THREE ESSAYS ON CORPORATE GOVERNANCE, RISK AND CROSS LISTING

by

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ABSTRACT

XINDE ZHANG. Three essays on corporate governance, risk and cross listing.
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In Chapter 1, we set up an equilibrium model which emphasizes cost of corporate governance. The model indicates that better corporate governance increases the likelihood of dispersed corporate ownership structure.

In Chapter 2, we use a sample of democratic firms (with 5 or less anti-takeover provisions) from the Investor Responsibility Research Center (IRRC) database and use idiosyncratic volatility as a proxy for information from the market of corporate control as in Ferreira and Laux (2007) to link the equity performance, market of corporate control and corporate governance. We find that firms which are the least vulnerable to takeover threat (the least idiosyncratic risk) outperform the others. We also find that market information of takeover vulnerability is negatively related to future merger and acquisition shocks. All these effects are mitigated by the Sarbanes-Oxley Act 2002.

Chapter 3 examines the decision to list abroad by Chinese companies in the form of ADRs and foreign IPOs from 1993 to 2005. Subsequent to the listing events, the issuers experience a significant drop in profitability, tangible assets ratio, and asset turnover. There is no significant change in capital expenditure. Stock returns after the listing events are generally negative for ADR and foreign IPO stocks. More significantly, these stocks under-perform the market in the post-event window ranging from three days to three years.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: CORPORATE GOVERNANCE

1.1 Introduction

Good corporate governance and dispersed ownership structure parity is well established. La-Porta, Lopez-de Silanes, and Shleifer (1999) find that large firms are closely held across the world with exception of US and UK. They argue that level of shareholder protection offered by different legal systems can be a potential explanatory factor of such observation. In the NBER series edited by Morck (2005), the authors further point out that ownership structure evolutes with corporate governance structure and practice. However, it is not well understood why such parity exists.

This paper presents a cost-based approach to study the relationship of corporate governance and ownership structure. We show that corporate governance elements in cost based perspective are important determinants of ownership structure. Indeed, The advantages of good corporate governance practice have long been understood but the costs of having it are largely ignored. We offer an explanation from costs of corporate governance perspective in this paper. We start a model with a minority large shareholder who is making the decision of taking over the firm or adjusting her holding with respect to corporate governance elements. This is really a two way avenue. Large shareholder can initially hold control and then makes the decision of

liquidating shares and control. Clearly, if she takes over the firm, the firm is closely held. With burdens of takeover market, buying control is not necessary to be the optimal decision. In the case of not takeover, her holding decision is also affected by corporate governance elements. We further deliberate the cost factors in the following paragraphs.

Separation of ownership and control problem has been extensively studied since Smith (1937). The so called agency problem is one of the most important issues in corporate governance. In practice, we can either empower the principle or control the management to mitigate agency problem. However, both principle and agent face cost of optimizing their benefits. Principle invests time and money to monitor the agent. Agent on the other hand faces threats such as law suit and burden of career from both principle and society. These costs are inevitably related to corporate governance elements. An ideal corporate governance would increase the cost of agent misconduct while reduce the cost of monitoring. Executive incentive compensation is one of the examples of such dream. Forbidding poison pill would also offer shareholder more comfort and limit agency problem by inviting raiders. Important players such as governments can come in with their own objective to impose cost to both agent and principle as well. To improve transparency, governments tend to put more disclosure requirements on firms. Eventually, firms pay all the cost to fulfill these requirements. The real payers, of course, are the owners of the firms–shareholders. In the same time, more transparent environment increases the cost of agent misconduct. So, we can see that some of these corporate governance practices increase cost of agent but reduce the cost of principle, some of them increase cost of principle but reduce the

cost of agent and there are still others which may increase costs of both principle and agent.

While the cost of corporate governance is hard to observe, its consequences are readily available. Gompers, Ishii, and Metrick (2003) construct an anti-takeover provision index. They count number of anti-takeover provisions as the index and further conclude that firms with few anti-takeover provisions outperform others both operationally and marketwise. While the stock market performance is challenged,[1] the outstanding operation performance is validated by many other researchers.[2] Agency problem is less severe in the firms with few anti-takeover provisions as well. The firms with few anti-takeover provisions are share holder friendly firms and therefore, the stealing cost factor is high whereas the monitoring cost factor is low or at least not higher than the others. In our model, we confirm that such firms deliver more value to their shareholders.

Sarbanes-Oxley Act 2002 is another silent corporate governance event. By adding transparency, the act increases both stealing and monitoring costs. Firms with different characteristics are affected differently. Iliev (2009) documents that even with delay reporting option, small firms are wounded by the act. The act reduces the market value of small firms. It is a clear tradeoff in this case of the reducing stealing cost and increasing monitoring cost. Shareholders are not beneficial when the cost out-weights the benefit.

[1] For example, Lehn, Patro, and Zhao (2007).

[2] For example, Bebchuk, Cohen, and Ferrell (2009) and Ferreira and Laux (2007).

Debt, incentive compensation plan and board structure used properly can increase cost to manager while reduce cost to shareholders. A society with trustable managers is desired and common law system is more likely protect shareholders better than civil law system. Examples of corporate governance effects on the two cost factors are listed in Table 1.

Table 1: Corporate Governance Effects

Corporate Governance Elements	**Monitoring Cost Factor**	**Stealing Cost Factor**
Independent Board	-	+
Ideal Incentive Compensation	-	+
Ideal Debt	-	+
Director Ownership	-	+
Corporate in Delaware	+	-
Less Anti-takeover Provisions	-	+
More Anti-takeover Provisions	+	-
Trustable Manager	-	+
Common Law	-	+
Sarbanes-Oxley Act 2002	+	+

+: increases;
-: decreases.

We model both costs in our equilibrium model simultaneously. Two factors, stealing cost factor and monitoring cost factor, are both functions of all corporate governance elements such as board structure, law and regulations, block holding, market of corporate control, incentive equity based compensation, payout policy, capital structure, history, peace or war, culture, custom, ideology, trust, politics, crisis and many more. In our model, the stealing cost factor is directly related to agency stealing cost whereas the monitoring cost factor is directly related to monitoring cost. They are

linked by the holding decision of the only active shareholder in the model–the large shareholder.

Large shareholders have advantage in nature. This is the reason why they are blamed very often for not being active enough. However, being large shareholder can be costly. The famous free rider theory by Grossman and Hart (1980) tells us that the responsibility which supposes to be performed and covered by all parties would eventually be put on only large shareholder's shoulders. Shleifer and Vishny (1986) further show that large shareholder is most likely to be the only possible takeover buyer. Our model is built on these theories. With large shareholder as the protagonist facilitated by market of corporate control, we answer the following questions: how large shareholder's holding (ownership structure) is influenced by corporate governance? how do stealing cost factor and monitoring cost factor shape takeover decision and firm value and are monitoring and stealing cost factors different and how are they different? In our model, large shareholder either monitors the manager or replaces the manager by herself. With either methods, cost occurs. She pays monitoring cost if she keeps the manager in place and pays takeover premium to small shareholders and takeover transaction cost if she takes over. Manager steals from the firm (agency cost) with a stealing cost if he runs the firm. He leaves the firm if large shareholder takes over. Small shareholders always free-ride in either takeover or not-takeover events. In the model, we let stealing cost factor only directly affect manager's cost of stealing and let monitoring cost factor only directly relates to principle's monitoring cost. By modeling two cost factors separately, we are able to

draw implication on the relationship between corporate governance and ownership structure.

The model is inspired by Shleifer and Vishny (1986). We address principle-agent problem whereas Shleifer and Vishny (1986) assume that manager try his best to serve shareholders' interest. In Shleifer and Vishny (1986), they argue that "In an imperfect and evolving world, managers of some firms, though they may try hard, may just not be good enough." However, in reality, these managers are not only incompetent but also put their own interest over that of the shareholders. Agency cost is real and rather significant as stated in Jensen and Meckling (1976). The takeover gain is then coming from increasing profitability potential and correcting the agency cost whereas it is coming from only increasing profitability potential in-Shleifer and Vishny (1986). However, it is not surprise that Takeover premium is still decreasing with large shareholder's initial holding as in Shleifer and Vishny (1986). A larger holding allow large shareholder to pursuit takeover with smaller gain. Small shareholders therefore correspond with a smaller premium requirement. However, the optimal tender percentage is no longer fixed at 50%. The tender offer is not only large shareholder's signal to small shareholders of improvement, but also signal of severeness of agency problem. In order to suffer less from the agency problem and share the improvement potential, small shareholders no longer read more than 50% tending offer as the pure signal of large share holder exploiting. Additional large shareholder's holding increases pressure to managerial stealing but the marginal effect of the pressure decreases. While the manager and the large shareholder make

their decisions simultaneously, the convexity of the saving from agency cost makes the difference.

Our analysis is also closely related to another stream of researches which add agency concern on top of traditional asset pricing models. In Dow, Gorton, and Krishnamurthy (2005), shareholders as a whole make monitoring decision. Free rider problem is therefore ignored in their model. In Albuquerque and Wang (2008), external forces such as regulation play the dominating disciplinary role. Firm specifics are largely left out of the picture. Both Dow, Gorton, and Krishnamurthy (2005) and Albuquerque and Wang (2008) do not consider market of corporate control neither holding changes. Takeover does not happen very often. Nonetheless, its significance is worth an investigation.

In our model, the large minority share holder makes the decision of her share holding and the manager makes the decision of stealing. All actions, stealing, takeover and monitoring are costly. Managerial stealing cost is a concave function of large shareholder's holding. It is positively correlated to stealing cost factor (η) which is a function of all corporate governance elements. The stronger of the pressure on manager, the larger the η. Monitoring cost is a function of large shareholder's holding. It is also positively correlated to monitoring cost factor (γ) which is a function of corporate governance elements as well.

When it is optimal for the large shareholder to hold more than critical percentage, 50% in this paper, of shares, she takes over the firm–replaces the manager and runs

the firm herself.[3] To become the majority shareholder, she makes a tender offer to buy shares from small shareholders. Small shareholders free-ride in all corporate events but do ask for premium to give up their shares in takeover event. In the equilibrium, takeover decision, large shareholder's holding decision, manager's stealing decision and takeover premium are revealed simultaneously.

Our results come from two folders. The first set of results is from takeover case and the second set of results is from not-takeover (monitoring) case.

One benchmark result is when stealing cost factor is trivial. Manager's cost of stealing is approaching zero in this case. So, large shareholder has to take over the firm or give up all her shares. As the consequence, ownership is concentrated. The firm either controlled by the large shareholder or the manager holds 100% of the cash flow right. Clearly, if manager cannot be monitored and disciplined, owner of the firm has to take control to protect her property right as argued in Shleifer and Vishny (1997) or walk away from the firm. In general, if the factors are not trivial, takeover happens either monitoring cost factor is relatively high compare to stealing cost factor. However, takeover is not the only solution. When corporate governance is constructed properly, large shareholder can step back as the monitor of the manager. Other factors, takeover transaction cost, expected improvement potential, and large shareholder's initial holding, are all important determinants of large shareholder's decision. Different from Shleifer and Vishny (1986) where large shareholder always tender 50%, the added agency cost element makes it possible for

[3]For the sake of simplicity, we use 50% as the critical percentage in this study. It can be replaced by any other appropriate percentage. In UK, whenever a tender offer reaches 30%, the bidder must bid 100% to ensure the fairness to all shareholders.

large shareholder to tender more if she wants to take over the firm. We also find that a better corporate governance featured with low monitoring cost factor or high stealing cost factor increases L's wealth. Therefore, it reduces the likelihood of takeover.

Both stealing cost factor and monitoring cost factor help to mitigate agency problem and improve shareholder's equity value. However, the two factors affect large shareholder's holding decision differently. In the case of not-takeover, large shareholder's holding decision is largely determined by monitoring cost factor. Large shareholder only stays as monitor if stealing cost factor is large enough. That is, shareholder's right is protected adequately. Large shareholder then turns her attention to the cost of being large shareholder which is affected by monitoring cost factor. When the cost is high, she will hold less and hold more if the cost is low. This offers us a novel angle to think of share holding concentration. In the countries, such as US and UK, with sophisticated security market and stringent disclosure requirements, the cost of being a large shareholder is high. So, we see dispersed ownership structure in both countries. In other countries such as those developing ones, where shareholder protection is not as needed, shareholders protect themselves by closely holding shares and control or simply not invest in firm equity. Family business is common in these countries. For the other countries in the middle, shareholders are protected but not as strong as US and UK, power over the management and certain control are necessary. We therefore see blockholding is common–large shareholders exist.

As we can see that a better corporate governance featured with low monitoring cost factor or high stealing cost factor not only increases L's wealth but also increases firm equity. Large shareholder's interest can then be aligned with that of small

shareholders. Large shareholder, if used properly, is a valuable resource for corporate governance.

Our model is closely related to Shleifer and Vishny (1986). We extend the model in the following aspects. First, we introduce agency costs and the role of manager by modeling the manager's decision to steal from the firm. Large shareholder considers the tradeoff between the cost of monitoring and the gain from takeover. Following La-Porta, Lopez-de Silanes, Shleifer, and Vishny (2002) and Albuquerque and Wang (2008), we assume that manager can steal from the firm if he is in control. Second, we assume that the information and resource of the raider (large shareholder) are exclusive. [4] All tender offers made based on the equilibrium solution will always be successful. As in Shleifer and Vishny (1986) and Hirshleifer and Titman (1990), we treat the large shareholder and raider as the same agent.

One important issue in the market for corporate control is the free-rider problem. In the context of corporate governance, there are two free-rider problems. We address both problems in the model. The first free-rider problem lies in the monitoring event. Minority shareholders have little incentive to monitor the management since the benefit relative to cost is minimal. Therefore, minority shareholders are likely to free ride on the benefits of monitoring performed by large shareholders. The second free-rider problem is related to tender offers or buyouts. Minority shareholders may choose not to tender their shares since they wish to free ride on the gain that will

[4] We shall not consider the probability of takeover success as in Hirshleifer and Titman (1990). Hirshleifer and Titman (1990) consider unsuccessful takeover and draw implications on different defensive strategies. They find that even though most anti-takeover actions reduce the probability of takeovers, certain manager's defensive actions increase the probability of a takeover success because these actions can either increase the takeover premium or reduce information asymmetry.

be realized by the raider if the offer is accepted. The consequence is a failed tender offer or a higher takeover premium. Gross and Hart (1980) suggest that, given the free-rider problem, all tender offers fail unless we give raider the right to dilute the payout to the free-riders. Shleifer and Vishny (1986) show that large shareholders can overcome the free-rider problem since they offer a part of their gain from the successful tender offer to small shareholders in the form of a takeover premium. We address the monitoring problem by assuming that small shareholders do not monitor the manager. Following Shleifer and Vishny (1986), we consider the second free-rider problem by offering the small shareholders a takeover premium.

Our model also shares the spirits of Dow, Gorton, and Krishnamurthy (2005) and Albuquerque and Wang (2008). In Dow, Gorton, and Krishnamurthy (2005), shareholders monitor the management to reduce agency cost via an auditing and monitoring technology. We use a similar approach by introducing the cost of monitoring. Albuquerque and Wang (2008) explicitly model manager's stealing cost under imperfect investor protection at the country level. In this paper, we analyze the tradeoff between monitoring and controlling in the presence of management stealing cost.

Our model contributes to the literatures in the following ways. First, we demonstrate the importance of corporate governance cost factors which are largely left behind. Second, we draw intuitive connection between corporate governance and ownership structure. Third, we further confirm that corporate governance creates value.

We review relevant literatures in Section 1.2. The model setup and the equilibrium solution are presented in Section 1.3 and the properties of the equilibrium solution are

in Section 1.4. We discuss model implications in Section 1.5 and conclude in Section 1.6.

1.2 Literature Review

Our corporate governance elements can be proxies of block holding, corporate board and other corporate governance practices.

Blockholders are prevalent all over the world and significantly affect firms' value (La-Porta, Lopez-de Silanes, and Shleifer (1999), Holderness (2003)). They are also the most nature and important monitor of the management (Shleifer and Vishny (1986)). Even in U.S. where people generally believe that the public firms are widely held, blockholders present. Cronqvist and Fahlenbrach (2009) find that not only large shareholders exist in U.S., but also important blockholder fixed effects exist. They document that blockholders affect firms' investment, financial, and executive compensation policies. Further, the blockholders are important to firm performance measures. The differences in corporate policies are systematically related to differences in firm performance. Claessens, Djankow, Fan, and Lang (2002) also find that large shareholders' cash flow right is positively correlated to firms' value but the relationship is not linear. Ownership is affected by other historical, social and economic factors. However, block holding is largely out of control of manager.[5] Claessens, Djankov, and Lang (2000) and Faccio and Lang (2002) further record evidence on ownership concentration for East Asia and Western Europe.

[5]Japanese keiretsu firms and Korean chaebol firms are exceptions.

Factors such as trust, custom, culture, law and regulation, war and crisis, firm specific risk and changes of these factors affect ownership structure.[6] In our model, active large shareholder monitors the manager and ready to replace the manager if necessary. Monitoring cost, stealing cost, potential takeover gain and market of corporate control environment jointly determine the large shareholder's holding and takeover decision, manager's stealing decision and the takeover premium.

Even though some blockholders do not seek for control, some of them raise their voice through the channels such as voting and/or making operating suggestions. These suggestions serve as the information of the level of agency problem. The recent hedge fund activism in U.S. demonstrates the value of such blockholders. Brav, Jiang, Partnoy, and Thomas (2008) document that even though hedge funds seldom seek control, the announcement of activists by proposing strategic, operational and financial remedies leads to 7% abnormal return with no reversal during the subsequent year. Target firms increase in payout, get better operating performance and have higher CEO turnover after the activism.

Corporate board is counted on for monitoring manager. The board represents shareholders to make important corporate decisions such as management compensation and CEO appointment. Even though board structures are very different across countries, almost all corporations in the world have board. If board monitoring is effective, manager who generates significant agency cost or underperforming should be replaced. Dahya, McConnell, and Travlos (2002) offer evidence from UK. The Cad-

[6]Morck (2005), Holderness, Kroszner, and Sheehan (1999) and Himmelberg, Hubbard, and Palia (1999).

bury Committee issued the Code of Best Practice recommending that boards of U.K. corporations include at least three outside directors and that the positions of chairman and CEO be held by different individuals. They find that CEO turnover increased following issuance of the Code. The negative relationship between CEO turnover and performance became stronger following the Code's issuance. More important, the increase in sensitivity of turnover to performance was concentrated among firms that adopted the Code. On the other hand, as observed by Denis and Denis (1995), in U.S., force resignations are rare and are due more often to external factors such as takeover attempt or blockholder pressure than to normal board monitoring. Shivdasani (1993) finds that outside directors in hostile targets have lower ownership stakes. Ownership by block holders unaffiliated (affiliated) with management raises (decreases) the likelihood of a hostile takeover attempt. He argues that these results suggest that the board of directors and hostile takeovers are substitute mechanisms and that unaffiliated blockholding and hostile takeovers are complementary mechanisms for corporate control. Using panel data between 1990 and 2006, John and Kadyrzhanova (2009) find that board classification is related to takeover activities. In particular, they document a reliable negative association between board classification and transaction outcomes, such as likelihood of receiving a takeover bid and likelihood of bid completion, but only in industries with high incidence of board classification.They state that "These findings offer direct evidence supporting the hypothesis that board classification diverts takeover activity to substitute targets with better governance. Moreover, they imply that generally overlooked lax governance standards at the industry level are as important a determinant of managerial entrenchment as much looked upon firm-level

governance measures." So, in practice, board is at most necessary but not efficient. While high proportion of outside directors does not help firm performance (Hermalin and Weisbach (2003)). It does help on decisions of takeover, CEO compensation and CEO turnover. Board size and firm size performance are generally negatively correlated.[7] Shareholders also try to use incentive compensation plan to align the interest of their own and that of the manager. Given that the CEO selected board members determine the compensation plan, CEO himself really decides his own pay check.[8]

If blockholding and monitoring are not effective, we turn to the last resort of corporate governance–market of corporate control. Takeover is promoted by academic for decades since Manne (1965). Unfortunately, hostile takeover is so cost that one can only use the mechanism for extreme cases nowadays.[9] Even in relative active takeover markets such as US and UK, we do not observe significant amount takeover transaction. According to Jensen (1993), the large takeover premium is the evidence of extensive agency cost. The buyout wave in 1980's is one of the driving forces which convert U.S. public firms towards shareholder value maximization in 1990's. Hostile takeovers and other type of buyouts create value even after the significant transaction cost. It is widely accepted that 1980's buyouts bring efficiency back to the economy. Even after 1980, Guo, Hotchkiss, and Song (2009) still find that buyouts still add economic value using completed buyout samples from 1990 to 2006. It is even more appealing that takeover threat rather than the (costly) physical takeover is valuable. Gompers, Ishii, and Metrick (2003) document that firms with less anti-

[7]Yermack (1996) for U.S. firms and Eisenberg, Sundgren, and Wells (1998) for Finish firms.

[8]See Murphy (1999) and Core, Guay, and Larcker (2003).

[9]Takeover can also due to the buyer's agency problem when the acquirer's manager builds his own empire through the deal. We do not consider acquirer side agency problem in this study.

takeover provisions outperform the ones with more such provisions in both capital market and operation-wise.

It is natural to assume that (unaffiliated) large shareholders are more likely to initiate proxy fight. Holderness and Sheehan (1988) find that majority-owned firms are acquired more frequently than their diffusely held peers. 38 percent of their corporate majority shareholder firms were either acquired or taken private, compared with only 21 percent of the diffusely held peers. Morck, Shleifer, and Vishny (1998) find that the probability of a Fortune 500 firm being acquired between 1981 and 1985 increased with the percentage of common stock owned by its top two managers. On the other hand, if the manager is also a blockholder or there is no blockholder of the firm, it becomes difficult to replace him due to performance. However, empirical evidence is not clear on this point. Mikkelson and Partch (1989) find that for 240 randomly selected corporations over the 1973-83 period, the probability of a change in control-which they define as a merger, delisting, or bankruptcyis unrelated to managerial ownership.

Other interested parties, especially government also seek to protect investor's property right and improve firm performance by setting up laws and regulations. Albuquerque and Wang (2008) demonstrate that better shareholder protection can improve firm value significantly. Sometimes internal mechanism and external mechanism can be substitutions to each other. Mitton (2002) look at this approach from a very interesting angle. He takes firms from East Asian during the East Asian financial crisis of 1997 to 1998 and finds that firms with indicators of higher corporate governance practice (ADRs and auditors from Big Six accounting firms) perform significantly

better. Social and legal systems are essential to protect investors. These factors lay out the play ground for the corporate players–investors and management. La-Porta, Lopez-de Silanes, Shleifer, and Vishny (1998) report that common-law countries have the strongest and French-civil-law countries have the weakest legal protections of investors. Ownership concentration is negatively related to investor protection. Volpin (2002) reports that in environment with a weak legal protection of investors such as Italy, while the sensitivity of turnover to performance is low in general, it is even lower in firms where the top executive also holds significant shares of the firm or has power over the other parties.

1.3 Model

We consider a one-period economy with two securities: one is a locally riskfree asset with risk free rate, $r = 0$; the other is the equity of a firm with a certain production technology where the production rate is q. The firm is owned by two types of shareholders: one large shareholder (L, hereafter) and a group of atomistic shareholders (S, hereafter). Initially, no one holds more than 50% of the shares. The initial firm value is V_0. It grows at a production rate q before agency costs. All agents are assumed to be risk neutral.

At the beginning of the period, a manager in place with a compensation package as follows:[10] manager receives a constant proportion of the realized firm value, $\theta \in (0, 1)$, if firm is not being taken over. He leaves the firm and receives nothing if large

[10] According to Dittmann and Maug (2007), restricted stock is more beneficial to the firm owners than the employee stock option. The model can be easily extended to the case that some cash amounts are included in the compensation package. In the compensation package we consider, the manager is fully entrenched since he receives nothing if he is replaced. For comprehensive review on managerial compensation, see Murphy (1999).

shareholder takes over the firm. For simplicity, we assume that the manager's initial wealth is zero. At the end of the time period, the production technology is realized and the payouts to all the agents are realized.

L initially owns significant portion of the firm, $\alpha_0 < 50\%$ of the firm. L has an exclusive access to the technology for identifying and implementing valuable improvements using the firm's current assets and her own resources (see Shleifer and Vishny (1986)). The significant holding motivates L to better manage the firm and are more willing to exert effort into the firm than M . These advantages give L the capability to improve firm value to $(Z + q)V_0$, where Z is a nonnegative random variable. We assume that L and M do not collaboratively exploit S. We further assume that L does not try to dilute small shareholder's interest.

We first discuss large shareholder's cost structure.

In our setting, L either takes over the firm or doesn't take over the firm, with costs in both situations. In the first case, L improves firm performance by taking over the firm with significant transaction cost and takeover premium. In the second case, L intends to monitor the manager as a minority blockholder with monitor cost.

Precisely, if the new holding of L, α, is greater than 50%,[11] L makes a tender offer to buy enough shares from S to take over the firm, and S tender their shares with a takeover premium π. L also bears the cost of transferring ownership, preparing legal documents, reorganization and other necessary efforts to realize the improvement. The takeover transaction cost is cV_0 where c is non-stochastic.

[11] 50% is selected for the sake of simplicity. It can be replaced by any other appropriate percentage.

On the other hand, if $\alpha < 50\%$, L stays as the blockholder and M runs the firm. L then bears a monitoring cost $I(\alpha;\gamma)$ where α is L's holding and γ is the monitoring cost factor which is a function of corporate governance elements. On top of fulfill common legal requirements such as preparing quarterly and annually accounting reports, L may need to pay a little more due to her extensive holding. For example, in U.S. by SEC disclosure requirement, L must disclose her holding if her holding is more than 5% while she does not need to do so if she holds less. This is true in most of other countries too. For Hong Kong, the threshold is 5% of a listed companys voting shares. In Taiwan and Sri Lanka it is 10%. Countries such as U.S and China also require blockholders to report their holding change frequently. [12] The extensive holding also gives L the leeway to gain some inside information easier than others. So, we have $I'(\alpha;\gamma) > 0$ and $I''(\alpha;\gamma) > 0$. To facilitate future analysis, we let

$$I(\alpha;\gamma) = \frac{1}{2}\gamma\alpha^2 V_0. \tag{1}$$

We now turn to the cost structure on the manager.

We use a stealing technology to demonstrate the agency cost if the firms is operated by the manager ($\alpha < 50\%$). M steals β fraction of the firm. As in Albuquerque and Wang (2008), Johson, La Porta, Lopez-de Silanes, and Shleifer (2000b), and La-Porta et al. (2002), the cost of stealing[13] is a function of stealing cost factor η, the stealing amount β and large shareholder's holding α.

[12] See SEC Schedule 13D for US market. Disclosure level is different in countries and industries. L's power of getting information is also important to the cost of monitoring. All these are reflected in the monitoring cost factor γ.

[13] It is also termed as the *cost-of-theft* function in La-Porta et al. (2002).

Corporate governance has important effect on stealing cost, written as Φ. In the model, the stealing cost factor η is a function of corporate governance elements. For example, civil law and common law countries are different in term of the pressure since managers in common law face the potential risk that court can rule against the managers' favor even there is no explicit statement in the law. The more disciplinary power in place (larger η), the more costly of M's stealing. Therefore,

$$\frac{\partial \Phi}{\partial \alpha} > 0, \frac{\partial \Phi}{\partial \beta} > 0, \frac{\partial^2 \Phi}{\partial \beta^2} > 0, \frac{\partial \Phi}{\partial \eta} > 0.$$

McConnell and Servaes (1990) documented that blockholding is positively correlated to firm value. It is also obvious that the more L holds, the more pressure M has.

In the model, we assume stealing cost[14]

$$\Phi(\alpha, \beta, \eta, V_1) = \frac{1}{2}\alpha\beta^2\eta V_1. \tag{2}$$

Large shareholder either takes over the firm with substantial transaction cost and takeover premium or lives with agency cost; whichever case is cost-efficient. The tradeoff in takeover case is between improving firm performance plus getting rid of agency cost and transaction cost plus takeover premium. whereas the tradeoff In not-takeover case L considers the tradeoff between monitoring cost and reduction of agency cost. The decision variable for L is her holding, α. The sequential equilibrium solution to L is her holding which maximize her wealth. Her decision is therefore per-

[14]The convexity assumption of the stealing cost with respect to β is standard. Our choice of the stealing cost is the same as in Albuquerque and Wang (2008) except for in our case α is involved. We argue that our choice is reasonable in a framework with both stealing and monitoring. Albuquerque and Wang (2008) do not consider the monitoring case and market of corporate control.

suaded by corporate governance elements, improvement potential, her initial holding, takeover transaction cost, takeover premium, and manager's decision.

Manager faces a tradeoff between stealing and cost of stealing. His decision is also influenced by corporate governance elements and large shareholder's decision. S always free-ride and collect takeover premium and the fruit of monitoring. Firm value at time $t = 1$, L's takeover decision, M's stealing strategy, and the takeover premium are determined simultaneously in the equilibrium.

Table 2: M's and L's Wealth

This table shows firm value, large shareholder's wealth and the manager's wealth, at time $t = 1$. α and β are two decision variables of L and M, respectively.

	Firm Value V_1	L's final wealth W^l	M's final wealth W^m
Takeover	$V_0(q+Z)$	$\alpha V_1 - cV_0$ $-(\alpha-\alpha_0)(V_0+\pi(\alpha)V_0)$	0
Monitor	$V_0 q$	$\alpha(1-\theta)(1-\beta)V_1$ $-I(\alpha)-(\alpha-\alpha_0)V_0$	$\theta(1-\beta)V_1+\beta V_1$ $-\Phi(\alpha,\beta,\eta,V_1)$

Table 2 demonstrates explicitly how firm value and the final wealth of L and M are affected by L's holding decision and M's stealing decision. If L takes over the firm ($\alpha \geq 50\%$), she needs to pay a premium of $(\alpha-\alpha_0)\pi(\alpha)$ to S and bears the takeover transaction cost c. Therefore, the final wealth W^l is αV_1 minus $(\alpha-\alpha_0)(V_0+\pi(\alpha)V_0)$, which reflects the amount payout to S and the transaction cost cV_0. If L doesn't take over the firm, M steals β fraction of the firm, and the firm's value is reduced to $(1-\beta)V_1$. After the manager's compensation, $\theta(1-\beta)V_1$, the firm has $(1-\theta)(1-\beta)V_1$ to distribute to its shareholders. Consequently, the final wealth W^l is $\alpha(1-\beta)(1-\theta)V_1$

minus $(\alpha - \alpha_0)V_1$ and then minus the monitoring cost $I(\alpha)$. The final wealth of the manager can be derived using the same logic.

We start with the characterization of the takeover premium.

1.3.1 Takeover Premium

As in Shleifer and Vishny (1986), when L makes a tender offer, S read the offer as that L has the ability to make improvement and therefore demands a premium. L on the other hand wants to make sure her decision executed. The takeover premium therefore is small shareholders' expectation of the improvement which large shareholder can make with control. The takeover premium $\pi(\alpha)$ is the point where S is indifferent to tender or not tender. Thus, S's expectation of the improvement given that L makes a tender offer is:

$$\pi(\alpha) = \mathbb{E}[Z|\alpha Z - (\alpha - \alpha_0)\pi(\alpha) - c \geq 0]. \tag{3}$$

We assume that Z is uniformly distributed on $[0, Z_{max}]$.[15] Then, by equation (3), we obtain

$$\pi(\alpha) = \frac{Z_{max}\alpha + c}{\alpha + \alpha_0} \tag{4}$$

and

$$\frac{\partial \pi(\alpha)}{\partial \alpha} = \frac{Z_{max}\alpha_0 - c}{(\alpha + \alpha_0)^2} \tag{5}$$

We have the following result.

Proposition 1

[15]The uniform distribution assumption is only used in this paper for illustrative purpose. Other distributions of Z can be imposed and the main findings of this paper are still the same as long as S observes some information of the distribution of Z. For instance, if S observes $Z + \epsilon$ where ϵ is a noise independent of Z, the equation (3) still holds.

1. *If the expected takeover gain from the L' s initial holding, $\alpha_0 Z_{max}$, is greater (less) than half of the takeover transaction cost, then the takeover premium is increasing (decreasing) with respect to L's decision variable α.*

2. *The takeover premium,π is positively correlated with the takeover transaction cost, c.*

3. *The takeover premium is always greater than the expected improvement potential, $\mathbb{E}[Z]$.*

Proof: See Appendix. □

This proposition presents the general behavior of the takeover premium. It not only shows the property of takeover premium, but also serves as guideline of L's holding decision. L takes over the firm only if the takeover is more attractive than staying as monitor. Takeover premium is one of the two burdens of takeover transaction. It is important to notice that the relationship between holding decision and the premium is not monotone. This distinguished our model from Shleifer and Vishny (1986). In Shleifer and Vishny (1986), they do not put any consideration of this relationship since the large shareholder always takes 50%. In our model, however, the added agency cost makes L's decision a little more complicated. It also blurs small shareholders believe in that if they do not tender, they have to suffer from the agency cost. This gives L some flexibility on tending amount. Therefore, there is no guarantee that L will not exploit S after she gains control in our model. For a simple case where the stealing cost factor is infinitesimal, keeping the M will leave shareholders all empty. Rational small shareholders then would sell all their shares to L. Our model is not

applicable to the case of large shareholder exploiting small shareholders. We would rather take the merit from Albuquerque and Wang (2008) for the agency problem between large shareholder and small shareholders.

Taking the takeover transaction cost as sink cost, large shareholder's motivation of takeover would be different from the nature of her own holding and the improvement opportunity. As we mentioned before, the gain of takeover is generated from two sources: agency cost reduction or/and improvement potential. When one or both of these two are large, takeover is more likely to take place. Notice that $\alpha_0 Z_{max}$ is small only if both α_0 and Z_{max} are small. When they are both small, L does not have much of flexibility. Takeover is more likely driven by agency cost. It is then a matter of fight for control rather than a portfolio choice problem. On the other hand, if the product of α_0 and Z_{max} is large, takeover can driven by both agency concern and improvement potential. So, we would see some taste of portfolio choice.

Moreover, L must pay the transaction cost c. Keeping α as constant, greater takeover transaction cost means greater improvement potential of the firm. The takeover premium is therefore increases with the transaction cost. Furthermore, improvement plan as a publicly available good, L must pay at least fair price of the good–expected improvement potential. L also willing to pay more than the expected improvement to avoid potential competition and to ensure the tender offer going through.

The analysis on the takeover premium forms the basis for our subsequent derivation of the Nash equilibrium. We first examine the manager's stealing decision and then L's decision to take over or not.

In the equilibrium, M anticipates L's holding decision α, and chooses his optimal stealing amount β and L anticipates M's decision and chooses her optimal holding α simultaneously. We solve these first order condition equations to reach the final equilibrium.

1.3.2 Manager's Stealing Decision

Given L's decision α, the manager's wealth is

$$\mathbb{E}[W^m] = \left\{\theta(1-\beta) + \beta - \frac{1}{2}\alpha\eta\beta^2\right\}\mathbb{E}[V_1]. \tag{6}$$

By solving the first order condition (FOC), M's optimal stealing fraction β is

$$\beta^* = argmax_\beta \mathbb{E}[W^m] = \frac{1-\theta}{\alpha\eta}. \tag{7}$$

β is inversely related to the numbers of holding, α, and the stealing cost factor, η. Greater disciplinary pressure (greater η) leads to less managerial stealing. We will show that monitoring cost factor (γ) also affects the manager's stealing decision indirectly in the next three sections. In takeover case, we consider two seniors: $\alpha_0\mathbb{E}[Z] > \frac{c}{2}$ and $\alpha_0\mathbb{E}[Z] < \frac{c}{2}$. L's final decision is the one maximize her wealth, either takeover (denoted as α_1^*) or not-takeover (denoted as α_2^*). L's optimal decision of α is then:

$$\alpha^* = argmax_{\alpha\in\{\alpha_1^*,\alpha_2^*\}}\{\mathbb{E}[W^l]\}$$

where α_1^* is L's optimal decision if she does not take over the firm and α_2^* is L's optimal decision if she takes over the firm.

We move to not-takeover case first.

1.3.3 L Does Not Takeover

According to Table 2, L's wealth in the monitoring region that $\alpha < 50\%$ is concave. The maximum wealth is achieved at

$$\alpha_2^* = min\left\{\frac{(1-\theta)\mathbb{E}[q]-1}{\gamma}, 50\%\right\} \tag{8}$$

One clear observation is the negative correlation between monitoring cost factor and L's holding decision. The more powerful L is, the more she holds and the smaller legal obligation, consequently the more she holds.

1.3.4 Large Takeover Gain from L's Initial Holding – $\alpha_0\mathbb{E}[Z] > \frac{c}{2}$

In this section we characterize the equilibrium when $\alpha_0\mathbb{E}[Z] > \frac{c}{2}$. A large takeover gain from L's initial holding, $\alpha_0\mathbb{E}[Z]$, gives L a better chance to take over the firm. However, small shareholders ask for more premium at the same time. So, even with a substantial improvement opportunity, L may still better off not take over the firm. In the "takeover" region where $\alpha \geq 50\%$, the optimal holding α_1^* depends on how large the expected improvement $\mathbb{E}[Z]$ can be achieved. As shown in Appendix, if $\mathbb{E}[Z] \geq \mathbb{E}[q] - 1$, then

$$\alpha_1^* = \min\left\{\max\{50\%, \sqrt{\frac{s}{u}} - \alpha_0\}, 100\%\right\}, \tag{9}$$

where

$$s = 2\alpha_0(\alpha_0 Z_{max} - c) \text{ and } u = \mathbb{E}[Z] - (\mathbb{E}[q] - 1).$$

On the other hand, if $\mathbb{E}[Z] < \mathbb{E}[q] - 1$, then L will tender 100% of the firm.

1.3.5 Small Takeover Gain from L's Initial Holding – $\alpha_0\mathbb{E}[Z] < \frac{c}{2}$

In this section, we derive the equilibrium where the takeover gain from L's initial holding is small. That is $\alpha_0\mathbb{E}[Z] < \frac{c}{2}$. L's optimal holdings are different in nature in these two regions. In this region, L's optimal holding is either 50% or 100%. Precisely,

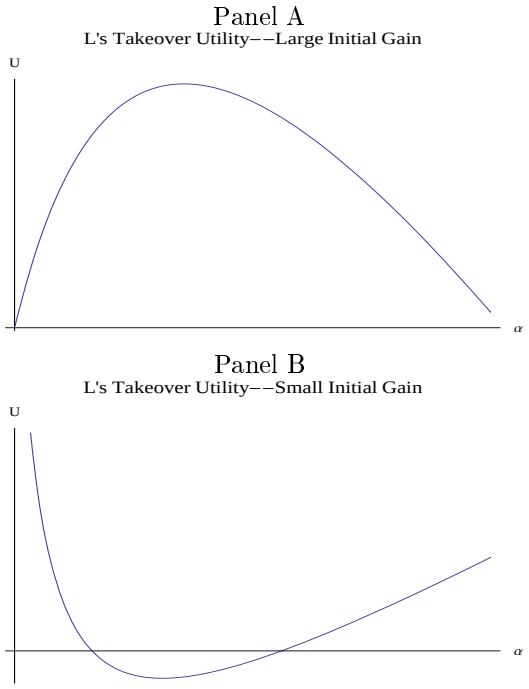
$$\alpha_1^* = argmax_{\alpha\in\{50\%,100\%\}}\{\mathbb{E}[W^l];\alpha\} \tag{10}$$

when $\alpha_0\mathbb{E}[Z] < \frac{c}{2}$. Moreover, L takes over the firm by purchasing just 50% of the firm's shares for a reasonable level of the takeover transaction cost c.[16]

The difference on the optimal holding in the large initial holding and the smaller initial holding, is illustrated by L's expected wealth. When $\alpha_0\mathbb{E}[Z] > \frac{c}{2}$, L's wealth is a **concave** function with respect to her holding α. Therefore, the global maximum point is not necessarily 50% nor 100%. On the other hand, L's wealth becomes **convex** when $\alpha_0\mathbb{E}[Z] < \frac{c}{2}$. This convexity follows from the trade-off between the benefits of acquiring more shares and the costs of takeover (takeover premium and takeover transaction cost). L's maximum wealth of this function is always achieved at the binding point, $\alpha = 50\%$ or the fully control point, $\alpha = 100\%$. These patterns are shown in Figure 1.

As we discussed in Proposition 1, L is more likely to takeover the firm due to agency problem and is more constraint. She is taking over the firm not because she is excited on improvement opportunity but the bad behavior of the manager or insufficient protection of shareholder by corporate governance.

[16]See Proposition 0.2 , Appendix for its proof.



This figure shows L's wealth in the takeover region with respect to her holding α. In the upper panel, $c = 0.15, \mathbb{E}[Z] = 0.75, q = 1.12$, and $\alpha_0 = 0.4$. $\alpha_0 \mathbb{E}[Z] > \frac{c}{2}$. The wealth is concave and the optimal holding $\alpha^* = 35.6\%$. In the lower panel, $\alpha_0 = 0.05, \mathbb{E}[Z] = 0.005$ while other parameters are the same as in Panel A. In this case, the wealth behaves as a convex function. The optimal holding $\alpha^* = 50\%$.

Figure 1: L's optimal holding in the takeover region

After determining L's optimal holding α_1^* in takeover region, α_2^* in the not-takeover region, we can solve the Nash Equilibrium. We then present the properties of the equilibrium and implications from the model in next section.

1.4 Discussions

We first discuss large shareholder's first order decision, that is either take over the firm or not to take over the firm.

1.4.1 Takeover Decision

A benchmark model for our subsequent analysis is the case without the stealing cost for the manager, that is $\eta \to 0$.

Proposition 2 *If $\eta \to 0$, L takes over the firm or holds no share of the firm.*

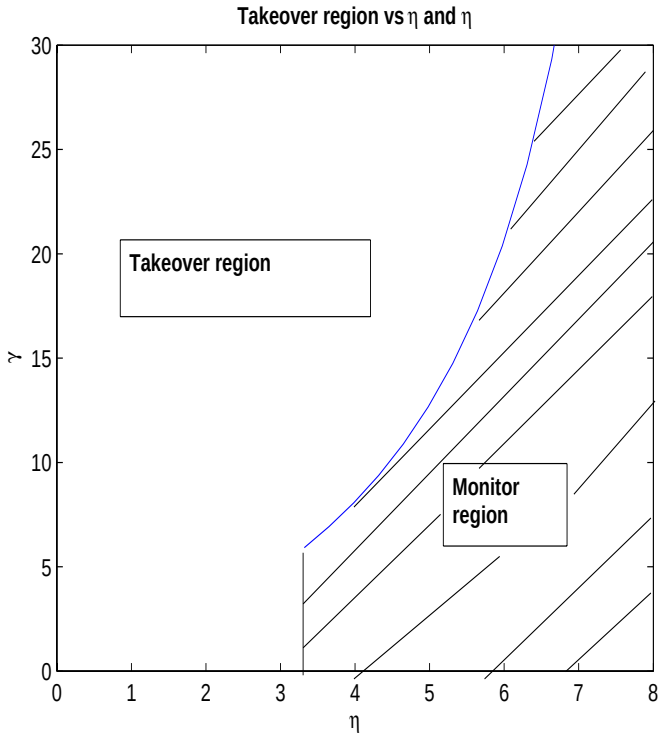
Proof: See Appendix. □

This proposition asserts that in a world without cost of managerial stealing, L always takes over the firm. In a world without investor protection, M does not need to disgorge any cash back to the shareholders. L thus takes over the firm to protect her investment. However, minority shareholders may stay on since L, as an entrepreneur, returns cash back to investors due to future financing concern[17].It is also possible that L realizes that there is no way to get her money back. Rather than throw money into the water, she hoards coins in her backyard. Carrying this logic further, there would be no investment in the firm so manager holds the firm. In either case, the ownership structure would be concentrated.

A general case is illustrated in Figure 2.

Figure 2 shows how the takeover decision is affected jointly by stealing cost factor and monitoring cost factor. In Figure 2, both the monitoring and takeover regions are presented. The parameters in this figure are $Z_{max} = 8, \mathbb{E}[q] = 4, \alpha_0 = 1\%, \theta = 1\%, V_0 = 1$ and $c = 0.05$. The takeover gain from L's initial holding is $\alpha_0 \mathbb{E}[Z] = \frac{1}{2}\alpha_0 Z_{max} = 0.04 > \frac{c}{2}$. According to proof of Proposition 3 in Appendix, the critical monitor parameter $\gamma^* = 2\{(1-\theta)\mathbb{E}[q] - 1\} = 5.92$, and the critical stealing cost

[17]See Shleifer and Vishny (1997) for further discussion.



This figure shows the takeover region and the monitoring region in term of the monitoring cost factor and stealing cost factor. The parameters of this figure are $Z_{max} = 8, \mathbb{E}[q] = 4, \alpha_0 = 1\%, \theta = 1\%, V_0 = 1$ and $c = 0.05$. There are two different situations: $\eta \leq 3.32$ and $\eta > 3.32$. L takes over the firm if $\eta \leq 3.32$.

Figure 2: $L's$ Takeover Decision for the Case of Large Initial Gain

factor parameter $\eta^* = 3.32$. When $\eta \leq 3.32$, L takes over the firm. When $\eta > 3.32$, L's decision depends on the stealing cost factor and the monitoring cost factor. As presented by the proof of Proposition 3, L takes over the firm if

$$\gamma \geq \frac{\frac{1}{2}((1-\theta)\mathbb{E}[Z]-1)^2}{\frac{(1-\theta)^2\mathbb{E}[Z]}{\eta} - \alpha_0 + \frac{A}{V_0}},$$

where A is L's maximum wealth in the takeover region.[18] Otherwise, L remains as a monitor. L does not to take over the firm in the latter case because L is willing to monitor the firm when γ is small and η big.

[18] Write $f(\alpha)$ as $\mathbb{E}[W^l]$, the expected wealth of large shareholder, when $\alpha \geq 50\%$ in the takeover case. Then $A = \max_{\alpha \geq 50\%} f(\alpha)$.

Large shareholder's takeover decision in the large initial takeover gain situation in given by the next proposition.[19]

Proposition 3 *For $\alpha_0\mathbb{E}[Z] > \frac{c}{2}$, L takes over the firm if either γ is relatively too high to η, or η is extremely low.*

Proof: See Appendix. □

High γ leads to a significant monitoring cost. While the stealing environment provides investor protection, L's decision also depends on how costly the monitoring is. When the monitoring cost is high, L is more likely to take over the firm. On the other hand, if monitoring cost is reasonable, the large shareholder is more likely to remain as a monitor and she can acquire shares to enhance her monitoring position. By increasing her holding on the firm, the agency cost is deduced by equation (7). In Appendix we illustrate how other factors, such as $\mathbb{E}[Z], \alpha_0$ and c, affect L's decision.[20]

A remarkable implication of equation (9) is that the optimal shares α^* of L is not necessarily the binding point 50%. The complete characterization of the circumstance under which $\alpha^* \neq 50\%$ is presented by the following proposition.

Proposition 4 *Assume that $\alpha_0\mathbb{E}[Z] > \frac{c}{2}$ and $\mathbb{E}[Z] > \mathbb{E}[q] - 1$. The optimal holding α^* is not equal to binding level 50% as long as the initial holding α_0 satisfies*

$$\alpha_0 > \frac{u + 2c + 2\sqrt{u(c + \mathbb{E}[Z]) + c^2}}{2(4\mathbb{E}[Z] - u)},$$

[19]For interested readers we present L's takeover decision when $\alpha_0\mathbb{E}[Z] < \frac{c}{2}$ in Appendix. See Proposition A.2.

[20]See Proposition A.1 in Appendix.

where $u := \mathbb{E}[Z] - (\mathbb{E}[q] - 1)$. *Moreover, the optimal holding* $\alpha^* \in (50\%, 100\%)$ *if and only if*

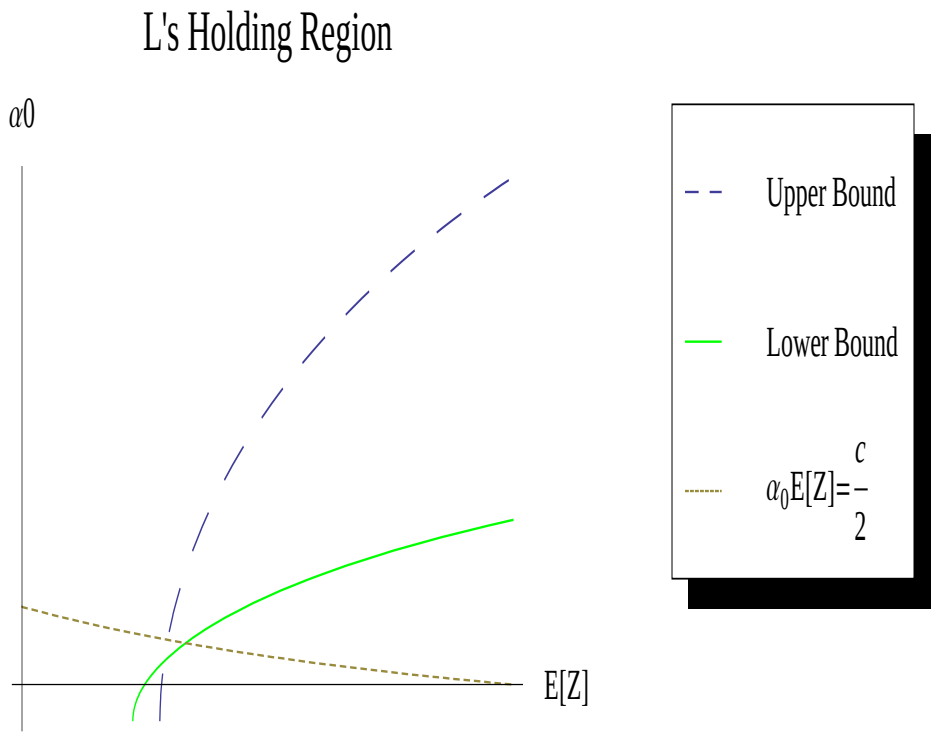
$$\frac{u + 2c + 2\sqrt{u(c + \mathbb{E}[Z]) + c^2}}{2(4\mathbb{E}[Z] - u)} < \alpha_0 < \frac{u + c + 2\sqrt{2u(c + \mathbb{E}[Z]) + c^2}}{4\mathbb{E}[Z] - u}. \qquad (11)$$

Proof: See Appendix. □

This result states that $\alpha^* > 50\%$ when the initial holding α_0 is large, or $\mathbb{E}[Z] - (\mathbb{E}[q] - 1)$ is relatively small. When the expected improvement is close to the expected return without taking over, firm return remains constant before and after the takeover. L's decision is similar to a standard portfolio choice decision. Therefore, the optimal number of shares is not necessarily 50%.

On the other hand, if the expected improvement is relatively large, or α_0 is relatively small, then L's optimal holding is 50%, as predicted in previous literature (e.g. Shleifer and Vishny (1986) and Goldman and Qian (2005)). In Shleifer and Vishny (1986), small shareholders read more than 50% tender offer as the price of their shares is not maximized. Therefore, L must tender 50% of the firm's outstanding shares. To some extent agency problem concern eliminates such believe of small shareholders.

Figure 3 shows the region of α_0 when the optimal holding α^* is 50%, 100% or some interior points in $[50\%, 100\%]$. There are three boundaries; the lower boundary is given by the lower bound in formula (11) while the upper boundary is given by the upper bound in the formula (11). We see that, if α_0 is small, $\alpha^* = 50\%$. However, when α_0 is in a reasonable range, it is possible for L to take an interior solution due to the concavity of the utility function.



This Figure shows L's optimal holding if she takes over the firm and $\alpha_0\mathbb{E}[Z] > c/2$. In this figure, the brown dish line is the line of $\alpha_0\mathbb{E}[Z] = \frac{c}{2}$, the blue upper bound line is the upper boundary of inequality (11) and the green lower bound line is the lower boundary of inequality (11). In the area above the brown dish line $\alpha_0\mathbb{E}[Z] = \frac{c}{2}$, L's optimal holding is between 50% and 100% in the area between the blue upper bound and the green lower bound lines. Parameters of this figure are $q = 1.25, c = 0.07$ and $\theta = 0.003$.

Figure 3: $L's$ Optimal Holding in Takeover Region

1.4.2 Takeover Likelihood

It is reasonable to believe that the greater of the difference of L's wealth between takeover and not takeover, the more likely that takeover takes place. Denote $L's$ takeover wealth as W_T^L and not takeover wealth as W_{NT}^L. From previous sections, we can see that W_T^L does not depend on η and γ. It is in turn the same as analyze the opposite of L's wealth in not takeover case.

The difference is:

$$\mathbb{E}\left[W_T^L - W_{NT}^L\right] = \mathbb{E}\left[W_T^L - \alpha(1-\theta)(1-\beta)V_1 - I(\alpha) - (\alpha-\alpha_0)V_0\right] \tag{12}$$

We have the following propositions.

Proposition 5 *1. Larger stealing cost factor reduces the likelihood of takeover.*

2. Larger monitoring cost factor increases the likelihood of takeover.

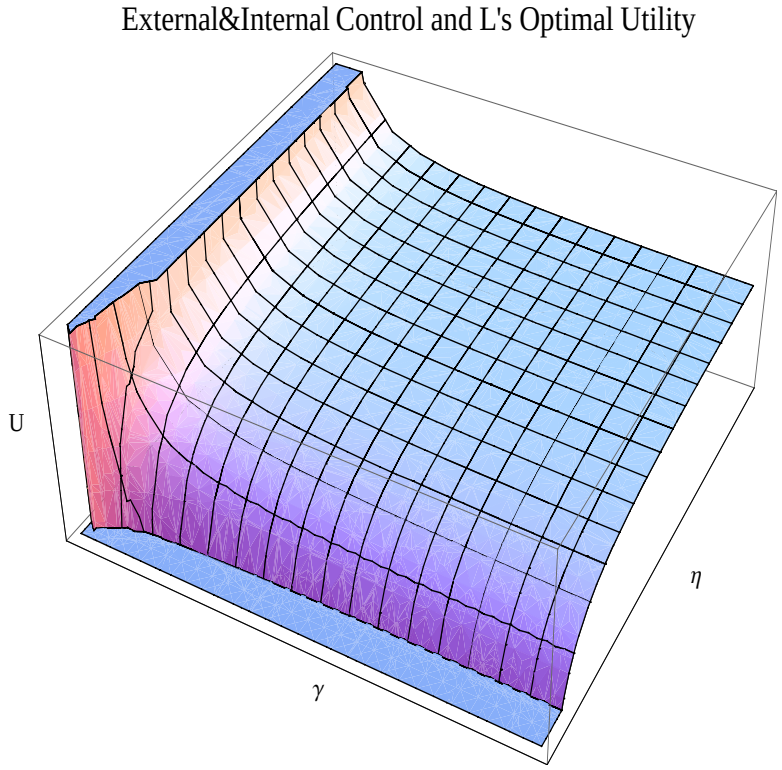
Proof: See Appendix. □

If we fix all other factors while look at either stealing cost factor or monitoring cost factor, a better corporate governance featured with low monitoring cost factor or high stealing cost factor increases L's wealth. Therefore, it reduces the likelihood of takeover.

As we can see in next section, such corporate governance structure increases equity value as well. It shows that L's interest can be aligned to small shareholders. Our results provide justification that large shareholder is a valuable resource in corporate governance. Other shareholders can benefit from the existence of large shareholder.

1.4.3 Equity Value

To illustrate the joint effects of the monitoring and stealing focused corporate controls simultaneously, we plot L's wealth with respect to γ and η in Figure 4. L's wealth increases with η, but decrease with γ. Given η, γ is only effective before the critical point in Proposition 3 where takeover occurs. When η is less than the critical value, L takes over the firm. L's wealth then does not depend on these two parameters. If the equilibrium is in takeover region, then the firm value also equity



This figure shows how the monitoring cost factor (γ) and stealing cost factor (η) affect L's maximum wealth. In general, L's wealth is negatively correlated with γ and positively correlated with η. Parameters of this figure are $\alpha_0 = 0.4, q = 1.12, c = 0.15, \mathbb{E}[Z] = 0.25$ and $\theta = 0.003$.

Figure 4: $L's$ Expected Utility with respect to η and γ

value is straight forward, $\mathbb{E}(1 + q + Z) * V_0$. If the equilibrium solution land in not-takeover region, then the equity value is (assuming non-corner solution):[21]

$$V_1 = V_0\mathbb{E}(q)\left(1 - \frac{\gamma(1-\theta)}{\eta(\mathbb{E}(q)(1-\theta)-1)}\right)(1-\theta) \tag{13}$$

Proposition 6 *Both stronger stealing cost factor (larger η)and monitoring cost factor (smaller γ) enhance firm's equity value.*

Proof: Take first derivative of Equation (13) with respect to η and γ, respectively. The result follows. □

[21]Since the firm value is $V_0\mathbb{E}[q]$, the equity value is $V_0\mathbb{E}[q](1-\beta)(1-\theta)$ after payout to and stealing of the manager. By using formula (7) and formula (8) together we derive β, hence the formula (13).

There are many empirical evidences that both stealing cost factor and monitoring cost factor help on shareholder's wealth. Among others, Gompers, Ishii, and Metrick (2003) find that better shareholder protection improves shareholder's value and reduce agency cost and Bhagat and Bolton (2008) find that better governance, board member holding, and CEO-Chair separation is significantly positively correlated with better contemporaneous and subsequent operating performance. Their measures are proxies of our stealing cost factor and monitoring cost factor.

1.4.4 Ownership Structure

We have seen in Proposition 2 that trivial stealing cost factor leads to concentrate ownership structure. In a more realistic case where certain level of shareholder protection is in place, stealing cost factor η and monitoring cost factor γ work in different ways. If η is given by social and legal system, L looks into her direct cost more closely. The different role of stealing cost factor and monitoring cost factor is stated in the following proposition:

Proposition 7 *L's optimal holding depends on γ but does not depend on the level of η.*

Proof: If L takes over the firm, as indicated in equation (9) and (10), her holding is not a function of η nor γ. If L does not take over the firm, L's holding is not function of η as in equation (8). □

Proposition 8 *If L does not take over the firm, then L's holding is negatively correlated to monitoring cost factor γ.*

Proof: Take the first derivative of equation (8) with respect to γ, the result follows. □

This explains the difference of ownership diffusion between highly developed financial markets such as US and UK and under developed financial markets. In US and UK, very sophisticated disclosure requirements make corporate shares widely held. Market of corporate control is relatively more active than elsewhere in the world as well. In under developed markets, it is more desirable to have large shareholders. Further, Proposition 7 and 8 show that the cost of being large shareholder is dominating L's decision. However, it is not saying that the cost of stealing is not important. With little cost of stealing, the firm is always closely held by either the large shareholder or the manager. Therefore, in this case, we do not need to distinguish the role of large shareholder and manager.

This also offers us the opportunity of looking into ownership structure from a different angle. Prevailing litterateurs contribute the concentration of ownership structure to shareholder protection. The basic argument is that improving shareholder protection encourages small investors' participation. However, in order to improve shareholder protection, mostly through reducing information asymmetry, shareholders pay the cost of providing such transparency. This cost discourages blockholding while promotes society ownership of public firms.

1.4.5 Agency Cost

Proposition 9 *Stronger corporate governance elements, i.e. greater η and smaller γ, reduce agency cost.*

Proof: Substitute α in equation (8) into equation (7). Then take the first derivative with respect to η and γ, respectively. The result follows. □

To L, if she takes control of the firm, agency problem is resolved in her end. In general case where M runs the firm, both stealing cost factor and monitoring cost factor help L to mitigate agency problem.

1.4.6 Takeover Premium

We next examine how the initial holding α_0 and the expected improvement affect the takeover premium.

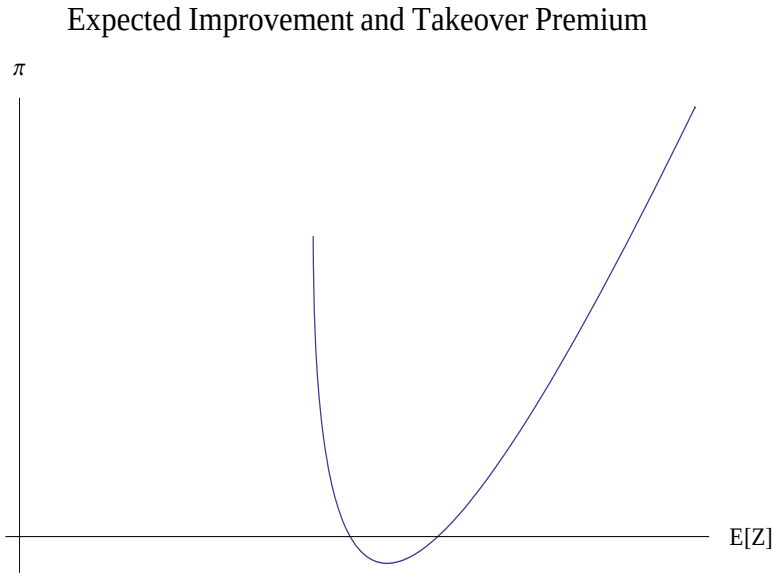
Proposition 10 *The takeover premium is always negatively correlated to α_0. If the takeover gain from L's initial holding is small, the takeover premium is positively correlated to $\mathbb{E}[Z]$. If the takeover gain from L's initial holding is large, the correlation between the takeover premium and $\mathbb{E}[Z]$ can be either positive or negative.*

Proof: See Appendix. □

As in Shleifer and Vishny (1986), the more L holds initially, the more she can give small shareholders to compensate their shares. The effect of the expected improvement, however, is complicated. It can be seen in Figure 5.

1.4.7 Monitoring and Stealing Cost Factors

Our aforementioned results depend on the cost structures imposed on L and M. Corporate governance shocks can change these cost factors and affect shareholders and firms significantly. Table 3 categorizes the corporate governance elements based on their effects on monitoring and stealing cost factors, and consequently, on the influence on shareholder's equity and ownership concentration.



This figure shows the relationship between expected takeover improvement and the takeover premium. It shows that these two parameters can be either positive or negatively correlated. Parameters of this figure are $\alpha_0 = 0.4, q = 1.25, c = 0.07, \gamma = 1, \eta = 1$ and $\theta = 0.003$.

Figure 5: The Relationship between $\mathbb{E}[Z]$ and π

Table 3: Corporate Governance on Monitoring and Stealing Cost Factors

	Group I	Group II	Group III
Monitoring Cost Factor	+	-	+
Stealing Cost Factor	-	+	+
Effect on Shareholder's Equity	-	+	?
Effect on Ownership Concentration	+	-	?

In Table 3, the corporate governance elements are divided into three groups based on their different affects on "monitoring cost factor" and "stealing cost factor". Group I represents the elements which *positively* affect the monitoring cost factor while *negatively* influence the stealing cost factor. From Table 1, Group I consists of "Corporate in Delaware" and "More Anti-takeover Provisions". Group II includes elements that negatively affect to the monitoring cost and positively related to the stealing cost. Hence, "Independent Board", "Ideal Incentive Compensation", "Ideal Debt, Director Ownership", "Less Anti-takeover Provisions", "Trustable Manager" and "Common Law" belong to Group II. At last, elements in Group III are positively related to both the monitoring cost and the stealing cost. Hence, "Sarbanes-Oxley Act 2002" is one corporate governance element in Group III.

From previous discussion, elements in Group I and II are fairly intuitive. Group I serves the manager's interest but Group II serves the stockholder's interest. Group I can decrease shareholder's equity whereas Group II increases it. Group I increases the likelihood of takeover and discourage minority holding. Therefore, this type of shock increases the likelihood of having concentrated ownership structure. Group II would just do the opposite of Group I and so increase the likelihood of have dispersed ownership structure.

It is more challenging to see what Group III would do. If both costs increases, manager and large shareholder have to look into the shocks and form new equilibrium. When the benefit of reducing managerial stealing is offset by the cost of more monitoring cost, the takeover likelihood is unlikely to change.[22] However, the greater

[22]It is easy to verify that $\frac{\partial^2\left(W_T^L - W_{NT}^L\right)}{\partial\eta\partial\lambda} = 0$ from the proof of Proposition 5.

monitoring cost makes large shareholder hold less shares. Therefore, in more transparent market environment, dispersed ownership structure is more prevalent.

1.5 Implications

Corporate governance has been extensively discussed since last decades. Our model not only sheds light on different prospects of corporate governance, namely, stealing cost factor and monitoring cost factor, but also draws implications on market of corporate control, ownership structure, agency problem and free rider problem.

In countries such as US and UK where shareholders are well protected at the cost of whole society, blockholding exists but not common. Shares of public firms are widely held and shareholders are nonetheless free-ride. Still, market of corporate control or similar mechanisms such as proxy fight might be successful. Brav et al. (2008) find that hedge fund activism helps firm correct agency problem with the funds non-dominating holding. This is almost impossible in elsewhere of the world. For elsewhere in the world, ownership is either concentrate or cross holding is common. It is not only the best interest of large shareholders to taking control, but also the small shareholder's best interest to have large shareholder on board. In developing country, to develop financial system and corporate governance, decision makers should see the trade-off of government takeover and free market approach. It is the question of what to do rather than who should do. The control of agency problem and therefore the efficiency of the economy can be achieved by different combination of stealing cost factor and monitoring cost factor in this paper. While governments try to mimic the approach in US to improve transparency, they should be aware of the alternative

way, might be a more efficient way–utilizing the existing ownership structure. Board holding and board independence can be a reasonable alternative for these countries. US Sarbanes-Oxley Act 2002 (SOX) and UK Combined Code offer another type of approaches. While SOX is mandatory, Combined Code offers a set of good practice suggestions. The adoption of Combined Code is voluntary but firms do need to report how they have applied the Code to the public.[23] The adoption level reveals the firm basic to general public as well.

While large shareholders are still dominantly popular across the world, with proper corporate governance, their interest can be aligned to that of other shareholders. Therefore, they can be very valuable device for corporate governance. It is painful to reverse the ownership structure but utilize the current structure may achieve better.

La-Porta, Lopez-de Silanes, and Shleifer (1999) document that the corporate ownership is highly concentrated all over the world with exception of UK and US. In their view, financial development and law origin are crucial for this phenomenon. Our model digs further on this point. Different aspects of corporate governance can influence ownership structure as well. If the society and financial revolution offer enough pressure to the management, shareholders view holding public firms' shares as the reasonable response to the system since they are paying the monitoring cost anyway. When the system is not as efficient, large shareholder can be a necessary element in corporate government structure. Again, there are many ways for different players to achieve the same goal. Decision makers should look into these alternatives if they want the best output of it.

[23] A recent version of Combined Code can be found at http://www.frc.org.uk/.

1.6 Conclusion

This paper presents a cost-based approach to study the corporate governance and the ownership. The approach uses the same inspiration of Shleifer and Vishny (1986) and add cost of corporate governance and agency cost into consideration. Stealing cost factor and monitoring cost factor are both function of corporate governance elements. We document that these cost factors are effectively influence ownership structure. We also demonstrate that corporate governance elements, stealing cost factor and monitoring cost factor, are both important to shareholders in term of equity value, agency cost and holding decision. Stealing cost factor and monitoring cost factor work together most of time. They are both important determinants of large shareholders takeover decision along with takeover transaction cost, firm potential, and takeover premium. Monitoring cost factor is more important to shareholders' holding decision when stealing cost factor is adequate. We also demonstrate that large shareholder's interest can be aligned to that of small shareholders and so large shareholder can be a valuable resource for corporate governance.

Our model can be further developed to incorporate managerial defense and corporate governance design. A dynamic alternative would have application on asset pricing as well. One can also test the implication of ownership structure by looking into the efficiency of government regulation, financial market development and proportion of taxation applied to these two.

CHAPTER 2: RISK, GOVERNANCE AND EQUITY PERFORMANCE

2.1 Introduction

While takeover activity gives a significant positive premium to a target firm's equity, the link between takeover vulnerability, corporate governance structure and the information content of equity prices is not well-established in the literature. Ferreira and Laux (2007) document that idiosyncratic risk in stock returns tends to be greater for firms that are open to the market for corporate control. They argue that this relationship is due to the collection of private information by takeover speculators. In this paper, we further explore the link between takeover vulnerability, information content of stock returns, and corporate governance structure by focusing on firms with the strongest shareholder protections.

The relationship between corporate governance and firm value is addressed extensively in the literature. Gompers, Ishii, and Metrick (2003) use the number of anti-takeover provisions to proxy the quality of corporate governance. This so-called G-index ranges from 0 to 24. They categorize firms into three groups: the "democratic group" with 5 or fewer provisions, the "dictator group" with 14 or more provision and the "neutral group" with at least 6 and at most 13. Gompers, Ishii, and Metrick (2003) document that the democratic firms enjoy significant positive abnormal returns, have higher firm values, higher profits, higher sales growth, lower capital ex-

penditures and make fewer acquisitions. So democratic firms outperform the others and are less likely to have agency problems.

This paper contributes to the literature in several ways. First, we establish that even within the democratic group, firms are different in nature. The democratic firms with few anti-takeover provisions, in general, outperform the others. We are able to differentiate the best of the best from the others. We show that democratic firms with the least idiosyncratic volatility i.e. the least likely takeover targets, outperform the rest of the democratic group. Second, we confirm the links among anti-takeover provisions, market information flow, takeover activity and equity return. Takeover speculators drive the information flow on the market and the information is further reflected in supply and demand relationships. Third, we show that regulatory policy shocks can shift the market for corporate control, by documenting significantly changes in acquisition activity information and risk-return linkage after the Sarbanes-Oxley Act went into effect in 2002. The information effect cannot be captured by our current model. Therefore, the market is more efficient than it was in pre-SOX period.

The remainder of the paper is organized as follows. In the next section, we review the relevant literature and motivate the hypotheses to be tested. We introduce our sample and methodology in Section 2.3. Then we report and discuss our tests and findings in Section 2.4. We conclude in Section 2.5.

2.2 Review of Relevant Literature and Hypothesis Development

Dow, Gorton, and Krishnamurthy (2005) take free cash flow (Jensen (1986)) assumption into consideration for their asset pricing model. The key difference between

this model and the neoclassical models is the introduction of "the friction caused by imperfect corporate control." The model considers maximizing agents' utilities rather than firm value as traditionally seen in neoclassical models. If the managers with control rights are self-interested, then shareholders are not going to get as good return as we see in agency-problem free models. They show that aggregate free cash flow of the corporate sector is a important variable to explain asset returns, investment, and the cyclical behavior of interest rates and the yield curve. The financial friction causes cash-flow shocks and the shocks propagate through large firms and during booms.

Using a similar framework, Albuquerque and Wang (2008) show that in an ideal world with perfect shareholder protection (no agency friction), investors would pay much more for equity than in the real world. In Albuquerque and Wang (2008)'s model, the conflicts between controlling shareholders and minority shareholders lead to lower asset prices. Controlling shareholders have full control rights while minority shareholders do not. However, given different levels of (minority) shareholder protection, controlling shareholders have to bear certain levels of costs for their expropriation behavior. Comparing the benchmark model, where the controlling shareholders maximize the firm value, to the Korean market, Albuquerque and Wang (2008) find that investors would pay 11% more for the existing equities and firm value will then increase by 22% overall. They also find that weaker investor protections lead to lower Tobin's q, more incentive to overinvest, higher return volatility, larger risk premium and higher cost of capital. Both Dow, Gorton, and Krishnamurthy (2005)'s and Albuquerque and Wang (2008)'s models predict that better investor protection improves firm value because insiders would act more in the best interests of the shareholders

by taking value generating projects and reducing agency cost. Cremers, Nair, and John (2009) find that takeover vulnerability is a risk-factor like component for asset pricing.

However, the role of the equity market is not emphasized in this line of literature. Further, there is no research studying the differences within the firm groups. We use a sample containing only firms with very few anti-takeover provisions (democratic firms) to study equity market information and performance. Ferreira and Laux (2007) present evidence that takeover vulnerability is proxied by market information which is generated by takeover specialized speculators. These speculators research target firms which have significant improvement opportunity for potential acquirers. Acquirer can make profit either by getting rid of agency cost or making substantial improvement of the target. For democratic firms, agency cost is unlikely to be the motivation. Therefore, acquirers buy the targets due to performance. The most efficient firms cannot give acquirers much opportunity for improvement, so they are the least likely targets. As argued in Ferreira and Laux (2007), democratic firms are much more likely to be targets than other firms. Following Ferreira and Laux (2007), we use idiosyncratic volatility as the proxy for the information flow of takeover vulnerability. High idiosyncratic risk firms are more likely to have private information as target, i.e. greater likelihood that takeover speculators trade on these firms. We use a group of firms from Investor Responsibility Research Center corporate governance index database. To control for takeover cost and corporate government structure, we only use firms with five or less anti-takeover provisions. These firms called "democratic firms" in Gompers, Ishii, and Metrick (2003). Democratic firms pose lower barriers

to acquirers due to lower takeover costs, as well as a reduced likelihood of having agency problems as documented in Gompers, Ishii, and Metrick (2003). Therefore, the motivation to acquire these types of firms is based more on potential improvement of performance. So, we have the following hypothesis:

Hypothesis 11 *For democratic firms, the ones with the least takeover vulnerability outperform the others.*

We use 90 trading day rolling windows to estimate beta's of the Fama-French (FF) three factor model (Fama and French (1992)) and use standard deviation of last month FF three factor model residual as the measure of idiosyncratic risk. We form five equal-weighted idiosyncratic volatility portfolios where the first quintile portfolio (1st portfolio hereafter) contains the firms with the least idiosyncratic volatility and the last (5th portfolio hereafter) Quintile portfolio contains the firms with the most idiosyncratic volatility. The portfolios are reshuffled monthly. Hypothesis 11 is supported in that for the entire sample period 1991 to 2008 and years up to 2006, first portfolio outperforms the other portfolios in term of Sharpe ratios and alphas (abnormal return). It is the only portfolio in our study that generates significant positive alpha. Its Sharpe ratio is also the highest among all five portfolios.

John, Litor, and Yeung (2008) argue that better investor protection may induce risky, but value-enhancing investment. They test for operational performance but not stock market performance and do not examine if the risk firms are taking is efficient. Our findings confirm that better governed firms with the least idiosyncratic risk outperform the others. This shows that the firms which can integrate corporate

government structure and utilize the structure efficiently would be desirable to shareholders. To further confirm that idiosyncratic volatility can be a proxy for takeover vulnerability of democratic firms, we use the monthly change of Merger and Acquisition as the proxy for shock of takeover market and test the direct connection between takeover activity and equity returns.

Hypothesis 12 *Return of the democratic firms is negatively correlated with the demand shock of the takeover market.*

Ferreira and Laux (2007) argue that idiosyncratic volatility of democratic firms is directly related to the market for corporate control information. We seek to reenforce this notion further by looking at the direct connection between the information and equity returns. As predicted in Ferreira and Laux (2007), speculators move a step ahead of the rest of the market. If their argument is correct, we should observe the information flow first and takeover market reaction after. Based on this argument, we use forward change of M&A activities to proxy takeover market change to test the prediction [24].

Consistent with Ferreira and Laux (2007), in the sample from 1991 to 2006 and 1991 to 2008, we find that expected returns of the portfolios are negatively correlated to the forward change of M&A activity even after controlling for interest rates and economic conditions. The insights of this finding are twofold. First, the information proxied by idiosyncratic volatility is highly correlated to takeover vulnerability in the democratic group. Second, as stated in Ferreira and Laux (2007), these specialized

[24] We also use contemporaneous M&A shock but do not see any significant relation.

traders driving such volatility have an informational advantage so they move a step ahead of the market.

King, Tian, and Zhang (2010) present a model which predicts that corporate governance control factors impact takeover activities. According to King, Tian, and Zhang (2010), corporate governance structure change will effect potential acquirer's interest in a takeover. The easier for shareholders to monitor the manager (stronger internal control) or/and the harder for manager to realize private benefit (stronger external control), the less likely it becomes for a firm to be acquired. The Sarbanes-Oxley Act of 2002 is such an event which facilitates shareholder monitoring of managers by enhancing transparency. At the same time, it is also much more costly for managers to realize private benefits. We therefore have the following hypothesis:

Hypothesis 13 *The takeover information effect will be weakened after Sarbanes-Oxley Act of 2002.*

When there is more costless information available in the market, the marginal benefit for speculators to collect their own private information is reduced. Also, if the predictions of the model of King, Tian, and Zhang (2010) hold, we expect less M&A activity. This further reduces the interest of takeover speculators. We separate the sample into subsamples prior and post Sarbanes-Oxley Act 2002. Both Hypothesis 11 and Hypothesis 12 no longer hold after Sarbanes-Oxley Act 2002. They hold from 1991 to 2002 but are mitigated after 2002. These findings further confirm the information advantage of these specialized traders. While the market is much more transparent than before, the information advantage of speculators is decreased.

Therefore, they either stop collecting the information or have to take more rapid action.

2.3 Data and Methodology

We obtain corporate governance data from the Investor Responsibility Research Center (IRRC)[25] corporate governance index (G-Index) database, stock return data from CRSP, Merger and Acquisition data from SDC and interest rate and economic data from Federal Reserve Bank of St. Louis.

2.3.1 Corporate Governance Measures

The G-index from IRRC counts number of anti-takeover provisions. It was updated in the years 1990, 1993, 1995, 1998, 2000, 2002, 2004 and 2006. We use the most recent past corporate governance index as the index for current year. Our sample has 617 firms with 32,806 firm month observations from 1990 to 2008.

The corporate governance index is recorded as the number of anti-takeover provisions ranging from 0 to 24.

In Gompers, Ishii, and Metrick (2003), firms are separated into three groups:

$$\begin{cases} \textit{Democratic} \text{ if } G \in [0,5] \\ \textit{Neutral} \text{ if } G \in (5,14) \\ \textit{Dictator} \text{ if } G \in [14,24] \end{cases}$$

We use democratic firms for this study. The democratic firms adopt the least anti-takeover provisions. Takeover cost for such firms is low since there are not many

[25]Gompers, Ishii, and Metrick (2003) and Cremers, Nair, and John (2009) have details of the construction of the G-index.

anti-takeover defense strategies these firms can employ. Therefore, these firms have low M&A transaction cost and are less likely to have serious agency problem.

2.3.2 Ex-ante Idiosyncratic Volatility Measure

We compute idiosyncratic volatility measure using 90 trading day rolling window Fama-French (FF) three factor model. First, we run Fama and French three factor model, i.e. to estimate day 0 beta, we run FF three factor model with data of trading day [-90,-1]:

$$r_{it} = \alpha_{it} + \beta_{i,1} MKTRF_t + \beta_{i,2} SMB_t + \beta_{i,3} HML_t + \varepsilon_{i,t} \tag{14}$$

where r_{it} is daily excess return of security i, α_{it} is the intercept, $\beta_{i,j}$, $j = 1, 2, 3$ are the regression coefficients, $MKTRF$ is the market index, SMB is the the average return on small market capitalization portfolios minus the average return on three large market capitalization portfolios, HML is the average return on two high book-to-market equity portfolios minus the average return on two low book-to-market equity portfolios, and ε_{it} is the regression residual.

For every firm i, we run the model with daily $t-90$ to $t-1$ trading data and save $\beta_{i,j}$ where $j = 1, 2, 3$. We then use the stored $\beta_{i,j}$, $j = 1, 2, 3$ as the beta for day t to calculate the residual term $\varepsilon_{i,t}$ using Fama-French model (14) above. Current month's (T) idiosyncratic volatility is defined as the standard deviation of last month ($T-1$) residuals:

$$Idio_{i,T} = \sigma(\varepsilon_{i,T-1}) \tag{15}$$

Since we are more interested in quantitative measure of risk and return, we do not use relative measure used in Ferreira and Laux (2007).

2.3.3 Portfolio

We form monthly reshuffled quintile portfolios based on idiosyncratic risk defined in previous section. The 1st quintile portfolio contains the firms with the least idiosyncratic risk whereas the 5th contains the ones with the most idiosyncratic risk. Therefore, firms in the 1st portfolio are the least likely M&A targets whereas firms in the 5th portfolio are the most likely M&A targets.

2.3.4 Economic Variables

Since M&A activities may be sensitive to economic conditions, especially interest rates and credit market factors, we control for these factors in our model as well.

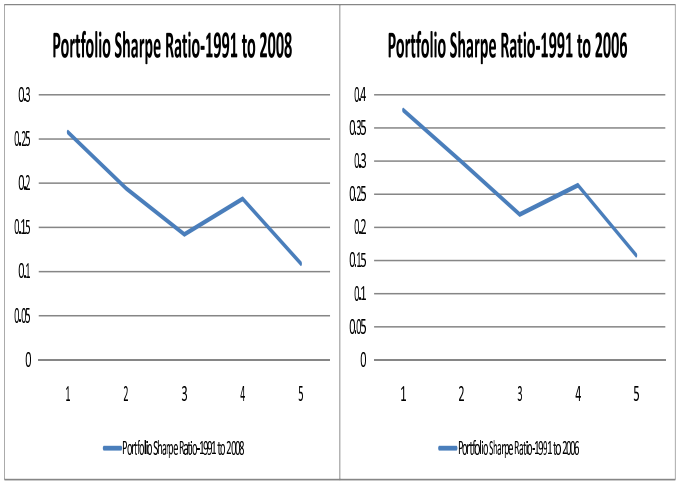
We use the following economic and interest rate variables:

- IRL: Interest Rate Level, is defined as Treasury 1 Year Constant Maturity Rate;
- IRS: Interest Rate Slope, is defined as the ratio of Treasury 10 Year Constant Maturity Rate and Treasury 1 Year Constant Maturity Rate;
- IRV : Interest Rate Volatility, is defined as Standard Deviation of over 12 month Treasury 1 Year Constant Maturity Rate prior to Current Month;
- MCP : is Market Credit Premium, is defined as Average Yield of BBB Corporate Bond minus Average Yield of AAA Corporate Bond;

- ΔMA : Monthly Change of M&A Activities, is defined as natural log of current month M&A activity($) minus natural log of previous month M&A activity ($). We use both total dollar amount of all M&A activities in and total dollar amount of M&A activities for deals greater than or equal to ten million dollars.

2.4 Tests and Results

We start with looking at the portfolio Sharpe ratios. There are five monthly reshuffled equal-weighted portfolios sorted by idiosyncratic volatility.

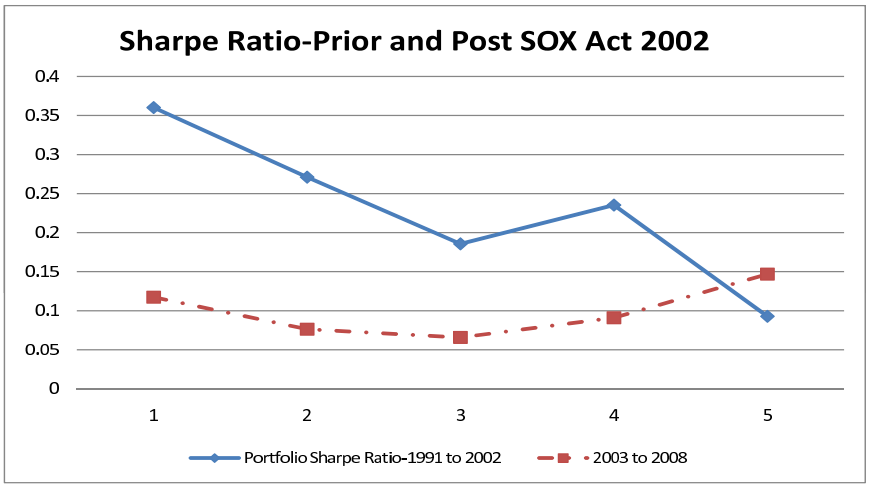


Five portfolios sorted by idiosyncratic volatility are formed monthly. Idiosyncratic volatility is calculated by the method in Section 2.3 monthly using historical return. Sharpe ratio of each portfolio is defined as the ratio of average monthly excess return and standard deviation of the excess return.

Figure 6: Portfolio Sharpe Ratio-With or Without 2007 and 2008

Monthly Sharpe ratios in Figure 2.4 of the portfolios range from 0.38 (first portfolio of years from 1991 to 2006) to 0.11 (5th portfolio of years from 1991 to 2008). We immediately observe a downward sloping trend in the Sharpe ratios. Firms with less idiosyncratic volatility are also less vulnerable to takeover speculation according to Ferreira and Laux (2007). These firms are much more efficient in term of risk/return

trade-off. Given that these firms are also the most shareholder friendly firms, the takeover potential improvement on these low idiosyncratic firms can be so low that acquirers could produce little improvement.



Five portfolios sorted by idiosyncratic volatility are formed monthly. Idiosyncratic volatility is calculated by the method in Section 2.3 monthly using historical return. Sharpe ratio of each portfolio is defined as the ratio of average monthly excess return and standard deviation of the excess return.

Figure 7: Portfolio Sharpe Ratio-Prior and Post Sarbanes-Oxley Act 2002

The pattern no longer holds if we separate the sample into pre- and post-Sarbanes-Oxley Act as in Figure 2.4. For period before Sarbanes-Oxley Act, we see exactly the same pattern as in Figure 2.4. However, the portfolios are indistinguishable post-Sarbanes-Oxley. Moreover, Sharpe ratios drop significantly from previous years. We clearly see the tradeoff between transparency and market self adjustment. When transparency is increased by regulatory action, the margin of private information is smaller. So, this indicates that fewer traders make an effort to uncover non-public firm-specific information.

We further investigate this with FF three factor model.

Table 4: Portfolio Alpha-1991 to 2008–Fama French Three Factor Model

Note: $***p \leq 0.01, **p \leq 0.05, *p \leq 0.1$

Decile Portfolios By Idiosyncratic Risk	**1st Quintile**	**2nd Quintile**	**3rd Quintile**	**4th Two Quintile**	**Last Quintile**
Excess Return on the Market	0.663***	0.877***	1.119***	1.261***	1.371***
	(20.202)	(18.724)	(15.466)	(20.224)	(9.817)
Small-Minus-Big Return	0.152***	0.246***	0.351***	0.745***	1.446***
	(3.600)	(3.809)	(3.451)	(8.055)	(6.602)
High-Minus-Low Return	0.472***	0.532***	0.617***	0.479***	0.345
	(9.058)	(7.303)	(7.426)	(5.248)	(1.412)
Alpha	0.003**	0.002	-0.001	0.003	-0.000
	(2.481)	(0.979)	(-0.393)	(1.321)	(-0.016)
Number of observations	216	216	216	216	216
Adjusted R^2	0.704	0.708	0.746	0.765	0.641
R^2	0.708	0.712	0.749	0.768	0.646
F	141.372	126.483	104.553	178.171	77.652

Table 5: Portfolio Alpha-1991 to 2006–Fama French Three Factor Model

Note: $***p \leq 0.01, **p \leq 0.05, *p \leq 0.1$

Decile Portfolios By Idiosyncratic Risk	**1st Quintile**	**2nd Quintile**	**3rd Quintile**	**4th Two Quintile**	**5th Quintile**
Excess Return on the Market	0.622***	0.857***	1.181***	1.242***	1.467***
	(17.112)	(18.835)	(18.685)	(15.226)	(9.283)
Small-Minus-Big Return	0.133***	0.236***	0.360***	0.731***	1.539***
	(3.025)	(3.625)	(3.627)	(7.490)	(6.710)
High-Minus-Low Return	0.444***	0.516***	0.672***	0.452***	0.500*
	(7.758)	(7.300)	(8.939)	(4.241)	(1.937)
Alpha	0.003**	0.002	-0.002	0.003	-0.001
	(2.572)	(1.195)	(-0.930)	(1.375)	(-0.347)
Number of observations	192	192	192	192	192
Adjusted R^2	0.631	0.656	0.721	0.719	0.643
R^2	0.637	0.661	0.725	0.723	0.649
F	98.235	134.543	192.406	104.564	68.942

In Table 4 and Table 5, the FF three factor regression results show consistently that the first portfolio is the only portfolio generating significant positive alpha. The 2nd and 4th portfolios have positive but insignificant alpha while 3rd and 5th portfolios have negative insignificant alpha. This further confirms Hypothesis 11. The first

portfolio is not only superior in term of Sharpe ratio, but also superior in alpha as well. The first portfolio generates 0.3% abnormal monthly return in both periods with and without 2007 and 2008. 5th portfolio generates the greatest return. However, it also has the largest market factor beta. The 2nd to 5th portfolios do not have positive alpha. In Gompers, Ishii, and Metrick (2003), they documented that a portfolio long democratic firms while short dictators generate positive alpha. We here show further that within democratic firms, those with the least takeover vulnerability generate positive alpha. There are 31 firms in our portfolios on average. So, the transaction cost can be manageable.

We then move to examine the effect of the Sarbanes-Oxley Act.

Table 6: Portfolio Alpha-1991 to 2002–Fama French Three Factor Model

Note: $***p \leq 0.01, **p \leq 0.05, *p \leq 0.1$

Decile Portfolios By Idiosyncratic Risk	**1st Quintile**	**2nd Quintile**	**3rd Quintile**	**4th Quintile**	**5th Quintile**
Excess Return on the Market	0.598***	0.836***	1.130***	1.198***	1.412***
	(15.389)	(16.504)	(16.567)	(14.634)	(7.383)
Small-Minus-Big Return	0.113**	0.209***	0.297***	0.677***	1.473***
	(2.358)	(3.108)	(2.959)	(6.875)	(5.420)
High-Minus-Low Return	0.449***	0.529***	0.649***	0.451***	0.448
	(7.092)	(7.038)	(7.932)	(4.047)	(1.427)
Alpha	0.004***	0.003	-0.001	0.005	-0.003
	(2.976)	(1.516)	(-0.275)	(1.609)	(-0.633)
Number of observations	144	144	144	144	144
Adjusted R^2	0.619	0.647	0.699	0.708	0.606
R^2	0.627	0.654	0.705	0.715	0.615
F	81.844	91.744	118.063	90.234	52.334

In Table 6 and Table 7, we run FF three factor model before and after Sarbanes-Oxley Act. While alpha's for the portfolios after Sarbanes-Oxley are largely positive with exception of the 3rd portfolio, none of these portfolios generate significant alpha.

Table 7: Portfolio Alpha-2003 to 2008–Fama French Three Factor Model

Quintile Portfolios By Idiosyncratic Risk	**1st Quintile**	**2nd Quintile**	**3rd Quintile**	**4th Quintile**	**5th Quintile**
Excess Return on the Market	0.773***	0.938***	1.041***	1.316***	1.399***
	(18.690)	(8.381)	(8.108)	(12.353)	(6.927)
Small-Minus-Big Return	0.342***	0.493***	0.863***	1.154***	1.514***
	(3.779)	(4.299)	(6.450)	(7.450)	(5.764)
High-Minus-Low Return	0.101	0.128	0.138	0.028	-0.197
	(1.265)	(0.649)	(0.860)	(0.155)	(-0.398)
Alpha	0.002	0.000	-0.001	0.001	0.006
	(1.103)	(0.039)	(-0.541)	(0.193)	(0.998)
Number of observations	72	72	72	72	72
Adjusted R^2	0.865	0.821	0.874	0.880	0.740
R^2	0.871	0.829	0.880	0.885	0.751
F	219.545	65.593	76.014	107.143	43.500

Note: $***p \leq 0.01, **p \leq 0.05, *p \leq 0.1$

Abnormal returns are no longer produced by this strategy. The monthly alpha's for first and last portfolios are 20 basis points and 60 basis points, respectively. Both are insignificant. This further confirms that the market has adjusted to Sarbanes-Oxley since 2002. Traders may either stop to collect information or use their information more conservatively so that we cannot capture the information with the current model.

Ferreira and Laux (2007) document that idiosyncratic volatility of democratic firms is directly related to market of corporate control information. We further reenforce this argument by considering the direct connection between the information and equity returns. Since speculators have an informational advantage, they move a step ahead of the rest of the market. If their argument is correct, we should observe the information flow first and takeover market reaction after. Based on this argument, we use forward change of M&A activities to proxy takeover market change to test the

prediction. Two models are used for the analysis:

$$R_{i,t} = \alpha + \beta_{i,j} MKTRF_t + \beta_{i,j} HML_t + \beta_{i,j} SMB_t + \rho_i \Delta MA_{t+1} + \varepsilon_{i,t} \tag{16}$$

and

$$\begin{aligned} R_{i,t} \quad = \quad & \alpha + \beta_{i,1} MKTRF_t + \beta_{i,2} HML_t + \beta_{i,3} SMB_t \\ & + \gamma_{i,1} IRL_t + \gamma_{i,1} IRS_t + \gamma_{i,1} IRV_t \\ & + \gamma_{i,1} MCP_t + \rho_i \Delta MA_{t+1} + \varepsilon_{i,t} \end{aligned} \tag{17}$$

where $MKTRF$, SMB, and HML are Fama-French market excess return, small minus big factor and high minus low factor, respectively; IRL is Interest Rate Level defined as Treasury 1 Year Constant Maturity Rate, IRS is Interest Rate Slope defined as the ratio of Treasury 10 Year Constant Maturity Rate and Treasury 1 Year Constant Maturity Rate, IRV is Interest Rate Volatility defined as Standard Deviation of over 12 month Treasury 1 Year Constant Maturity Rate prior to Current Month, MCP is Market Credit Premium defined as Average Yield of BBB Corporate Bond-Average Yield of AAA Corporate Bond and ΔMA is monthly change of M&A activities defined as natural log of current month M&A activities($) minus natural log of previous month M&A activities ($). We use both total dollar amount of all M&A activities and total dollar amount of M&A activities for deals greater or equal to ten million dollars.

Table 8 and Table 9 report regression results of portfolio returns on M&A activities. In Table 8, we test the relationship with the sample from 1991 to 2008 and the sample from 1991 to 2006. With the sample from 1991 to 2008, coefficients of forward ΔMA

Table 8: 1991 to 2006 and 1991 to 2008 Regressions

In model I and III, we run

$$R_{i,t} = \alpha + \beta_{i,j} MKTRF_t + \beta_{i,j} HML_t + \beta_{i,j} SMB_t + \rho_i \Delta MA_{t+1} + \varepsilon_{i,t}$$

and in model II and IV, we add interest rate factors

$$\begin{aligned} R_{i,t} \quad = \quad & \alpha + \beta_{i,1} MKTRF_t + \beta_{i,2} HML_t + \beta_{i,3} SMB_t \\ & + \gamma_{i,1} IRL_t + \gamma_{i,1} IRS_t + \gamma_{i,1} IRV_t \\ & + \gamma_{i,1} MCP_t + \rho_i \Delta MA_{t+1} + \varepsilon_{i,t} \end{aligned}$$

where $MKTRF$, SMB, and HML are Fama-French market excess return, small minus big factor and high minus low factor, respectively; IRL is Interest Rate Level defined as Treasury 1 Year Constant Maturity Rate, IRS is Interest Rate Slope defined as the ratio of Treasury 10 Year Constant Maturity Rate and Treasury 1 Year Constant Maturity Rate, IRV is Interest Rate Volatility defined as Standard Deviation of over 12 month Treasury 1 Year Constant Maturity Rate prior to Current Month, MCP is Market Credit Premium defined as Average Yield of BBB Corporate Bond-Average Yield of AAA Corporate Bond and ΔMA is monthly change of M&A activities defined as natural log of current month M&A activities($) minus natural log of previous month M&A activities ($). We use total dollar amount of all M&A activities in Model I and II and total dollar amount of M&A activities for deals greater or equal to ten million dollars in Model III and IV.

Note: $***p \leq 0.01$, $**p \leq 0.05$, $*p \leq 0.1$

	1991 to 2008				1991 to 2006			
	Model I	Model II	Model III	Model IV	Model I	Model II	Model III	Model IV
1st Portfolio	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(-0.394)	(-0.390)	(-0.351)	(-0.346)	(-0.929)	(-0.918)	(-0.933)	(-0.923)
2nd Portfolio	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.144)	(0.134)	(0.232)	(0.222)	(0.183)	(0.174)	(0.144)	(0.134)
3rd Portfolio	-0.003	-0.003	-0.002	-0.002	-0.002	-0.002	-0.003	-0.003
	(-1.153)	(-1.162)	(-1.096)	(-1.104)	(-0.987)	(-0.995)	(-1.023)	(-1.032)
4th Portfolio	-0.003	-0.003	-0.003	-0.003	-0.004	-0.004	-0.004	-0.004
	(-1.150)	(-1.157)	(-1.047)	(-1.053)	(-1.211)	(-1.218)	(-1.242)	(-1.250)
5th portfolio	-0.011*	-0.011*	-0.010*	-0.010*	-0.014**	-0.014**	-0.014**	-0.014**
	(-1.918)	(-1.930)	(-1.773)	(-1.786)	(-2.178)	(-2.183)	(-2.211)	(-2.218)
Number of Observations	215	215	215	215	192	192	192	192

are negative and significant in all four models for the 5th portfolio. The coefficients are negative but not significant for all other portfolios. Similarly,in the period 1991 to 2006, the coefficients for the 5th portfolio are negative and significant while the other coefficients are negative but not significant with exception of the 2nd portfolio. For the 5th portfolio, the coefficients are about 1.1% monthly or 13.2% annually in

years 1991 to 2008 and 1.4% monthly or 16.8% annually in years 1991 to 2006. Given that the median bid premium for successful takeover targets is about 35% to 38%, what we observe here is not unexpected.

More importantly, we observe that the return of the highest takeover vulnerable firms, i.e. firms in 5th portfolio is significantly correlated to market M&A activities. In addition, the return is correlated to the forward M&A activities [26]. It further confirms that there are some traders with an informational advantage in the market.

We investigate this further with SOX Act as the event shock in Table 9.

In Table 9, we separate the sample into two subperiods, pre-Sarbanes-Oxley, 1991 to 2002 and post-Sarbanes-Oxley, 2003 and 2008. In the prior subsample, we still see the M&A coefficients for the 5th portfolio is negative and significant. The coefficient for other portfolios are large and negative but insignificant with the exception of the 2nd portfolio where the coefficient is positive and insignificant.

However, in the post Sarbanes-Oxley Act subsample, we do not see any significance of the coefficients. The M&A coefficients are still largely negative but no longer significant. We cannot distinguish these firms in terms of takeover vulnerability.

To sum up the results, we find consistent support for Hypothesis 11, 12 and 13. While the Sarbanes-Oxley Act adds to transparency, the cost of the Act is that it changes a heterogeneous market into a homogenous market. Information collecting effort of takeover speculators is largely reduced.

[26] We run the model with contemporaneous M&A change but no significant result is found.

Table 9: Prior and Post of Sarbanes-Oxley Act–2002

In model I and III, we run

$$R_{i,t} = \alpha + \beta_{i,1} MKTRF_t + \beta_{i,2} HML_t + \beta_{i,3} SMB_t + \rho_i \Delta MA_{t+1} + \varepsilon_{i,t}$$

and in model II and IV, we add interest rate factors

$$\begin{aligned} R_{i,t} \quad = \quad & \alpha + \beta_{i,1} MKTRF_t + \beta_{i,2} HML_t + \beta_{i,3} SMB_t \\ & + \gamma_{i,1} IRL_t + \gamma_{i,1} IRS_t + \gamma_{i,1} IRV_t \\ & + \gamma_{i,1} MCP_t + \rho_i \Delta MA_{t+1} + \varepsilon_{i,t} \end{aligned}$$

where $MKTRF$, SMB, and HML are Fama-French market excess return, small minus big factor and high minus low factor, respectively; IRL is Interest Rate Level defined as Treasury 1 Year Constant Maturity Rate, IRS is Interest Rate Slope defined as the ratio of Treasury 10 Year Constant Maturity Rate and Treasury 1 Year Constant Maturity Rate, IRV is Interest Rate Volatility defined as Standard Deviation of over 12 month Treasury 1 Year Constant Maturity Rate prior to Current Month, MCP is Market Credit Premium defined as Average Yield of BBB Corporate Bond-Average Yield of AAA Corporate Bond and ΔMA is monthly change of M&A activities defined as natural log of current month M&A activities($) minus natural log of previous month M&A activities ($). We use total dollar amount of all M&A activities in Model I and II and total dollar amount of M&A activities for deals greater or equal to ten million dollars in Model III and IV.

Note: $***p \leq 0.01, **p \leq 0.05, *p \leq 0.1$

	1991 to 2002				2003 to 2008			
	Model I	Model II	Model III	Model IV	Model I	Model II	Model III	Model IV
1st Portfolio	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001	-0.001	-0.001
	(-0.200)	(-0.193)	(-0.170)	(-0.163)	(-0.394)	(-0.396)	(-0.461)	(-0.462)
2nd Portfolio	0.001	0.001	0.001	0.001	-0.000	-0.000	-0.001	-0.001
	(0.430)	(0.420)	(0.436)	(0.424)	(-0.171)	(-0.176)	(-0.355)	(-0.359)
3rd Portfolio	-0.003	-0.003	-0.003	-0.003	-0.001	-0.001	-0.001	-0.001
	(-0.811)	(-0.821)	(-0.821)	(-0.832)	(-0.484)	(-0.486)	(-0.378)	(-0.376)
4th Portfolio	-0.005	-0.005	-0.005	-0.005	0.001	0.001	0.000	0.000
	(-1.575)	(-1.582)	(-1.527)	(-1.536)	(0.183)	(0.186)	(0.120)	(0.124)
5th portfolio	-0.018**	-0.018**	-0.018**	-0.018**	0.000	-0.000	-0.000	-0.000
	(-2.122)	(-2.125)	(-2.148)	(-2.153)	(0.004)	(-0.009)	(-0.046)	(-0.052)
Number of Observations	144	144	144	144	71	71	71	71

2.5 Conclusion

Takeover is an important method to control agency problem. In this paper, we use a sample containing only firms with very few anti-takeover provisions (democratic firms) to study equity market information and performance. First, we demonstrate

that when firms protected by few anti-takeover devices, market information can identify firms with high and low takeover vulnerabilities firms. Firms with low takeover vulnerability are more efficient in terms of risk-return trade-off as measured by Sharpe ratios and have greater abnormal returns than the others. This supports the findings of Ferreira and Laux (2007) in that the measure of takeover vulnerability is proxied by market information which is generated by takeover specialized speculators. We also further confirm that some players in the market have an information advantage over the others. They trade with their private information. Such activities help market to distinguish firms with different risk efficiency. Second, we confirm the links among anti-takeover provisions, market information flow, takeover activity and equity return. Takeover speculators drive the information flow on the market and the information is further reflected in supply and demand relationships. We find that the returns of potential targets react to forward takeover demand shocks negatively. Third, we document that Sarbanes-Oxley Act 2002 can mitigate these effects. Sarbanes-Oxley Act improves transparency. As a consequence, it discourages information collecting by takeover speculators. Therefore, regulation instead of market forces provides information to the market after Sarbanes-Oxley. While Sarbanes-Oxley Act improves market transparency, it also reduces market self regulatory power at the same time.

CHAPTER 3: THE DECISION TO LIST ABROAD BY CHINESE FIRMS

3.1 Introduction

The globalization of capital markets has been on an accelerated path in the past twenty years. According to the U.S. Treasury, cross-border capital flows between residents of the U.S. and other countries grew exponentially from less than 1% of U.S. GDP in 1980 to 30% in 2006. On one hand, we observe intense competition among major stock exchanges to obtain listings of foreign companies. On the other hand, companies have the opportunities to benefit from a global shareholder base, greater liquidity of their issuance, and international reputation and prestige. The number of foreign companies with shares listed on exchanges outside their home countries has grown significantly since the early 1990s. In particular, a significant number of firms from the emerging markets such as Asia and South America join this trend of cross-listings.

In a recent study, Pagano, Roell, and Zechner (2002) examine foreign listings by European and U.S. companies. They find that more European companies are drawn to the U.S. to cross-list, while the cross-listing activity of U.S. companies on the European exchanges has declined. They compare European firms listed on other European exchanges and those listed in the U.S. and find significant differences in ex ante characteristics and ex post performances. They argue that cross-listing in

the U.S. seems to be driven by the need to finance rapid growth and expansion, mostly in the high-tech industry. On the other hand, the companies that cross-list in Europe has less foreign sales and average growth. To further support this argument, Doidge (2004) finds that the non-U.S. firms that cross-list on U.S. exchanges have voting premiums that are 43% lower than non-U.S. firms that do not cross-list. His findings support the bonding hypothesis that cross-listing improves the protection afforded to minority investors and decreases the private benefits of control. Karolyi (2006) reviews the conventional wisdom that rationalizes why firms cross-list.[27] He describes a significant slowdown in the international cross-listing and trading activity in the past years. He further points to risk factors raised in recent studies that could help explain the new trend. Some of the factors discussed include corporate governance issues, information asymmetries, and liquidity issues when shares are traded in multiple markets.

The literature on the decision to go public is also relevant to the decision to list abroad since firms can do an IPO on a foreign exchange, bypassing the domestic exchanges entirely. Mello and Parsons (1998) present a model of an optimal strategy for going public after incorporating the ownership structure. Puri (1999) develops a model for analyzing the role of commercial banks as underwriters in the going public process. Chemmanur and Fulghieri (1999) develop a model on the timing of going public by analyzing the tradeoff between minimizing the duplication in information collection by outside investors and avoiding the risk premium demanded by venture

[27]Karolyi (1998) provides an extensive survey of the academic literature on the evidence and implications of the decisions to cross-list.

capital firms. Subrahmanyam and Titman (1999) explore the choice between public and private financing and its relation with stock market efficiency. They argue that the advantage of going public is significant when the cost of information is low and when the market is large and efficient. Gomes (2002) addresses the agency problem between controlling and minority shareholders and its relation to the going public decision. Finally, Ang and Brau (2002) link firm transparency to the costs of going public.[28]

In this paper, we explore the decision to list abroad based on a unique sample of American Depository Receipts (ADRs) and foreign initial public offerings (IPOs) by Chinese companies. These ADRs are listed on the U.S. exchanges and backed by Chinese shares. The foreign IPOs are listed on major markets including Hong Kong, Singapore, U.S., and U.K. The explosive economic growth in China leads to a strong presence of Chinese firms on the global platform. Chinese market is one of the most dynamic markets of the world; however, there remain many aspects about this market that are under-researched. In addition, due to its significant economic growth, Chinese firms have been aggressive in seeking capital via foreign listings. It is important to examine how firms from this emerging economy make decisions to list abroad and the post performance of these issuers. Literature suggests that it is important to examine both IPOs and ADRs and different markets. For example, Li, Yan, and Greco (2006) document that Chinese A and H shares are segmented and their return differential can be explained by their risk premiums. ADR and H shares

[28]The effects of going public for companies in various countries have been explored extensively. For example, see Wang, Xu, and Zhu (2004) the effects of going public for Chinese companies, Goergen (2006) for UK firms, and Alvarez and Gonzalez (2005) for Spanish firms.

have advantage to B shares since B shares are traded in big discount as documented for the Chinese stock markets by Yang and Lau (2005). In particular, we examine 251 Chinese companies that list abroad in various markets from 1993 to 2005. Out of the 251 firms, 33 firms choose to issue ADRs on a foreign exchange (mainly in the U.S.) and 218 firms issue IPOs on exchanges outside of China. The control sample contains 1,418 firms of domestically listed companies during the same period.

We first study the motives to list abroad by examining the ex ante predictors of listing abroad stemming from various hypotheses. Similar to Pagano, Roell, and Zechner (2002), we explore possible motives for listing abroad. Each motive suggests a set of firm characteristics that can be linked to a higher probability of a foreign listing. To test these hypotheses about motives, we examine these characteristics using the multivariate Probit framework and a sample consisting of ADR, foreign IPO firms, and their domestic counterparts. We examine ADRs and foreign IPOs separately as they are different issues. Our results for the ADR sample are generally consistent with the hypotheses about the motives to list abroad. We find that firms with better profitability and a larger firm size are more likely to list an ADR, supporting the hypothesis that more stringent listing requirements and closer monitoring by regulatory agencies motivate top performers with a larger size to list abroad. Significant demands for external financing suggest that a high growth firm is more likely to cross-list in the ADR market, which is confirmed by our result. Our findings suggest that issuers with a lower financial leverage are more likely to issue an ADR, which is contrary to the prediction of the demand for external capital hypothesis that these issuers are motivated to list abroad due to an exhausted debt capacity. Since

we observe that most of the Chinese firms have low leverage ratios due to limited sources of borrowing, we argue that the limited cross-sectional variation in leverage and/or the uniqueness of low financial leverage (so the issuers still have plenty of debt capacity) support our finding on financial leverage. The results indicate that high risk firms are more likely to list an ADR, which is consistent with the hypothesis that an expanded shareholder base leads to risk sharing for investors. We find that high tech firms are significantly more likely to issue and ADR, which strongly supports the hypothesis that foreign expertise is what the issuers seek in ADR listings. Finally, we find evidence supporting the listing costs hypothesis that larger firms, which are more likely to bear the listing costs, are more likely to issue an ADR.

The findings of the foreign IPO issuers suggest much weaker results compared to those of the ADR issuers. In particular, we find weak evidence for the prediction that issuers with better profitability and a larger size should issue a foreign IPO. We also find weak support for the prediction that a high growth firm is more likely to list a foreign IPO. We find no evidence that issuers with higher financial leverage are more likely to issue a foreign IPO. Due to the fact that the leverage ratio of the foreign IPO companies is extremely low, we argue that the motive of an exhausted debt capacity leading to listing abroad is not applicable in this case. We find weak evidence that high-risk firms are more likely to list a foreign IPO. Finally, the results on high tech dummy indicate that foreign expertise may not be what the issuers look for when they issue a foreign IPO.

A further analysis of the foreign IPOs suggests that the motives for firms to list a foreign IPO differ by market. The issuers of Hong Kong IPOs are generally similar

to the ADR issuers: large, low-leverage, profitable, high growth, and high-tech firms. Therefore, the motives for issuers to list an ADR or a Hong King IPO are somewhat similar. In other words, we find similar support for the same set of hypothesis about the motives to list abroad for ADR and Hong Kong IPO issuers, but the evidence is much weaker for the Hong Kong IPOs. On the other hand, issuers of Singapore IPOs are small, high-leverage, of superior profitability, high growth, and non-high-tech. Due to lower listing requirements on size, Singapore exchange appeals to small issuers. Our results support the hypothesis that more stringent listing requirements and monitoring lead to better performing companies to list abroad. We also find strong evidence for the hypothesis that significant demands for external capital motivate higher-levered and high growth firms to list abroad. We find no evidence to support the hypotheses on expanded shareholder base (high risk firms) and listing costs (large firms).

Finally, we examine the post-issue operating and stock price performance of the firms that list abroad. For operating performance, Chinese issuers that choose to issue abroad do not fare well in operating performance after the listings. These issuers generally experience lower profitability, a drop in tangible assets ratio, and deteriorating asset turnover. Firms do not seem to enjoy better sales growth or spend greater amounts in capital expenditure than their industry median and peers. Interestingly, these issuers have a drop in leverage ratio after listing abroad. As to financial performance, our findings on post-issue stock prices indicate negative returns over the short and long run for issuers that list abroad. These stocks significantly

under-perform the market over the event windows ranging from 3 days to 3 years after issuance.

Our study makes important contributions to the literature. First, we compare the sample of issuers that list abroad with those that list on domestic exchanges from the largest emerging market of the world. The key factors and conditions of the Chinese economy are far from stable, whereas those of the E-9 countries and US are at steady state. As far as we know, this is the first comprehensive study of the listing behavior of Chinese firms. Sun and Tong (2003) and Wang, Xu, and Zhu (2004) study the going public process and success of Chinese state-owned enterprises (SOEs). The focus of these two studies is on the publicly listed Chinese shares on China's two domestic exchanges. We, on the other hand, focus on Chinese shares listed on exchanges outside of China in the form of ADR or IPO. Second, as Chine goes through the rapid evolution of financial markets, it is an ideal market for research. The unique characteristics of Chinese companies such as eastern culture, corporate governance structure, and explosive growth allow us to examine the listing decisions after incorporating the new risk factors summarized in Karolyi (2006) and factors unique to Chinese companies. Lastly, we broaden the scope of the existing literature on cross-listing and IPOs. By examining the listing decisions of Chinese firms, we are able to provide an important piece of evidence in the decision to cross-list in the form of ADRs and the decision to do an IPO on a foreign exchange. In particular, one is no longer limited to exploring the benefits of foreign firms listing on the U.S. exchanges; instead, we examine the decision to list abroad for firms from a given country (China

in this case) in two possible forms (ADR or IPO) and the shares are issued on major exchanges around the world.

The chapter is structured as follows. Section II discusses the background on listing behavior of Chinese companies. Section III discusses the sample data and descriptive statistics. Section IV presents the examination of the motives for Chinese firms to list abroad in the form of ADRs and foreign IPOs. Section V presents the empirical analysis of the ex post performance of the ADR and foreign IPO firms. Section VI concludes.

3.2 Background on the Listing Behavior of Chinese Firms

In 2006, twenty Chinese companies made the Fortune 500 list. Ten out of these twenty companies are listed abroad in the form of ADR or foreign IPO, reflecting the recent trend for Chinese issuers to seek on foreign listings. The history of Chinese companies listing on foreign exchanges can be traced back to the early 1990s. Immediately after the birth of the Chinese Securities and Exchange Committee in 1992, Qingdao Beer became the first Chinese company listed overseas.[29] Following Qingdao Beer, Huachenjinbei landed on NYSE. Since the Chinese government and corporations were still cautious about listing overseas, the height of cross-listing activity did not come until after the Asian financial crisis. Many Chinese firms demonstrated strong performances during the crisis. Since then, Chinese stocks became sought-after investments in Hong Kong and Singapore markets, which fueled a rapid growth for Chinese stocks to be listed on foreign markets. At the same time, major ex-

[29] Qingdao Beer was cross-listed on the Hong Kong Stock Exchange in July 1993.

changes around the world expressed their keen interests in Chinese issuers. New York Stock Exchange (NYSE), London Exchange, Australian Exchange, and many other exchanges went on promotional tours in China.[30] The economic growth of China is also an important reason behind the waves of foreign listings. Claessens, Klingebiel, and Schmukler (2006) suggest that better economic fundamentals for a country such as higher income and growth opportunities is associated with more internationalization of the firms including listing, trading and capital raising in international exchanges.

Several notable cross-listing events took place in recent years. On August 5, 2005, Baidu (NASDAQ: Bidu) issued ADR, which was the most successful ADR/IPO on NASDAQ in that year. With an issuing price of $27.00, the shares opened at $66.00 and closed at $122.54. The fourth largest Chinese commercial banks, China Construction Bank (CCB), had an IPO on the Hong Kong Exchange with an open price of HK$2.35. CCB's IPO is the first step toward a grand-scale privatization of the Chinese state-owned banks.[31] In 2006, the Industry and Commerce Bank of China (ICBC) collected $21.6 billion in the biggest initial public offering in history.

Due to language barriers, geological preference, and the costs of offering, Hong Kong and Singapore are the first choices for Chinese issuers. The preference of the Hong

[30]See the press release on December 11, 2007 for Henry Paulson's opening statement at the meeting of the U.S. China Strategic Economic Dialogue at http://www.ustreas.gov/press/releases/hp727.htm. NYSE, Nasdaq, and London AIM have been on promotional tours to China over the past several years. See the following references: http://findarticles.com/p/articles/mi_hb5562/is_200512/ai_n22725859 for Nasdaq and http://www.nyse.com/press/1188902323389.html for NYSE.

[31]To facilitate the privatization process, the Chinese government established a Non-performing Loan Clearing Company to shift the non-performing loans from the four largest banks. By doing so, the government hopes position the banks for international competition.

Kong and Singapore exchanges is consistent with the findings by Sarkissian and Schill (2004). In particular, Sarkissian and Schill (2004) examine the market preferences of firms listing abroad and find that geographic, economic, cultural, and industrial proximity is the main determinant of the choice of overseas listing exchange. On the other hand, US and European markets are attractive alternatives when one considers market size and liquidity. Of the Chinese corporations that list abroad, about 59% are listed on Hong Kong and Singapore exchanges, 14% listed on the US market, and the remainder listed on exchanges in Europe.[32] It is important to note that many of China's blue-chip companies are listed only on foreign exchanges (foreign IPOs) and not available for domestic investors. Although foreign listing is quite common for companies in certain countries (e.g., South Africa), China's implementation of listing abroad goes far beyond that of any other country.[33]

To examine the decision of Chinese firms to list abroad, we need to have a thorough understanding about the domestic markets and exchanges. First, the domestic exchanges are still at their infancy and therefore regarded as inefficient.[34] The market prices of equity generally do not reflect the performance of the firms. In particular,

[32]We obtain the information on the listings from Bloomberg and DataStream.

[33]China is ranked second in the number of ADRs listed on the U.S. exchanges. As of the end of 2005, the number of Level II and III ADRs is 33 for China, 34 for Brazil, 28 for Japan, 26 for France, 19 for Mexico, 12 for India, and 5 for Russia. In addition, China indices are established on the Singapore Exchange (Prime Partners China Index (PPCI)) and on the Hong Kong Exchange (Hang Seng China Enterprises Index (HSCEI)). Chinese corporations account for 6% of the total value and 15% of total turnover in the Singapore Exchange, and 46% of total value and 56% of total turnover in the Hong Kong Exchange.

[34]Chen, Chen, and Gu (1997) find that Chinese domestic stock markets are weakly efficient with one lag returns, while Zhang and Zhou (2001) suggest that Chinese domestic stock markets are not weakly efficient based on generalized spectral analysis.

while China's GDP grows by 8% annually since the 1990s, the stock markets suffer from poor performances. Recent movements suggest significant volatility on the domestic exchanges. On Feb. 26, 2007, the Shanghai composite reached its historical high of 3040.60, but plummeted the very next day to 2771.79 (an 8.84% drop). At the same time, the Shenzhen Composite went from 8,588.69 to 7,790.82 (a 9.29% drop).[35] In addition, the average underpricing ratio of IPOs in China is 267%, which is one of the largest IPO underpricing ratios among countries. Consequently, the domestic market is considered a highly speculative market. For an issuer seeking a stable access to the long-term capital market, the domestic exchanges are not the best candidates. Second, an unusual feature of the Chinese market is the dominance of retail investors. Institutions and foreign investors account for over 60% of the market capitalization in the U.S. However, the holdings of institutions and foreign investors in China are estimated to be less than 25%.[36] In addition, the retail investors in China are significantly risk-averse. With the lack of a well-established social welfare system, people generally prefer safe investments that guarantee security and minimize risk. The risk aversion of investors presents a challenge for issuers to gauge the supply of capital in the market. Furthermore, the privatization of government-owned banks takes away the cheap and easy access to bank loans, limiting the sources of capital for Chinese firms. Third, an issuer is required to go through a lengthy and cumbersome process to

[35]The 8 to 9% drop is significant not only because of the magnitude, but also due to the fact that the day trading is stipulated to be terminated if the change in the index exceeds 10% on a given day. The sudden drop of the two indices made big waves in the global markets. All indices of the major exchanges around the world plummeted right after this so-called "Black Tuesday".

[36]See Gao (2002) for a comparison of the breakdown of shareholder structure in the U.S., Japan, and China.

list on domestic exchanges. Gao (2002) suggests that the Chinese government represents an extreme case in terms of setting strict regulations for initial public offerings. China is the only country in which the government controls the size of the stock market, the pace of issue and the allocation of resources. In particular, the average length of time it takes to list on a domestic exchange is five years. The companies that are experiencing rapid growth cannot afford to wait such a long period of time to meet their capital needs.

3.3 Sample Data and Descriptive Statistics

Our sample includes all listings of Chinese companies from 1993 to 2005. In particular, we collect ADR listings backed by existing shares, foreign IPOs issued on exchanges outside of China, and domestic IPOs on Chinese exchanges. Data on listing activity is collected directly from the exchanges on which the shares are listed. These exchanges include NYSE and NASDAQ (US), London AIM (UK), Hong Kong Exchange and Hong Kong Growth Enterprise Market (Hong Kong), Singapore Exchange and Singapore Catalist (Singapore), and Shanghai Stock Exchange and Shenzhen Stock Exchange (China). Listing dates are collected from China Center for Economic Research. The search yields an initial sample consisting of 33 ADRs, 218 foreign IPOs, and 1,418 domestic IPOs over the period 1993 to 2005. [37] There are no overlaps among the three groups. Any issuer who has issued an ADR or a foreign IPO is excluded from the domestic listing sample. There are 12 firms that have an

[37] This sample is slight larger than the one used in earlier versions of this study. We added the growth sectors of Hong Kong (Hong Kong Growth Enterprise), Singapore (Catalist), and the U.K. (AIM). We also were able to obtain additional IPO dates on the domestic listings from the China Center for Economic Research.

ADR immediately (1 or 2 days) after a foreign IPO in Hong Kong. These issuers are included in the ADR sample since the main purpose of these issuers is to issue an ADR.[38] We regard Hong Kong as a separate and independent market from the Chinese market. The reasons are as follows. Hong Kong is one of two special administrative regions and is not considered part of mainland China. Under the "one country, two systems" policy, Hong Kong has a high degree of autonomy in all areas except defense and foreign affairs. Hong Kong maintains a capitalist economic system and its own legal/court system that follows the English Common Law tradition established during British rule. Hong Kong is one of the world's leading financial centers and has been ranked as the most free economy of the world in the *Index of Economic Freedom* for 14 consecutive years. As of the end of 2007, the Hong Kong Stock Exchange is the sixth largest in the world and the second highest value of IPOs, after London.

Table 10 presents the frequency of listings of Chinese companies by year. We observe a few notable trends. ADR-listing activity has been relatively slow from 1993 to 2003, but picks up significantly in 2004 and 2005. A similar pattern can be found in foreign IPOs. The number of foreign IPOs in the 2003-2005 period is more than double the average number of issues in the earlier period. As to the domestic market, the listing activity peaked in the 1996-1997 period but showed signs of a slowdown since 2001.

[38] Out of the 33 ADRs, 12 are backed by Hong Kong shares, 4 are backed by Shanghai A, and remainder is backed by Bermuda or other unknown shares.

Table 10: Number of Chinese Firm Listings by Year and Type of Listing

The table reports the number of listings of Chinese companies in foreign IPOs, ADRs, and domestic listings, respectively. The sample includes 33 ADRs, 218 foreign IPOs, and 1,418 domestic listings. The sample period is from 1993 to 2005.

Year	ADRs	Foreign IPOs	Domestic Listings
1993	1	7	180
1994	1	10	109
1995	0	3	30
1996	1	7	203
1997	3	19	214
1998	1	4	109
1999	0	10	99
2000	4	12	142
2001	2	12	79
2002	1	16	72
2003	2	31	67
2004	10	49	100
2005	7	38	14
Total	**33**	**218**	**1418**

We collect additional information on the initial sample from various sources. Accounting data of the issuers are obtained from Worldscope. We obtain information on stock prices and market index returns from DataStream and company profiles from Bloomberg and official websites of the stock exchanges. Data on exchange rates and Consumer Pricing Index (CPI) is collected from the Federal Reserve Bank of St. Louis Economic Data (FRED). After excluding the issuers with missing accounting information and/or stock prices, we arrive at the final sample of 26 ADRs, 146 foreign IPOs, and 468 domestic IPOs.

The growth in the total size of Chinese issuers that list abroad is astounding from 1993 to 2005. Panel A of Table 11 presents the total size of Chinese issuers by type of listing (ADR, foreign IPO, and domestic IPO) and year. In a given year for a given

type of listing, we report the sum of total sales (total assets) of all issuers outstanding at that time. Dollar values are in millions of 2006 U.S. dollars. [39] For example, at the end of 2005, the sum of total sales (total assets) of all ADR firms outstanding is \$22,704.88 (\$454,749.83) million. Based on total assets, the total size of the Chinese firms that list abroad (ADR and foreign IPO firms combined) is 1.78 times as much as that of their domestic counterparts.

Panel B of Table 11 presents the descriptive statistics of issuer characteristics for ADR, foreign IPOs, and domestic listing firms, respectively. All variables are measured at the end of year immediately prior to the issue date. For a given variable, we report the mean and median. Dollar variables are shown in millions of 2006 U.S. dollars. For example, ADR listing firms have an average of \$317.943 million and a median of \$20.278 million of total sales. Ratio and growth variables are presented in percentages. For example, ROA (return on assets, which is operating income over total assets) for the foreign IPO listing firms has a mean of 19.285% and a median of 13.859%. As means can be driven by extreme values, we focus the analysis using medians. In general, ADR listing firms are the largest in firm size based on total assets, total sales, and operating income. Interestingly, ADR firms have the lowest amount of total debt among the three groups, however foreign IPO listing firms have almost no long term debt at the time of issuance. Cost of debt (measured by interest expense over total debt) and capital expenditure (CAPX) over total assets are somewhat higher for ADR firms than for the other two groups. In terms of profitability,

[39] We perform the following conversion:, where y_{ijt} is the inflation-adjusted value of the ith data item of firm j at time t, x_{ijt} is raw value of th$_{ei}$th data item of firm j at time t, r_t is the exchange rate of firm j's currency and US dollar at time t, $CPI2006$ is the Consumer Pricing Index at the year-end of 2006, and CPI_t is the Consumer Pricing Index at time t.

Table 11: Descriptive Statistics of Firm Characteristics

The table reports the issuer characteristics of Chinese companies that list abroad in the form of foreign IPO and ADR. The characteristics of the domestically listed Chinese firms are also reported. The sample includes 23 ADRs, 146 foreign IPO listings, and 468 domestic listings by Chinese companies with valid financial data from Worldscope. The sample period is from 1993 to 2005. All variables are measured at year-end immediately prior to the listings. Total assets, total sales, operating income, total debt, and long term debt are shown in millions of 2006 U.S. dollars. Total debt equals the sum of long-term debt, short-term debt, and current portion of long-term debt. All ratio and growth variables are shown in percentage. Cost of Debt is measured by interest expense divided by total debt. CAPX is capital expenditure. Financial leverage is defined as total debt dividend by total assets. ROA is operating income divided by total assets. ROCAA is operating income divided by total assets excluding cash. ROS is operating income divided by total sales. Asset and sales growth are measured over the calendar year prior to the listings. PP&E is property, plant, and equipment.

Panel A: Total Size of Firms Outstanding by Type of Listing and Time (in $ Million)													
Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
ADRs													
Total Sales		250.89	275.32	515.13	422.29	2,894.05	4,281.13	8,512.00	11,521.90	15,994.70	16,278.24	19,390.15	22,704.88
Total Assets		1,389.87	4,815.52	14,747.56	24,564.98	74,410.02	143,730.05	174,669.47	237,489.47	306,400.55	331,555.68	389,856.99	454,749.83
Foreign IPOs													
Total Sales	15.72	28.97	429.13	460.20	586.11	755.73	1,818.02	3,586.23	4,606.07	6,217.55	8,553.10	9,856.95	11,342.03
Total Assets	2,412.77	3,470.23	15,704.30	20,542.04	25,997.02	29,170.68	40,226.86	53,679.17	65,873.00	584,285.14	737,360.14	826,134.78	964,750.10
Domestic Listings													
Total Sales	326.57	305.23	901.54	1,166.60	1,306.01	1,603.38	12,075.78	14,971.41	19,854.37	25,047.36	30,295.03	35,353.65	39,074.28
Total Assets	10,083.46	10,003.75	20,916.59	23,901.61	31,144.52	34,072.59	219,069.84	301,593.03	412,914.54	511,910.12	611,536.82	694,500.05	796,617.58

Panel B: Firm Characteristics of Chinese Firms listed in ADRs, Foreign IPOs, and Domestic Listings						
	ADR		Foreign IPO		Domestic IPO	
	Mean	Median	Mean	Median	Mean	Median
Total Assets ($ Million)	8645.056	123.039	5280.977	37.836	281.914	63.668
Total Sales ($ Million)	317.943	20.278	44.452	3.251	12.191	4.925
Operating Income ($ Million)	679.610	19.352	96.535	5.902	14.366	6.989
Total Debt ($ Million)	2369.455	5.202	200.075	7.157	61.849	17.702
Long Term Debt ($ Million)	1108.518	3.896	145.411	0.000	23.219	2.679
Cost of Debt (%)	10.411	6.890	21.897	5.020	7.808	5.201
CAPX/Total Assets (%)	8.848	8.315	8.180	5.228	7.903	5.170
Financial Leverage (%)	13.017	10.746	7.246	0.000	8.577	4.922
ROA (%)	15.973	16.394	19.285	13.859	12.188	11.294
ROCAA (%)	23.181	17.257	22.297	15.272	12.388	11.416
ROS (%)	250.374	151.035	288.858	180.811	219.466	138.085
Asset Growth (%)	203.426	122.444	145.375	31.335	22.578	14.425
Sales Growth (%)	127.602	39.498	37.580	22.480	25.368	15.994
PP&E/Total Assets (%)	38.186	16.434	31.035	27.292	38.548	36.330
Asset Turnover (%)	16.114	10.533	13.403	9.261	11.044	8.190
Total Sales/CAPX (%)	511.634	199.149	1088.171	208.027	539.623	169.777

ADR firms are the top performers with 16.394% median ROA and 17.257% median ROCAA (return on cash-adjusted assets, which is operating income over total assets excluding cash). ADR listing firms are also the high growth firms with 122.444% median asset growth and 39.498% median sales growth. On the other hand, domestic IPO firms have the highest ratio of tangible assets (measured by PP&E/Total Assets) whereas ADR listing firms have the lowest ratio. Lastly, in term of efficiency, firms that list abroad (ADR and foreign IPO firms) have better asset turnover and Total Sales/CAPX ratios than the domestic listing firms.

3.4 Motives for Listing Abroad

Why do firms list abroad? In this study, we examine the motives of Chinese companies to list abroad in the form of ADRs or foreign IPOs. In general, the hypotheses about the motives for listing abroad include better legal systems, more reliable accounting standards, more stringent listing requirements and stronger regulatory agencies, significant demands for external capital, a broader shareholder base, foreign expertise, and listing costs. We discuss each hypothesis/motive in details.[40]

A. Hypothesis about Motive for Listing Abroad

A1. Better Legal Systems and Higher Accounting Standards

Issuers are motivated to list abroad due to better legal systems and/or higher accounting standards in foreign markets. Allen, Qian, and Qian (2005) suggest that while China is one of the fast growing economies of the world, neither its legal nor

[40]There are other hypotheses about motives for listing abroad or cross-list. We include a set of hypotheses that are applicable to our sample of Chinese ADRs and foreign IPOs and that we have data available to test the hypotheses. Please see Karolyi (2006) and Pagano, Roell, and Zechner (2002) for more discussions on the hypotheses about the motives to list abroad or cross-list.

financial system is well developed. La Porta and Lopez-de Silanes (1998) reports the efficiency of judicial system and the index of accounting standards of over 40 developed and developing countries around the world (China was not included in their study). Based on La Porta and Lopez-de Silanes (1998), we report in Panel A of Table 12 these two measures for the four countries/regions in which Chinese firms issue ADRs and foreign IPOs and four developing countries selected for comparison. The efficiency of judicial system pertains to law enforcement and is collected by private credit risk agencies for foreign investors who are interested in these countries. Hong Kong, Singapore, U.S., and U.K, all have the highest efficiency measure of 10, whereas the selected emerging markets have an average measure of 5.81. Reliable accounting standards are essential to the assessment of performance, therefore higher quality of accounting standards signals the transparency of firm performance and enables a wider array of financing instruments.[41] Hong Kong, Singapore, U.S., and U.K. have an average index of accounting standards of 74.00, compared to an average index of 55.50 for the four emerging countries.

This hypothesis provides overall background factors that may attract issuers to list abroad. However, these factors are difficult to test as they can be applied to all issuers regardless of firm characteristics. In other words, any issuer in China may be attracted to list abroad due to better legal systems and higher quality accounting standards in the U.S. Therefore, this is the only hypothesis that we provide general

[41] According to La Porta and Lopez-de Silanes (1998), the efficiency of judicial system measure is reported in *International Country Risk Guide*, published by Business International Corporation. The index of accounting standards is obtained from the Center for International Financial Analysts and Research.

Table 12: Characteristics of Exchanges and Countries/Regions

Panel A of the table reports the market capitalization, number of domestic listings, number of foreign listings, average daily turnover, and average trading costs of various exchanges as of the end of 2005. Market capitalization and turnover are presented in millions of US dollars. Trading costs are shown in basis points per trade. Data source is World Exchange Federal at www.world-exchanges.org. Panel B of the table reports the levels of the efficiency of judicial system and accounting standard in Hong Kong, Singapore, UK, and US, based on the study by La Porta and Lopez-de-Silanes (1998).

Panel A: Efficiency of Judicial System and Accounting Standard of Countries/Regions

Country (Region)	**Efficiency of Judicial System**	**Accounting Standard**
Hong Kong	10.00	69.00
Singapore	10.00	78.00
UK	10.00	78.00
US	10.00	71.00
Average	**10.00**	**74.00**
South Africa	6.00	70.00
Brazil	5.75	54.00
Portugal	5.50	36.00
South Korea	6.00	62.00
Average	**5.81**	**55.50**

Panel B: Size, Turnover, and Trading Costs of Exchanges

Exchange	Domestic Market Capitalization ($Million)	Number of Domestic Listings	Number of Foreign Listings	Average Daily Turnover ($Million)	Average Trading Cost (in basis points)
Nasdaq	3,603,984.87	2,832	332	40,026.75	30.32
NYSE	13,632,303.00	1,818	452	70,866.53	23.26
Hong Kong	1,054,999.32	1,126	9	1,879.65	40.94
Shanghai	286,190.31	833	0	985.62	NA
Shenzhen	115,661.94	544	0	637.40	NA
Singapore	257,340.62	564	122	465.83	40.23
London	3,058,182.41	2,757	334	22,530.64	52.47

supporting information shown in Panel A of Table 12 and will not be included in the multivariate analysis of motives to list abroad for Chinese companies.

A2. Stringent Listing Requirements and Closer Regulatory Monitoring

Issuers are also drawn to foreign exchanges because of more stringent listing requirements and closer regulatory monitoring, signaling the quality and performance of the firms. We compare the listing requirements of foreign and domestic exchanges and confirm that firms are subject to a more stringent set of listing requirements set by the foreign exchanges and closer monitoring by the regulatory agencies in the foreign country. The Hong Kong Exchange Main Board, Singapore Exchange Main Board, NASDAQ Global Select, and NYSE have requirements on market capitalization, profitability, and liquidity. All numbers presented in this comparison are in 2006 U.S. dollars. The required market capitalization is $514.331 million in Hong Kong, $52.158 million in Singapore market, $750 million on NYSE, $850 million on NASDAQ, and $6.407 million on the Shanghai or Shenzhen Exchange. Note that the requirement of Singapore market is lowest among the overseas exchanges. All exchanges have requirements on profitability. For the Hong Kong Market, the cumulative pre-tax profit over the two preceding years must exceed $3.857 million. The Singapore Exchange requires that the cumulative consolidated pre-tax profit over the last three years to be at least $4.89 million, and a minimum of $0.652 million in each of the three years. On the NASDAQ Global Select, pre-tax earnings cumulated over the prior three fiscal years must be greater than $11 million and in each of the two most recent years the pre-tax earnings must be greater than $2.2 million. NYSE, on the other hand, requires the aggregate pre-tax income for last 3 years to exceed $100

Million, and the minimum pre-tax income in each of two preceding years to exceed $25 Million. For the Shanghai market, the aggregate net profit in prior three fiscal years must be greater than $3.844 million. There is no explicit requirement for profitability on the Shenzhen Exchange. The Hong Kong, Singapore and U.S. markets also have liquidity requirements for an issuer to offer seasoned issues, whereas the domestic markets do not.

Similar to the hypothesis about better legal systems and accounting standards, the hypothesis about listing requirements and closer monitoring suggests an overall background factor that applies to all issuers. However, we can test this hypothesis by examining firm size and profitability of the issuers that list abroad versus those of the domestic issuers. Top performers, who are more likely to signal about their quality and performance, would choose to list abroad as soon as they meet the listing requirements and welcome the close monitoring of regulatory agencies. Based on this hypothesis, we predict that issuers with a larger firm size and/or better profitability are more likely to list abroad

A3. Significant Demands for Capital

One of the main motives for issuers to list abroad is the significant need for external capital. These issuers may be experiencing tremendous growth and need frequent and sizable capital infusions. Issuers are likely to have exhausted their debt capacity to support the growth and additional borrowing might put too much strain on the firm's capital structure. Equity offerings are a preferred choice for issuers at this time. Therefore, we predict that the issuers who list abroad are more likely to have higher growth in assets and sales and higher leverage.

A4. A Broader Shareholder Base

Broadening the shareholder base for a firm's securities can lead to risk sharing and thus a lower cost of capital. Stulz (1999) studies the relation between globalization of equity markets and cost of capital and provides support for the above statement. Listing abroad also reduces market frictions for foreign investors who are interested in the firm's shares. These market frictions include transaction costs of trading a foreign stock, restrictions on foreign investing for a given investor, and lack of information (foreign investors have little information about the issuers). Listing abroad reduces the above barriers to foreign investors. Several papers provide support for the positive relation between announcement effects of cross-listings and the increase in shareholder base (for example, see Foerster and Karolyi (1999) and Miller (1999)). Since the benefit of a drop in cost of capital is greater for riskier firms, we predict that firm with higher risk are more likely to list abroad.

Note that the reputation of listing on major international exchanges can lead to benefits of increased analyst and media coverage (Baker, Nofsinger, and Weaver (2002)). Panel B of Table 12 presents the market capitalization, number of domestic and foreign listings, daily turnover, and average trading costs for the seven major exchanges relevant for our study. NYSE, Nasdaq, and London are significantly larger in market capitalization than the remaining four exchanges. The number of domestic and foreign listings is consistent with what we observe in market capitalization. In terms of trading activity, the turnover in three largest exchanges (NYSE, Nasdaq, and London) is extremely high compared to the others. Lastly, trading costs for non-Chinese exchanges are within a reasonable range.

A5. Expertise of Foreign Markets

The literature on cross-listings and foreign listings suggest that the expertise of investors and analysts in the country where the exchange is located is a major determinant of the issuer's listing decision. Blass and Yafeh (2000) find that Dutch and Israeli firms that bypass their home markets to list in the U.S. are mostly high-tech and fast growing companies. Pagano, Roell, and Zechner (2002) suggest that the U.S. exchanges attract high-tech and export-oriented European firms with rapid expansionary plans. With the expertise and superior knowledge about the high-tech industry, analysts in the U.S. can better assess the share value of a high-tech company. This may lead to greater availability of equity financing for these high-tech firms. Therefore, we predict that high-tech firms are more likely to list abroad.

A6. Listing Costs

There are a variety of costs associated with listing abroad. These costs include listing fees and charges for documentation, application process, legal services, investment bank services, compliance with accounting standards on the foreign exchange, and others. Since most of these costs have a fixed component, larger firms are more likely to be able to afford these costs. Therefore, we predict that larger firms are more likely to list abroad.

1. *Multivariate Probit Analysis of the Motives to List Abroad*

In this section, we explore the issuer's motives to list abroad in a multivariate Probit analysis. The listing events consist of three types. The first type is a foreign IPO. In other words, a Chinese firm, which has no publicly issued equity in domestic

or foreign market, lists its equity on a foreign exchange. The second type is a cross-listing event that occurs some time after the issuer's domestic IPO. In particular, a firm has an IPO in the domestic market and then cross-lists its shares on a foreign exchange (ADR) at a later time. A firm may not exhibit the characteristics of an issuer who are likely to list abroad at the time of its domestic IPO but later decide to list abroad (cross-list) when they start to exhibit those characteristics. The third type is a domestic IPO on either Shanghai or Shenzhen Exchange. These companies have never had a listing in a foreign market.

Based on the hypotheses A2 through A6 above, we have various predictions about the relation between a set of firm characteristics and the decision to list abroad. Since ADRs and foreign IPOs are very different security issues, we test the hypotheses about the motives for listing abroad separately for ADRs and foreign IPOs. Using the multivariate Probit regression, we examine how the likelihood of listing an ADR or a foreign IPO is affected by various firm characteristics. Each of these firm characteristics are based on the hypotheses about the motives to list abroad as discussed earlier. In particular, the set of determinants includes the following firm characteristics. All variables are measured in year -1, where year 0 is the issue year. Log (Total Assets) is the logarithm of total assets and is used a measure of firm size to test hypotheses A2 and A6. Financial Leverage (total debt over total assets) is included to test hypothesis A3. PP&E/Total Assets is property, plant, and equipment over total assets, which is included as a risk measure to test hypothesis A4. Note that the lower the PP&E/Total Assets ratio, the higher the firm risk. We include three return

measures to gauge firm profitability and to test hypotheses A2.[42] ROA (return on assets) equals operating income over total assets. ROCAA (return on cash adjusted assets) equals operating income over total assets excluding cash. ROS (return on sales) is operating income over total sales. Sales growth and asset growth are used to measure firm growth to test hypothesis A3. Finally, Hightech Dummy equals one if the issuer is classified by Datastream as a high tech company and zero otherwise. This variable is included to test hypothesis A5.

B1. ADR vs. Domestic Listings

Panel A of Table 13 reports the results of the multivariate Probit analysis for ADR versus domestic listings. The sample consists of 26 ADRs and 468 domestic listings with valid financial information from Worldscope. We run a set of six models shown as Model 1 ~ 6. The analysis yields many interesting results. First, Log (Total Assets) is significant and positive in all models. This indicates that ADR issuers are significantly larger than domestic listing firms. Interestingly, leverage ratio is significantly lower for ADR firms than domestic issuers: the coefficient on Financial Leverage is significant and negative in all except for Model 5. Our risk measure, PP&E/Total Assets, is negatively related the probability to list an ADR abroad and the coefficient is significant in four out of six models. Note that low PP&E/Total Assets ratio indicates high firm risk. Therefore, a negative relation between this ratio and the decision to list abroad suggests that firms are more likely to list and ADR when the firm is a high-risk firm. Generally, the return measures (ROA, ROCAA,

[42] We use return measures that are similar to those used in Grullon and Michaely (2004).

and ROS) have a positive effect on the decision to list an ADR. In other words, more profitable firms are more likely to issue an ADR. Both sales and asset growth have significant and positive impacts on the decision to issue and ADR. High growth firms with significant demands of external capital are more likely to list an ADR. Lastly, high-tech companies are shown to be drawn to the ADR market. We observe a significant and positive coefficient on the Hightech Dummy in all six models. The pseudo R square for the models ranges from 0.424 to 0.706.

The result is generally consistent with the hypotheses A2 through A6, except for the result on Financial Leverage. In particular, we find that that more stringent listing requirements and closer monitoring by regulatory agencies (hypothesis A2) motivate issuers with better profitability and a larger size to issue an ADR abroad. Significant demands for external financing (hypothesis A3) lead to higher probability for a high-growth firm to cross-list in the ADR market. However, we find that issuers with lower financial leverage are more likely to issue an ADR. This is inconsistent with the prediction of this hypothesis that these issuers might have exhausted their debt capacity. One possible explanation is that Chinese companies generally have low leverage ratios due to limited sources of borrowing. The banking industry is relatively young and the public debt market is extremely small and inactive. The cross-sectional variation in leverage ratio can be limited and/or the uniqueness of low financial leverage (so the issuers still have plenty of debt capacity) can help explain the result on financial leverage. We find that high-risk firms are more likely to list an ADR, which is consistent with the hypothesis that an expanded shareholder base leads to risk sharing for investors (hypothesis A4). The results on high tech dummy

Table 13: Probability of Listing Abroad by Chinese Companies

The table reports the Multivariate Probit Regressions of the probability of listing abroad by Chinese companies over the period from 1993 to 2005. Panel A presents regressions for the probability of listing an ADR. The sample consists of 26 ADRs and 468 domestic listings by Chinese companies with valid financial information from Worldscope. The dependent variable is the dummy variable for ADR listing, i.e., the dummy variable equals to one if the firm lists an ADR on a foreign exchange and zero listing on the domestic exchange. Panel B shows the results for the probability of issuing an IPO on a foreign exchange. The dependent variable is the dummy variable for an IPO, i.e., the dummy variable equals to one if the firm issues an IPO on a foreign exchange and zero listing on the domestic exchange. The sample consists of 146 foreign IPOs and 468 domestic listings. Log (Total Assets) is the natural logarithm of total assets at the end of the year immediately prior to the listing. Financial leverage is defined as total debt dividend by total assets, where total debt equals the sum of long-term debt, short-term debt, and current portion of long-term debt. PP&E/Total Assets is property plant and equipment divided by total assets. ROA is operating income divided by total assets. ROCAA is operating income divided by total assets excluding cash. ROS is operating income divided by total sales. Sales and asset growth are measured over the calendar year prior to the listing year. Hightech dummy equals one if the issuer is in the high tech industry. All ratio and growth variables are in percentage.

Note: $***p \leq 0.01, **p \leq 0.05, *p \leq 0.1$

Panel A. ADR Listings versus Domestic Listings						
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Log(Total Assets)	0.464***	0.441***	0.481***	0.58***	0.495***	0.644***
Financial Leverage	-0.032*	-0.028*	-0.034*	-0.037*	-0.029	-0.059***
PP&E/Total Assets	-0.018**	-0.023***	-0.019**	0.013	-0.002	0.019**
ROA	0.011			0.074***		
ROCAA			0.016			0.05***
ROS		0.001*			0.001*	
Sales Growth	0.006***	0.006***	0.006***			
Asset Growth				0.017***	0.012***	0.017***
Hightech Dummy	0.718**	0.826**	0.71*	1.975***	2.007***	2.399***
Constant	-3.215***	-3.129***	-3.284***	-7.068***	-5.219***	-7.176***
Pseudu R-Sq	0.424	0.443	0.437	0.675	0.613	0.706

Panel B. Foreign IPO Listings versus Domestic Listings						
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Log (Total Assets)	0.129	0.098	0.124	0.174**	0.202**	0.176**
Financial Leverage	-0.007	-0.005	-0.007	-0.01	-0.008	-0.01
PP&E/Total Assets	-0.008*	-0.013***	-0.008*	-0.002	-0.006	-0.002
ROA	0.019			0.001		
ROCAA			0.019			0.005
ROS		0.001***			0.001*	
Sales Growth	0.001	0.002	0.001			
Asset Growth				0.005**	0.004*	0.005**
Hightech Dummy	0.054	0.084	0.067	0.087	0.18	0.094
Constant	-1.198*	-0.962**	-1.214*	-1.581***	-1.809***	-1.651***
Pseudu R-Sq	0.062	0.073	0.073	0.106	0.109	0.108

strongly support the hypothesis that foreign expertise is what the issuers seek in ADR listings (hypothesis A5). Finally, we find that larger firms, that are more likely to bear the listing costs, are more likely to issue an ADR.

Overall, the multivariate analysis of the ADR and domestic listings indicates that high-tech firms with a larger firm size, better profitability, lower financial leverage, and higher growth are more likely to list and ADR. The results are robust to various combinations of explanatory variables. These findings are consistent with Stulz's (1999) hypothesis that high-profile issuers have better access the global markets and therefore are better qualified and positioned to consider listings on overseas exchanges. Our results are also consistent with Saudagaran's (1988) findings that the absolute and relative size of the firm in its domestic capital market has a significant impact of the firm's decision to list abroad.

B2. Foreign IPOs vs. Domestic Listings

Panel B of Table 13 presents the results for the foreign IPO sample. The sample consists of 146 foreign IPOs and 468 domestic listings with valid financial information from Worldscope. We run the same set of six models as in the ADR analysis. The regressions suggest significantly different results compared to those for the ADR sample. First, Log (Total Assets) is significant and positive in Model 4~6 only. We have weak evidence that foreign IPO issuers are larger than domestic listing firms. Financial leverage is insignificant in all models. In other words, the leverage ratio of the foreign IPO and domestic issuers is not significantly different. PP&E/Total Assets, is negatively related the probability to list a foreign IPO and the coefficient is significant in three out of six models. We find weak evidence that high growth firms

are more likely to issue a foreign IPO than a domestic one. For the return measures (ROA, ROCAA, and ROS), the results indicate that only ROS has a positive and significant impact on the probability to list a foreign IPO. We find that sales growth has insignificant effects on the probability of listing a foreign IPO, whereas asset growth has significant and positive impacts on the decision. High growth in assets but not in sales leads to a higher probability to list a foreign IPO. Lastly, we find that Hightech Dummy is insignificant in all six models. In other words, whether the issuer is a high tech firm, it has little effect on the decision to issue a foreign IPO versus a domestic one. The pseudo R square for the models, which is much smaller than that in the ADR regressions, ranges from 0.062 to 0.108.

The findings of the foreign IPO issuers suggest much weaker and different results compared to those of the ADR issuers. The notable differences are discussed as follows. We find weak evidence for the prediction of hypothesis A2 that issuers with better profitability and a larger size should issue a foreign IPO. We also find weak support for the prediction of hypothesis A3 that a high-growth firm is more likely to list a foreign IPO. We find no evidence that issuers with higher financial leverage are more likely to issue a foreign IPO. Recall in Table 11, the median leverage for foreign IPO issuers is zero, which suggests a very unique group of issuers with very little or almost no debt. Therefore, the argument for exhausting debt capacity and leading to listing abroad is not applicable to this sample. We find weak evidence that high-risk firms are more likely to list a foreign IPO. Finally, the results on high tech dummy indicate that foreign expertise may not be what the issuers look for when they issue a foreign IPO.

B3. Multinomial Probit Model Analysis of Decision to Issue IPOs

We use the multinomial probit model to further explore the foreign IPO sample. By decomposing the 146 foreign IPOs by market, we have 71 Hong Kong IPOs, 69 Singapore IPOs, 4 US IPOs, and 2 UK IPOs. Since the four markets are significantly different in market size, listing requirements, and foreign expertise, we examine if motives differ for issuers when different markets are chosen in the case of IPOs. Due to the small sample sizes of the US and UK IPOs, we focus the analysis on the HK and Singapore IPOs and use the domestic IPOs as the base sample. In particular, using the multinomial Probit model, we examine the discrete choice of Chinese issuers of which of the three markets to issue an IPO: Hong Kong, Singapore, and domestic market. The goal is to study if a different set of firms are drawn to a specific market due to different motives for listing an IPO. We include a set of explanatory variables similar to those in the multivariate Probit model. In particular, we include the following firm characteristics: Log (Total Assets) for hypotheses A2 and A6, Financial Leverage for hypothesis A3, PP&E/Total Assets for hypothesis A4, ROA, ROCAA, ROS for hypothesis 2, Sales Growth and Asset Growth for hypothesis A3, and Hightech Dummy for hypothesis A5.

Table 14 reports the results of the multinomial Probit regressions. To be consistent with the multivariate Probit regressions reported in Table 13, we present regression results using the same six models. We find very interesting results that suggest the motives for listing abroad are different when different listing markets are chosen. For the Hong Kong market, we find significant support for firm size and weak support for profitability and asset growth. In particular, Hong Kong issuers are significantly

larger in size than domestic issuers. There is no evidence that financial leverage or risk plays an important role. We find that Hong Kong issuers are likely to be better performers than domestic ones based on ROCAA only. We find weak support that asset growth is a driver for issuing a foreign IPO. Lastly, the coefficient on the high tech dummy is generally positive, however, the effect is insignificant except for one model. On the other hand, the findings for the Singapore listings suggest that smaller, higher-levered, more profitable, higher-growth, and non-high-tech firms are more likely to issue an IPO in Singapore than on domestic exchanges.

The findings indicate that, the motives for firms to list a foreign IPO in Hong Kong are different from those for firms to list a foreign IPO in Singapore. The issuers of Hong Kong IPOs are generally similar to (but with much weaker results) the ADR issuers: large, low-leverage, profitable, high growth, and high-tech firms. Therefore, the motives for issuers to list an ADR (on the US exchanges) or a Hong King IPO are somewhat similar. We find similar (again, much weaker) support for the same set of hypothesis about the motives to list abroad for ADR and Hong Kong IPO issuers. On the other hand, issuers of Singapore IPOs are small, high-leverage, of superior profitability, high growth, and non-high-tech. Recall from Section IV, the exchange requirement on firm size and profitability for Singapore is much lower compared to other foreign exchanges, which can help explain the appeal to small issuers to the Singapore exchange. For the Singapore sample, we have support for hypothesis that more stringent listing requirements and monitoring lead to better performing companies to list abroad. We also find strong evidence for the hypothesis that significant demands for external capital motivate higher-levered and high growth

Table 14: Probability of IPOs

The table reports the Multivariate Probit Regressions of the probability of issuing an IPO by Chinese companies in Hong Kong, Singapore, or the domestic exchanges over the period from 1993 to 2005. The sample consists of 71 Hong Kong IPOs, 69 Singapore IPOs, and 468 domestic listings by Chinese companies with valid financial information from Worldscope. The dependent variable is a discrete choice of HK IPO, Singapore IPO, and domestic IPO. The base sample is the domestic IPOs. Log (Total Assets) is the natural logarithm of total assets at the end of the year immediately prior to the listing. Financial leverage is defined as total debt dividend by total assets, where total debt equals the sum of long-term debt, short-term debt, and current portion of long-term debt. PP&E/Total Assets is property plant and equipment divided by total assets. ROA is operating income divided by total assets. ROCAA is operating income divided by total assets excluding cash. ROS is operating income divided by total sales. Sales and asset growth are measured over the calendar year prior to the listing year. Hightech dummy equals one if the issuer is in the high tech industry. All ratio and growth variables are in percentage.

Note: $***p \leq 0.01, **p \leq 0.05, *p \leq 0.1$

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Hong Kong Listing						
Log (Total Assets)	0.629***	0.571***	0.671***	0.543***	0.587***	0.574***
Financial Leverage	-0.013	-0.013	-0.009	-0.015	-0.014	-0.013
PP&E/Total Assets	0.001	-0.003	-0.001	0.006	0.002	0.005
ROA	0.022			0.036*		
ROCAA			0.046***			0.052***
ROS		0.001			0.001	
Sales Growth	0.004	0.004	0.003			
Asset Growth				0.008**	0.006	0.008**
Hightech Dummy	0.473	0.516	0.445	0.501	0.621*	0.473
Constant	-4.906***	-4.404***	-5.458***	-4.954***	-4.691***	-5.373***
Singapore Listing						
Log (Total Assets)	-0.69***	-1.207***	-0.662***	-0.635**	-0.802**	-0.685**
Financial Leverage	0.025*	0.014	0.032**	0.009	0.002	0.016
PP&E/Total Assets	-0.013	-0.023**	-0.013	-0.003	-0.015	-0.004
ROA	0.1***			0.067***		
ROCAA			0.111***			0.081***
ROS		0.004***			0.003***	
Sales Growth	-0.006	0.001	-0.007			
Asset Growth				0.014***	0.008*	0.014***
Hightech Dummy	-0.847**	-0.674	-0.947**	-1.504***	-1.339**	-1.62***
Constant	-0.628	2.646***	-1.152	-0.977	0.804	-1.252
Wald Chi-Sq	70.74	43.38	74.92	64.1	34.63	68.46
Prob¿Chi-Sq	0.000	0.000	0.000	0.000	0.001	0.000

firms to list abroad. We find no evidence to support the hypotheses on expanded shareholder base (high risk firms) and listing costs (large firm). Finally, high tech companies are more likely to be drawn to a market like the U.S., and therefore non-high-tech firms tend to choose other markets as they do not need the benefits of foreign expertise on technological innovations.

3.5 Post-Issue Performance of List Abroad Issuers

We study the operating and financial performance of the ADR and foreign IPO issuers immediately after the listing events. As these profitable firms seek foreign capital infusion to support their rapid growth, an important and interesting question is how well (or poorly) they perform after the listings. In particular, we examine these issuers from year -1 to year + 3 (where year 0 is the listing year) a set of operational performance measures that reflect profitability, growth, and efficiency. In addition, we study the post-issue stock performance of the issuers for a window of 3 days to 3 years after the listing events.

A. Post-Issue Operating Performance of ADR and Foreign IPO Issuers

Similar to Jain and Kini (1994), we calculate the change in a given variable between year 0 and -1, 1 and -1, 2 and -1, and 3 and -1. Two adjusted changes are reported: industry median adjusted change and match pair adjusted change. The industry median adjusted change for a given firm is the unadjusted change minus the median change of all domestic counterparts in the same industry. In addition to industry median adjusted change, we calculate the match pair adjusted change, which is similar to the performance-adjusted change in Grullon and Michaely (2004). The match pair

adjusted change is the unadjusted change minus the change of a pair firm matched by industry and profitability. The mean and median of the two adjusted changes are then calculated. Table 15 reports the ex post analysis of the operating performance of the ADR and foreign IPO issuers, respectively. Panel A reports the industry median adjusted changes and Panel B reports the match pair adjusted changes. Using the year prior to the cross-listing event (year -1) as the base year, we find several interesting implications. First, the results suggest that issuers of ADRs generally experience a drop in profitability (measured by ROA and ROCAA) after listing. In addition, these issuers have lower or similar level of profitability compared to the industry median and their match pairs. The picture about profitability is relatively dim; however, the result may be explained by the rapid expansion and a more intense competition as a result of the growth. Second, we find mixed and generally insignificant changes in sales growth for the ADR issuers. In particular, ADR issuers do not seem to have faster (or slower) sales growth than the industry or their peers. However, ADR issuers, which have high asset growth prior to listing, have a change in PP&E/Total Assets significantly lower than the industry and their peers in the subsequent years.

Third, we find that the change in asset turnover for ADR firms are significantly lower than the industry median and peer firms. On the other hand, there is a positive but insignificant change in capital expenditure after the listing. Lastly, ADR issuers have significantly larger drop in financial leverage than the industry median and peer firm. However, their cost of debt remains relatively constant from year -1 to 3.

The analysis of the foreign IPO issuers yields similar results. Foreign IPO issuers have drops in ROA and ROCAA that are significantly lower that the industry and

Table 15: Post-Listing Operating Performance of Firms that List Abroad

The table reports the post-listing performance of Chinese companies that listed abroad. The sample includes 26 ADRs and 146 foreign IPOs. We define year 0 to be the year in which the ADR or IPO is issued. Values are for median (mean) change expressed as a percentage for the sample firms during the period from 1993 to 2005. ROA is operating income divided by total assets. ROCAA is operating income divided by total assets excluding cash. PP&E/Total Assets is property plant and equipment divided by total assets. Asset turnover equals total sales over total assets. Financial leverage is defined as total debt dividend by total assets, where total debt equals the sum of long-term debt, short-term debt, and current portion of long-term debt. The industry-adjusted change for a given firm is the unadjusted change of the given firm minus the contemporaneous median change of all firms in the same industry. The matched pair adjusted change for a given firm is the unadjusted change of a given firm minus the change of a matching pair firm that closely resembles the sample firm by industry and profitability in year -1. Wilcoxon signed rank test is used to test the significance of medians. T-test is used to test the significance of means.

Note: $***p \leq 0.01, **p \leq 0.05, *p \leq 0.1$

Panel A: Industry Median Adjusted Changes

Listing Year=Year 0	Compare Year -1 to 0			Compare Year -1 to 1			Compare Year -1 to 2			Compare Year -1 to 3		
	Median	Mean	N	Median	Mean	N	Median	Mean	N	Median	Mean	N
ADRs												
ROA	-5.876*	-4.956**	23	-7.055**	-7.115**	23	-5.487**	-4.716	23	-0.338	-1.742	17
ROCAA	-2.091	0.132	23	0.355	-5.866	23	-6.868**	-11.051	23	0.37	-9.754	17
Sale Growth	7.592	-32.425	12	7.502	-8.643	12	-32.72	-80.648*	12	21.311	5.033	7
PP&E/Total Assets	-6.223***	-7.203***	23	-4.877***	-5.888***	23	-2.986*	-4.867**	23	-0.036	-2.193	17
Asset Turnover	-5.044***	-9.939***	21	-4.568***	-8.49***	21	-4.687***	-11.399***	21	-2.787**	-11.87***	15
Capital Expenditure/Total Assets	-0.914	-0.073	22	0.264	0.316	22	0.629	0.077	22	1.734	0.501	16
Financial Leverage	-1.631	-4.471	23	0.124	-6.083	23	1.369	-14.983*	23	-4.343	-24.934**	17
Cost of Debt	-0.087	4.347	10	-0.873	-16.434	10	-0.693	-19.333	11	-1.206	-0.678	8
Foreign IPOs												
ROA	-3.805***	-6.42***	140	-8.161***	-0.554	137	-8.182***	9.516	133	-7.727***	-6.518	98
ROCAA	-3.672***	-6.286***	140	-9.392***	-1.377	137	-9.289***	8.44	133	-9.072***	-8.303	98
Sale Growth	12.866*	130.684*	59	5.208	69.861***	58	7.222	270.084	60	8.68	68.261*	35
PP&E/Total Assets	-3.718***	-5.314***	140	-2.207***	-2.084*	139	-0.355	-1.398	135	0.634	-0.827	98
Asset Turnover	-1.072***	-3.506***	124	-0.752***	-10.539*	123	-1.367***	-16.951**	122	-1.31***	-12.78**	86
Capital Expenditure/Total Assets	0.02	-0.15	136	0.608	1.339	133	0.74	-0.256	130	0.011	-0.526	94
Financial Leverage	-6.878***	-9.452***	138	-5.661***	-13.895***	137	-6.541***	-20.302***	134	-2.704	-15.424***	96
Cost of Debt	0.705***	-0.156	107	0.503	-19.349	107	0.715	-23.919*	103	-0.252	-33.397*	72

Panel B: Matched Pair Adjusted Changes

Listing Year=Year 0	Compare Year -1 to 0			Compare Year -1 to 1			Compare Year -1 to 2			Compare Year -1 to 3		
	Median	Mean	N	Median	Mean	N	Median	Mean	N	Median	Mean	N
ADRs												
ROA	-4.496*	-4.448*	22	-7.548**	-7.403**	22	-6.856	9.216	22	-0.665	-4.43	16
ROCAA	-3.882	0.793	22	2.1	-5.861	22	-3.399	2.633	22	-1.03	-12.709	16
Sale Growth	4.543	-15.644	12	-35.892	0.486	12	-76.772*	-91.144*	12	57.871	45.756	7
PP&E/Total Assets	-5.333***	-5.608***	22	-3.442*	-4.861	22	-4.85	-4.108	22	-5.853	-6.45	16
Asset Turnover	-7.318***	-10.306***	21	-2.994**	-7.915**	21	-4.793***	-24.239	21	-3.203**	-9.776**	15
Capital Expenditure/Total Assets	-0.725	2.138	19	0.743	2.931	19	0.522	3.595	19	-1.554	2.697	13
Financial Leverage	-1.817	-5.477	22	-6.531	-4.019	22	-3.749	-1.631	22	-4.524	-32.444	16
Cost of Debt	-1.928	-1.371	10	-0.05	1.176	10	0.73	-5.779	10	-0.932	-1.36	8
Foreign IPOs												
Listing Year=Year 0	Compare Year -1 to 0			Compare Year -1 to 1			Compare Year -1 to 2			Compare Year -1 to 3		
	Median	Mean	N	Median	Mean	N	Median	Mean	N	Median	Mean	N
ROA	-4.421***	-7.62***	122	-9.505***	-11.6***	118	-9.727***	-9.944**	116	-10.61***	-6.006	80
ROCAA	-4.886***	-7.702***	122	-8.925***	-12.655***	118	-10.241***	-11.355***	116	-12.802***	-8.137	80
Sale Growth	20.43	32.115	56	15.881	8.199	54	10.446	22.442	54	8.394	-4.906	27
PP&E/Total Assets	-6.134***	-6.558***	122	-2.849**	-3.88**	120	-2.57**	-3.222	117	-3.957*	-3.657	80
Asset Turnover	0.209	-2.438	118	-0.25	-0.694	114	-1.127*	-5.498	112	-0.928**	-15.197*	75
Capital Expenditure/Total Assets	-0.077	0.21	115	1.518	1.235	111	0.553	-0.173	110	0.161	-1.244	72
Financial Leverage	-10.399***	-16.893**	121	-9.853***	-11.061***	119	-7.952***	-10.129***	116	-3.36	-11.832	78
Cost of Debt	1.051*	4.043	94	0.316	0.911	90	0.078	1.119	86	-0.123	-1.66	55

peer firms. Sales growth is generally positive, but not significantly higher than the industry and peers. This may be due to an industry effect that these IPOs cluster (and motivated) by the rapid growth in a given industry. Foreign IPO issuers experience a significant decrease in tangible assets and financial leverage. On the other hand, there is no significant change in asset turnover, capital expenditure, and cost of debt.

To sum up, Chinese issuers that choose to issue abroad do not seem to fare well in operating performance after the listings. These issuers generally experience lower profitability and a drop in tangible assets ratio and asset turnover. They do not seem to enjoy better sales growth or spend greater amounts in capital expenditure than the industry and peers. Interestingly, these issuers have lower leverage ratios after listing abroad.

B. Post-Issue Stock Price Performance of ADR and Foreign IPO Issuers

In addition to operating performance, we explore the stock returns of ADR and foreign IPO issuers after the listings. Following Ritter (1991), we calculate three types of returns for each issuer: buy and hold return (unadjusted), market index adjusted return, and market model abnormal return. Buy and hold return is measured for a given firm over a given window without adjustments. Market index adjusted return is the unadjusted return minus the return on the corresponding market index. The benchmark index for the various markets is the Heng Seng Index for Hong Kong market, the Straits Times Index for Singapore market, the S&P 500 index for US market, and the FTSE 100 Index for UK market. Market model abnormal return is estimated using the market model and market indices for the various markets (stated above). We report the mean of the three returns for each of the following time

windows after listing: 3-day, 5-day, 10-day, 30-day, 1 year, 2 years, and 3 years. The sample includes 26 ADRs, 8 US IPOs, 71 Hong Kong IPOs, 69 Singapore IPOs, and 2 UK IPOs.

For ADR issuers, their stocks have positive and small returns over the short run (30 days or less), which is not significantly different from zero. In the long run (1 year to 3 years), ADR experience negative returns and significantly under-perform the market based on the market model. For the US IPOs, we find that these stocks have negative buy and hold returns, market index adjusted returns, and market model abnormal returns across all windows. The three returns are significantly negative in the short run (10 days or less) and in the long run (3 years). We find similar results for the Hong Kong and Singapore IPOs, except that the magnitude of negative returns is smaller than that for the US IPO stocks. In other words, similar to the US IPOs, Hong Kong and Singapore IPOs under-perform the market; however, the underperformance is much more severe in the US IPOs. We find generally negative but insignificant stock returns in UK IPOs. The small sample size of the UK IPOs suggests that the result is preliminary and descriptive for this sample.

To sum up, our findings on post-listing stock price performance suggest negative returns over the short and long run for issuers that list abroad. These stocks significantly under-perform the market. The results are consistent with those of Foerster and Karolyi (1999). Using the weekly returns for two years around the listing dates for 183 ordinary and ADR issues, Foerster and Karolyi (1999) document on average a pre-listing run-up of abnormal returns of 10%, a significant return of 1% during the listing week, and a 9% drop after the listing.

Table 16: Post-Listing Stock Returns of the Issuers that List Abroad

The table reports the post-issue stock performance of Chinese issuers that issue ADRs or foreign IPOs. The sample includes 26 ADRs, 8 IPOs in the United States (US), 71 IPOs in Hong Kong, 69 IPOs in Singapore, and 2 IPOs in the United Kingdom (UK). We report three returns: (1) market model abnormal return, (2) market index adjusted return, and (3) buy and hold return. The benchmark market portfolio for calculating the market model abnormal return and the market index adjusted return is the S&P 500 index for the US market, Heng Seng Index for the Hong Kong market, the Straits Times Index for the Singapore market, and the FTSE 100 index for the UK market. We report the three returns in percent, for a period of 3-day, 5-day, 10-day, 30-day, 1 year, 2 years, and 3 years immediately after the listing. T-test is used to test the significance of means.

Note: $***p \leq 0.01, **p \leq 0.05, *p \leq 0.1$

	ADR		
Holding Period	Market Model Abnormal Return (%)	Market Index Adjusted Return (%)	Buy and Hold Return (%)
3 days	1.39	1.16	0.69
5 days	3.00	2.82	2.31
10 days	2.39	2.26	2.47
30 days	3.10	3.07	2.83
1 year	-14.55***	-8.11	-6.12
2 years	-64.3***	-14.15	-3.68
3 years	-121.7**	6.43	22.54

	US IPO			HK IPO			SG IPO			UK IPO		
Holding Period	Market Model Abnormal Return (%)	Market Index Adjusted Return (%)	Buy and Hold Return (%)	Market Model Abnormal Return (%)	Market Index Adjusted Return (%)	Buy and Hold Return (%)	Market Model Abnormal Return (%)	Market Index Adjusted Return (%)	Buy and Hold Return (%)	Market Model Abnormal Return (%)	Market Index Adjusted Return (%)	Buy and Hold Return (%)
3 days	-9.61***	-10.27***	-9.64**	-1.57**	-1.56**	-1.64**	-0.97	-1.41	-1.61*	0.87	0.23	0.15
5 days	-16.77***	-18.67***	-18.31***	-1.08*	-1.31*	-0.77	-3.41**	-4.12***	-4.26***	1.21	-0.16	0.15
10 days	-32.72*	-34.52**	-32.12***	-2.02**	-2.32**	-1.57*	-6.31***	-7.53***	-7.19***	0.43	-2.32	-1.35
30 days	-30.31	-37.37	-36.14	-0.57	-0.35	-0.18	-6.26***	-9.87***	-8.14***	1.46	-5.32	-3.33
1 year	-25.20	-15.36	-21.82	-9.72***	0.24	8.30	-16.15***	-27.62***	-11.28*	-0.60	-35.38	-21.80
2 years	-310.70	-15.26	-31.65	-67.37***	2.13	26.61**	-53.64***	-36.75**	2.48	-14.33	-57.21	-33.18
3 years	-1591.57	-37.04***	-61.37*	-171.87***	3.28	51.63***	-142.14***	-65.45***	-1.83	-23.94	-63.93	-45.00

3.6 Conclusion

This paper examines the decision of Chinese companies to list abroad over the period 1993 to 2005. We study 26 ADRs and 148 foreign IPOs that are issued in Hong Kong, Singapore, U.S., and U.K. markets by Chinese issuers. We include a sample of 468 firms that are listed domestically in China.

We first examine the motives of Chinese issuers to list abroad. Similar to Pagano, Roell, and Zechner (2002), we explore various hypothesis about motives to list abroad or cross-list and examine the predicting factors stemming from the hypotheses. We examine the ADRs and foreign IPOs separately as they are completely different issues. Our results for the ADR sample are generally consistent with the hypotheses about the motives to list abroad. In particular, we find that firms with better profitability and a larger firm size are more likely to list an ADR, which supports the hypothesis that more stringent listing requirements and closer monitoring by regulatory agencies motivate top performers with a larger size to list abroad. Significant demands for external financing suggest that a high growth firm is more likely to cross-list in the ADR market and our finding provides support for this prediction. However, we find that issuers with lower financial leverage are more likely to issue an ADR, which is inconsistent with the prediction of this hypothesis that these issuers might have exhausted their debt capacity. We observe that most of the Chinese firms have low leverage ratios due to limited sources of borrowing. We argue that the limited cross-sectional variation in leverage and/or the uniqueness of low financial leverage (so the issuers still have plenty of debt capacity) support our finding on financial leverage.

We find that high risk firms are more likely to list an ADR, which is consistent with the hypothesis that an expanded shareholder base leads to risk sharing for investors. We find that high tech firms are significantly more likely to issue and ADR, which strongly supports the hypothesis that foreign expertise is what the issuers seek in ADR listings. Finally, we find evidence supporting the listing costs hypothesis that larger firms, which are more likely to bear the listing costs, are more likely to issue an ADR.

The findings of the foreign IPO issuers suggest much weaker results compared to those of the ADR issuers. In particular, we find weak evidence for the prediction that issuers with better profitability and a larger size should issue a foreign IPO. We also find weak support for the prediction that a high growth firm is more likely to list a foreign IPO. We find no evidence that issuers with higher financial leverage are more likely to issue a foreign IPO. Due to the unique feature on leverage for the foreign IPO group (the median leverage is zero), we argue that the motive of an exhausted debt capacity leading to listing abroad is not applicable in this case. We find weak evidence that high-risk firms are more likely to list a foreign IPO. Finally, the results on high tech dummy indicate that foreign expertise may not be what the issuers look for when they issue a foreign IPO.

Examining the foreign IPO sample further, we find that the motives for firms to list a foreign IPO differ by market. We find that the motives for firms to list an IPO in Hong Kong are different from those to list a foreign IPO in Singapore. The issuers of Hong Kong IPOs are generally similar to the ADR issuers: large, low-leverage, profitable, high growth, and high-tech firms. Therefore, the motives for

issuers to list an ADR (on the US exchanges) or a Hong King IPO are somewhat similar. We find similar but much weaker support for the same set of hypothesis about the motives to list abroad for ADR and Hong Kong IPO issuers. On the other hand, issuers of Singapore IPOs are small, high-leverage, of superior profitability, high growth, and non-high-tech. Due to lower listing requirements on size, Singapore exchange appeals to small issuers. We find support for the hypothesis that more stringent listing requirements and monitoring lead to better performing companies to list abroad. We also find strong evidence for the hypothesis that significant demands for external capital motivate higher-levered and high growth firms to list abroad. We find no evidence to support the hypotheses on expanded shareholder base (high risk firms) and listing costs (large firms).

We also examine the post-list operating and financial performance of the firms that list abroad. In terms of operating performance, Chinese issuers that choose to issue abroad do not fare well in operating performance after the listings. These issuers generally experience lower profitability and a drop in tangible assets ratio and asset turnover. They do not seem to enjoy better sales growth or spend greater amounts in capital expenditure than the industry and peers. Interestingly, these issuers have a drop in leverage ratio after listing abroad. As to the financial performance, our findings on post-listing stock price performance suggest negative returns over the short and long run for issuers that list abroad. These stocks significantly underperform the market over the event windows ranging from 3 days to 3 years after issuance.

The significant growth in the listing activity of Chinese companies in various foreign exchanges provides an excellent opportunity for analyzing the motives and post-listing performance of these issuers. We find that ADR and foreign IPO issuers are strongly motivated to list due to the appeal of an advanced legal and regulatory environment of the foreign listing exchanges, the benefits of more stringent listing requirements and regulatory monitoring, significant demands for capital for rapid growth, an expanded shareholder base, and foreign expertise. However, the under performance of these listing firms after issuance sends a mixed message to future issuers. The implication is that issuers should examine closely the benefits and costs based on the issuers' motives and underlying firm factors for listing abroad and the appropriate choice of foreign exchange/market.

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APPENDIX

Write L's expected wealth $\mathbb{E}[W^l]$ as $f(\alpha)$, in the takeover case $\alpha \geq 50\%$, and $g(\alpha)$ for $\alpha < 50\%$, respectively.

Proof of Proposition 1.

The first two parts follow from the first derivative of Equation (3) with respect to α and c, respectively. By realizing $\alpha \in [50\%, 100\%]$, $Z_{max} = 2\mathbb{E}[Z]$ and $\alpha_0 < 50\%$, the result follows. ∎

The optimal holding in the takeover region in Section 3.4.

In the takeover region, L's expected utility is

$$\begin{aligned} f(\alpha) := & \quad \alpha\mathbb{E}[V_1] - (\alpha - \alpha_0)(V_0 + V_0\pi(\alpha)) - cV_0 \\ = & \quad \alpha_0 V_0 + \alpha(\mathbb{E}[V_1] - V_0) - (\alpha - \alpha_0)\pi(\alpha)V_0 - cV_0. \end{aligned}$$

By straightforward calculation, yield

$$\begin{aligned} f'(\alpha) &= V_0\left\{\mathbb{E}[q] + \frac{1}{2}Z_{max} - 1\right\} - \frac{Z_{max}\alpha^2 + 2\alpha_0 Z_{max}\alpha + 2\alpha_0 c - \alpha_0^2 Z_{max}}{(\alpha+\alpha_0)^2}V_1 \\ &= \frac{V_0}{(\alpha+\alpha_0)^2}\left\{(\alpha+\alpha_0)^2(\mathbb{E}[q] - \mathbb{E}[Z] - 1) + 2\alpha_0(\alpha_0 Z_{max} - c)\right\}, \end{aligned}$$

and

$$f''(\alpha) = -\frac{4\alpha_0(Z_{max}\alpha_0 - c)}{(\alpha+\alpha_0)^3}V_0. \tag{A-1}$$

By assumption, $Z_{max}\alpha_0 > c$, the function $f(\alpha)$ is concave with respect to the percentage α.

Case (1). Assume that $\mathbb{E}[q] < \mathbb{E}[Z] + 1$.Then by the first order condition, the maximum point of the function $f(\alpha)$ is

$$\alpha_1^* = \sqrt{\frac{s}{\mathbb{E}[Z] + 1 - \mathbb{E}[q]}} - \alpha_0. \tag{A-2}$$

Since $\alpha^* \in [50\%, 100\%]$, then

$$\alpha^* = \min\{\max\{50\%, \alpha_1^*\}, 100\%\}. \tag{A-3}$$

Case (2). Assume that $\mathbb{E}[q] \geq \mathbb{E}[Z] + 1$. Then $f'(\alpha) > 0$. Hence the optimal $\alpha^* = 100\%$. ∎

Proof of Proposition 2. Recall

$$\alpha_2^* \equiv \frac{(1-\theta)\mathbb{E}[q] - 1}{\gamma}.$$

For simplicity of notation let $B \equiv g(\alpha_2^*)$ and $C \equiv \lim_{\alpha\uparrow 50\%} g(\alpha)$. If $(1-\theta)\mathbb{E}[q] < \frac{1}{2}\gamma + 1$, then α_2^* is strictly smaller than 50%, by the above expression of $g(\alpha)$, L's optimal holding in the monitoring region is α_2^*. Hence, L's maximum expected utility in the

monitoring region is $B \equiv g(\alpha_2^*)$. By simple calculation, we see

$$\begin{aligned} B &= \alpha_2^*(1-\theta)(1-\beta^*)\mathbb{E}[q]V_0 - I(\alpha_2^*) - (\alpha_2^* - \alpha_0)V_0 \\ &= V_0\left\{\frac{1}{2\gamma}[(1-\theta)\mathbb{E}[q]-1]^2 - \frac{1}{\eta}(1-\theta)^2\mathbb{E}[q] + \alpha_0\right\}. \end{aligned}$$

If $(1-\theta)\mathbb{E}[q] \geq \frac{1}{2}\gamma + 1$, the expected utility $g(\alpha)$ is increasing with respect to α in the monitoring region $\{\alpha < 50\%\}$. Consequently, there exists no interior maximum point in the monitoring region and the expected utility is less than but can be close enough to $C \equiv \lim_{\alpha_2^* \uparrow 50\%} g(\alpha_2^*)$. By simple calculation we get

$$C = V_0\left\{-\frac{1}{8}\gamma - \frac{1}{\eta}(1-\theta)^2\mathbb{E}[q] - \frac{(1-\theta)\mathbb{E}[q]}{2} - (\frac{1}{2} - \alpha_0)\right\}.$$

By realizing that L takes over the firm if and only if $A \geq \max(B, C)$. Since

$$\lim_{\eta \to 0} B = \lim_{\eta \to 0} C = -\infty,$$

then $A > \max\{B, C\}$ when η is very small. Hence L will take over the firm.

However, by realizing the firm is a black hole, L's optimal decision would be hold no shares of the firm. ∎

Proof of Proposition 3. By the identical proof of Proposition 2, L takes over the optimal number of shares α_1^* if and only if $A > \max(B, C)$. As a matter of fact, the expression of A, B and C yields the following qualitative version of Proposition 3:

Assume $(1-\theta)\mathbb{E}[q] < \frac{1}{2}\gamma + 1$. Then

(1) If $\gamma \geq \frac{\frac{1}{2}\left\{[(1-\theta)\mathbb{E}[q]-1]^2\right\}}{\frac{A}{V_0} + \left(\frac{1}{\eta}(1-\theta)^2\mathbb{E}[q] - \alpha_0\right)}$, then L takes over with the optimal number of shares α_1^*.

(2) If $\gamma < \frac{\frac{1}{2}\left\{[(1-\theta)\mathbb{E}[q]-1]^2\right\}}{\frac{A}{V_0} + \left(\frac{1}{\eta}(1-\theta)^2\mathbb{E}[q] - \alpha_0\right)}$, then L decides not to take over the firm and acquire shares up to $\alpha_2^* < 50\%$.

Assume $(1-\theta)\mathbb{E}[q] \geq \frac{1}{2}\gamma + 1$. Then

(3) If $\gamma \geq 8\left[\frac{1}{\eta}(1-\theta)^2\mathbb{E}[q] + \frac{(1-\theta)\mathbb{E}[q]}{2} + (\frac{1}{2} - \alpha_0)\right] - \frac{8A}{V_0}$, then L takes over the firm with the optimal number of shares α_1^*.

(4) If $\gamma < 8\left[\frac{1}{\eta}(1-\theta)^2\mathbb{E}[q] + \frac{(1-\theta)\mathbb{E}[q]}{2} + (\frac{1}{2} - \alpha_0)\right] - \frac{8A}{V_0}$, then L decides not to take over. L purchases shares as close to 50% as possible.

∎

Proof of Proposition 4.

By equation (9), $\alpha^* > 50\%$ if and only if $\alpha_1^* > 50\%$, and equivalently,

$$u(\frac{1}{2} + \alpha_0)^2 < 2\alpha_0(\alpha_0 Z_{max} - c).$$

It is equivalent to

$$\alpha_0^2(4\mathbb{E}[Z] - u) - \alpha_0(u + 2c) - \frac{1}{4}u > 0.$$

Since $\mathbb{E}[Z] > \mathbb{E}[q] - 1 \geq 0$ by assumption, then there exists one positive and one negative root of the quadratic equation $(4\mathbb{E}[Z]-u)x^2-(u+2c)x-\frac{1}{4}u = 0$. Therefore, the last inequality holds if and only if the initial α_0 satisfies

$$\alpha_0 > \frac{u + 2c + 2\sqrt{u(c + \mathbb{E}[Z]) + c^2}}{2(4\mathbb{E}[Z] - u)}. \tag{A-4}$$

Note that, the right side of the above inequality is an increasing function of the variable u and takes limit $\frac{c}{Z_{max}}$ when $u \downarrow 0$. Therefore, when u is closes to zero, or when α_0 is large, the above inequality holds. Hence $\alpha_1^* > 50\%$. On the other hand, if u is relatively large, or α_0 is small, we see $\alpha_1^* \leq 50\%$.

By the same argument, we can show that $\alpha_1^* < 1$ if and only if

$$\frac{u + c + 2\sqrt{2u(c + \mathbb{E}[Z]) + c^2}}{4\mathbb{E}[Z] - u} < \alpha_0.$$

∎

Proof of Proposition 5.

Take first partial derivative of Equation 12 with respect to η and γ:

$$\begin{aligned}
\frac{\partial \mathbb{E}\left[W_T^L - W_{NT}^L\right]}{\partial \eta} &= \mathbb{E}\left[W_T^L - \alpha(1-\theta)(1-\beta)V_1 + I(\alpha) + (\alpha - \alpha_0)V_0\right] \\
&= \frac{\partial\left\{-\alpha_2^*(1-\theta)(1-\beta^*)\mathbb{E}[q]\,V_0\right\}}{\partial \eta} \\
&= \alpha_2^*(1-\theta)\mathbb{E}[q]\,V_0\frac{\partial \beta^*}{\partial \eta} \leq 0
\end{aligned}$$

$$\begin{aligned}
\frac{\partial \mathbb{E}\left[W_T^L - W_{NT}^L\right]}{\partial \gamma} &= \mathbb{E}\left[W_T^L - \alpha_2^*(1-\theta)(1-\beta)V_1 + I(\alpha_2^*) + (\alpha_2^* - \alpha_0)V_0\right] \\
&= -\frac{\partial\left\{\mathbb{E}\left[(1-\theta)\alpha_2^* V_1 - \frac{(1-\theta)^2}{\eta}V_1 - I(\alpha_2^*) - (\alpha_2^* - \alpha_0)V_0\right]\right\}}{\partial \gamma} \\
&= -\frac{\partial\left\{\mathbb{E}\left[(1-\theta)\alpha_2^* V_1 - \frac{(1-\theta)^2}{\eta}V_1 - I(\alpha_2^*) - (\alpha_2^* - \alpha_0)V_0\right]\right\}}{\partial \alpha_2^*}\frac{\partial \alpha_2^*}{\partial \gamma} \\
&= -\left[(1-\theta)\mathbb{E}[q]V_0 - \frac{1}{2}\left[(1-\theta)\mathbb{E}[q] - 1\right]V_0 - V_0\right]\frac{1-(1-\theta)\mathbb{E}[q]}{\gamma^2} \\
&= \frac{\left[(1-\theta)\mathbb{E}[q] - 1\right]^2}{2\gamma^2} \geq 0
\end{aligned}$$

∎

Proof of Proposition 10

For $\alpha^* = k$, where $k = 0.5$ or 1 :

$$\begin{aligned}
\pi &= \frac{\alpha Z_{max} + c}{\alpha + \alpha_0} \\
&= \frac{k Z_{max} + c}{k + \alpha_0}
\end{aligned}$$

So, π is increasing with $Z_{\max} = 2\mathbb{E}[Z]$ but decreasing with α_0.

In large takeover gain region from L's initial holding region, if $\alpha^* = \sqrt{\frac{2\alpha_0(\alpha_0 Z_{max} - c)}{\mathbb{E}[Z]+1-\mathbb{E}[q]}} - \alpha_0$:

$$\begin{aligned}
\pi &= \frac{\alpha Z_{max} + c}{\alpha + \alpha_0} \\
&= \frac{\left(\sqrt{\frac{2\alpha_0(\alpha_0 Z_{max} - c)}{\mathbb{E}[Z]+1-\mathbb{E}[q]}} - \alpha_0\right) Z_{max} + c}{\sqrt{\frac{2\alpha_0(\alpha_0 Z_{max} - c)}{\mathbb{E}[Z]+1-\mathbb{E}[q]}}} \\
&= Z_{max} - \frac{\alpha_0 Z_{max} - c}{\sqrt{\frac{2\alpha_0(\alpha_0 Z_{max} - c)}{0.5 Z_{max}+1-q}}} \\
&= Z_{max} - \sqrt{\frac{(\alpha_0 Z_{max} - c)(0.5 Z_{max} + 1 - q)}{2\alpha_0}}
\end{aligned}$$

$$\begin{aligned}
\frac{\partial \pi}{\partial \alpha_0} &= \frac{\partial\left(Z_{max} - \sqrt{\frac{(\alpha_0 Z_{max} - c)(0.5 Z_{max}+1-q)}{2\alpha_0}}\right)}{\partial \alpha_0} \\
&= \frac{-\sqrt{2}c\left(0.5 Z_{amx} - q + 1\right)}{2\alpha_0^2\sqrt{\frac{1}{\alpha_0}\left(\alpha_0 Z_{amx} - c\right)\left(0.5 Z_{amx} - q + 1\right)}} < 0
\end{aligned}$$

So, π is decreasing with α_0. ∎

In what follows we present two further results, as promised in the text. The first result show how other factors affect L's decision. The second one characterizes L's takeover decision when the initial takeover gain is small, as a counterpart of Proposition 3.

Proposition 0.1 *1. L takes over the firm in a weak control environment where η is small.*

2. When $\mathbb{E}[Z]$ is large and the takeover transaction cost c is bounded, then L never takes over the firm if her initial holding $\alpha_0 \leq \frac{1}{6}$.

3. L takes over the firm if her initial holding $\alpha_0 > \frac{1}{6}$.

4. L never takes over the firm when the takeover transaction cost c is large and $\alpha_0 \leq \frac{1}{4}$.

Proof: Since

$$\lim_{u\to\infty} \frac{u + 2c + 2\sqrt{u(c + \mathbb{E}[Z]) + c^2}}{2(4\mathbb{E}[Z] - u)} = 50\%, \tag{A-5}$$

then by the proof in Proposition 4, L's optimal holding in the takeover region is $\alpha^* = 50\%$. In this case, it is easy to see that

$$\lim_{u\to\infty} A = \begin{cases} -\infty, & \text{if } \alpha_0 < \frac{1}{6}; \\ \infty, & \text{if } \alpha_0 > \frac{1}{6} \end{cases} \tag{A-6}$$

Assume $\alpha_0 < \frac{1}{6}$. Hence $A < B$ and $A < C$ if the expected increment is very large. Then L doesn't take over the firm. By the same derivation, L takes over the firm by the same reason when $\alpha_0 > \frac{1}{6}$.

When the cost structure c is very large, by assumption $\alpha_0\mathbb{E}[Z] > \frac{c}{2}$, the expected increment $\mathbb{E}[Z]$ must be large too. Hence

$$\lim_{c\to\infty, \alpha_0\mathbb{E}[Z] > \frac{c}{2}} \frac{u + 2c + 2\sqrt{u(c + \mathbb{E}[Z]) + c^2}}{2(4\mathbb{E}[Z] - u)} \geq 50\%, \tag{A-7}$$

then by the proof in Proposition 4 again, the optimal holding in the takeover region is $\alpha^* = 50\%$. Therefore, the maximum expected in the takeover region is

$$\begin{aligned} A &= \alpha_0 + \frac{\mathbb{E}[q] - 1}{2} - \frac{1 - 2\alpha_0}{1 + 2\alpha_0}\left\{c + \frac{1 - 6\alpha_0}{2(1 - 2\alpha_0)}\mathbb{E}[Z]\right\} \\ &\leq \alpha_0 + \frac{\mathbb{E}[q] - 1}{2} - \frac{c}{4\alpha_0(1 + 2\alpha_0)}[-8\alpha_0^2 - 2\alpha_0 + 1] \end{aligned}$$

Hence for any $\alpha_0 < \frac{1}{4}$, since $8\alpha_0^2 + 2\alpha_0 - 1 < 0$, we have

$$\lim_{c\to\infty} A = -\infty.$$

Hence L doesn't take over the firm. ∎

Proposition 0.2 *Assume $\alpha_0 Z_{max} < c$. For a reasonable cost structure c, L takes over the firm by purchasing 50% of the firm's shares. For any cost structure c, L either chooses $\alpha^* = 0.5$ or $\alpha^* = 1$. Moreover, $\alpha^* = 1$ if and only if, the expected improvement is smaller than the expected return before taking over, $\alpha_1^* > 0.5$, and c is small enough such that*

$$c < \frac{(1+\alpha_0)(1+2\alpha_0)}{4\alpha_0}\{\mathbb{E}[V_1] - V_0\} - \frac{1+3\alpha_0-2\alpha_0^2}{4\alpha_0}Z_{max}.$$

Proof:

When $\alpha_0 Z_{max} < c$, by formula (A-1), the expected utility $f(\alpha)$ is a convex function of the percentage in the takeover situation. Hence, in the general cost structure of c, $f(\alpha)$ never takes the interior optimal over the available region $[50\%, 100\%]$. We then show that $\alpha^* = 50\%$ for a reasonable cost structure of c.

First, assume that $\mathbb{E}[q] - 1 \leq \mathbb{E}[Z]$. Then the expected utility $f(\alpha)$ is decreasing with respect to the percentage. Hence $\alpha^* = 50\%$.

Second, assume that $\mathbb{E}[q] - 1 > \mathbb{E}[Z]$. Then $\alpha^* = 50\%$ if either $\alpha_1^* \leq 50\%$, or $\alpha_1 > 50\%, f(50\%) \geq f(100\%)$. On one hand, by the proof of Proposition 4, $\alpha_1^* \leq 50\%$ if and only if

$$c \geq \alpha_0 \frac{\mathbb{E}[Z]}{2} - \frac{(2\alpha_0+1)^2}{8\alpha_0}u.$$

On the other hand, $f(50\%) \geq f(100\%)$ if and only if the following inequality holds:

$$\frac{2(1-\alpha_0)(Z_{max}+c)}{1+\alpha_0} - \frac{(1-2\alpha_0)(Z_{max}+2c)}{1+2\alpha_0} \geq \mathbb{E}[q+Z] - 1,$$

or equivalently,

$$c < 2\alpha_0\mathbb{E}[Z] - \frac{(1+\alpha_0)(1+2\alpha_0)}{4\alpha_0}u. \tag{A-8}$$

Hence, for a reasonable cost structure c, the optimal holding in the takeover region is always 50%. The proof is completed. ∎