. The predicted  $Q_s$  are calculated using the estimation results reported in Table 8, holding all variables at their mean level except for the level of cash flow rights and predicted probability of audit committee formation ( $pri\_pd\_ac$  and  $gov\_pd\_ac$ ). The indicator variable is set to be  $gov=1$  ( $gov=0$ ) and other interactive variables ( $gov\_c$ ,  $gov\_csq$ ,  $gov\_vc$ ,  $gov\_pyramid$ ,  $gov\_debt$ ,  $gov\_dirs$ ) are set accordingly for government (private) controlled firms. Figure 5a reports the predicted  $Q_s$  and Figure 5b reports differences in predicted  $Q_s$  and the 90 percent confidence intervals between private and government controlled firms.

**Figure 5a Predicted Q for Private and Government Controlled Firms**



**Figure 5b Difference in Predicted Q between Private and Government Controlled Firms**



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