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Large Owner Expropriation Threat and Stock Option Pay's Effect on Firm Risk-Taking Behaviors in Weak Institutions

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ABSTRACT

Research Question/Issue: This study investigates the impact of managerial stock option pay on firm risk-taking behaviors in a weak institutional context, a critical question that has been overlooked by the literature. Specifically, we build on the comparative corporate governance perspective that emphasizes the implications of large shareholders' expropriation threat in weak institutions to develop predictions about their impact on the stock option's incentive alignment effect. We further explore the boundary conditions of such a relationship.

Research Findings/Insights: Based on a sample of Chinese listed firms between 2006 and 2016, we find that a high level of large shareholders' expropriation threat weakens the effect of stock option value on firm risk-taking. We also find that such an adverse impact of large shareholders on the effect of stock option value is mitigated by the institutional factors that strengthen the protection of the interests of minority shareholders.

Theoretical Implications: Our results underscore the importance of integrating the potential expropriation risk due to large shareholders and the institutional contexts into understanding the effectiveness of incentive-alignment governance practices such as stock option pay in the context with weak institutions (e.g., China).

Practitioner/Policy Implications: Our findings offer insights for policy makers to better design the regulatory and institutional frameworks to increase the effectiveness of corporate governance practices. It also shows that firms in the context of weak institutions need to be more cognizant when adopting certain corporate governance practices (i.e., stock option pay for the incentive-alignment purpose).

1 | Introduction

Diverging interests between a firm's shareholders and managers represent a central tension in corporate governance literature (Jensen and Meckling 1976). Shareholders in general are risk neutral because they can balance their investment portfolios, but agents are risk averse because of the wealth effects of employment (Jensen 1998). Thus, to align the interests between shareholders and managers, firms often adopt stock option pay that grants managers the right to purchase firm stocks in the future at a predetermined price within an agreed period. As part of incentive contracts, such stock option pay incentivizes managers to take more risks and exert efforts in strategic activities to increase firm performance that benefits both shareholders and managers. Consistent with the incentive alignment logic, many studies have found a positive impact of stock option pay on managerial risk-taking and firm performance (see Devers et al. 2007; for a review, see Hanlon et al. 2003; Hou et al. 2020; Misangyi and Acharya 2014; Sanders and Hambrick 2007). However, most of the research is conducted in advanced economies with well-developed institutions such as the United States, where the corporate governance system is characterized by dispersed ownership and strong shareholder rights protection (DesJardine and Shi 2021; see van Essen et al. 2012 for a review). The manner and reasons behind how managers in weaker institutional contexts might react to such stock option pay remain relatively underexplored.

The insights from comparative corporate governance studies (e.g., Aguilera and Jackson 2010; Surroca et al. 2020) suggest that scholars need to consider how specific institutional contexts affect the provision of certain governance practices and their effectiveness in preventing managers from engaging in non-value maximizing activities (e.g., Berrone et al. 2010; Hou et al. 2017; Surroca et al. 2020). However, what has been less understood is how the effectiveness of such governance practices (e.g., stock option pay) could be affected by the governance structure in a weak institutional context that is characterized by concentrated ownership with a few large blockholders whose interests may be different from the dispersed minority shareholders. In the absence of robust checks and balances due to the weak protection of shareholder rights (particularly of minority shareholders) (Aguilera and Jackson 2010; La Porta et al. 1998; Shleifer and Vishny 1997), large shareholders might engage in self-serving activities that expropriate the benefit of minority shareholders. Such expropriation threats are particularly pronounced for the implications of governance practices such as stock option pay. We argue that the well-documented alignment effect between shareholders and managers through stock option pay in developed economies could be affected by the potential expropriation threat of large shareholders in weak institutions because their interests can diverge from those of managers and minority shareholders. Yet, the empirical investigation of this topic remains scarce.

To address this issue, this study examines to what extent the effect of stock option pay on managerial risk-taking depends on the presence of large shareholders in a transitional economy context—China. The introduction of stock option pay in 2005 was part of an ongoing reform in the Chinese stock market (Fang et al. 2015) and many Chinese firms have adopted this practice. However, both anecdotal evidence and large-sample studies have shown that the performance effects of stock option pay did not yield anticipated results (Chen et al. 2013; Chong et al. 2015; Feng and Yang 2018; Liu 2017; Liu and Liu 2015; Zong et al. 2013). We argue that the expropriation threat by large shareholders can change managers' perception regarding potential wealth gains from their stock option pay, providing a crucial boundary condition for the relationship between stock option pay and managerial risk-taking. As noted, in corporate governance literature based on studies of developed countries, stock option pay is designed to encourage managers to take more risks and increase firm performance by aligning the interests of shareholders and managers. However, in China, large shareholders, such as the state, the family, or privately owned business groups,[1] may pursue self-serving transactions like tunneling valuable assets out of the firm, to the detriment of the interests of other shareholders and stakeholders (e.g., managers) of the firm (Qian et al. 2017). As a result, the impact of stock option pay may differ significantly from those in developed economies. For example, stock option pay may be used by large shareholders as a symbolic mechanism to signal their alignment with the firm's long-term interests, rather than as an instrument to truly motivate managerial efforts.[2] Evidence has shown that around 20% of managers in Chinese listed firms did not even exercise their vested stock options, despite achieving performance targets (e.g., net profits or return on assets) (Liu and Liu 2015). For those who did exercise their stock options, the returns were deemed low (due to low stock price) (Liu and Liu 2015). To the extent that managerial risk-taking efforts are not fully reflected in the subsequent stock price appreciation, managers are less able to appropriate the returns from such efforts. As a result, they are inclined to avoid such risks that might threaten their secured compensation or career prospects (Devers et al. 2007; Wiseman and Gomez-Mejia 1998) and engage in less risky corporate investments. Thus, the impact of stock option pay on managerial risk-taking will be weakened with the presence of large shareholders.

We further argue that such a dampening effect of large shareholders' expropriation threat on the effectiveness of the stock options can be mitigated if other governance mechanisms or institutional factors can offer better protection for the interests of minority shareholders. Specifically, the levels of institutional ownership and regional market development provide institutional constraints on the power of large shareholders, which subsequently mitigate the dampening effect of large shareholders' expropriation on the relationship between stock option pay and managerial risk-taking. We test these predictions using a sample of publicly listed Chinese firms during the 2006–2016 period. Employing multiple estimation methods that account for potential endogeneity concerns (e.g., Heckman two-stage modeling, firm fixed-effect modeling, and propensity score matching [PSM]), we find results largely consistent with our predictions.

Our study makes two inter-related contributions. First, our empirical results show that the threat of large shareholders' expropriation dampens the risk-taking effect of the stock options in the Chinese context with weak institutions. Our study, therefore, extends the literature on stock options by introducing a new boundary condition for the effectiveness of this corporate governance practice. Second, our work contributes to comparative corporate governance research by offering insights for firms in weak institutional contexts regarding the implications of different governance practice configurations. Comparative corporate governance studies suggest that scholars need to consider how the relationship between governance practices and managerial behaviors is shaped by institutional context (e.g., Aguilera and Jackson 2010; Berrone et al. 2010; Hou et al. 2017; Surroca et al. 2020). As institutions shape how managerial and shareholders' interests are constructed (Aguilera and Jackson 2003, 2010; Cardinale 2018), our study provides one example showing that managerial behaviors are strongly affected by unconstrained powerful shareholders in weak institutional environments.

2 | Theory and Hypotheses

2.1 | The Conventional View of Stock Options

Stock option pay is one type of pay-for-performance compensation scheme designed to link managers' personal wealth with shareholder value (Tosi et al. 1997). It helps to align managerial interests with those of shareholders to address the principal-agent conflict. Option holders (managers) have the choice of buying shares in the future at a predetermined price (i.e., exercise price). Thus, by devoting greater effort to improving the firm's performance, they can hope to capture gains from an increased stock price (Baker et al. 1988; Barkema and Gomez-Mejia 1998; Nyberg et al. 2010). Because no rational managers will exercise the option if the stock price is below the exercise price, they enjoy upside gains with limited or no downside risks (Sanders 2001). Therefore, the stock option motivates managers to take more risks (Sanders 2001; Sanders and Hambrick 2007). Empirical studies have found evidence supporting this incentive alignment logic (Core and Larcker 2002; Hanlon et al. 2003; He and Wang 2009; Hogan and Lewis 2005; Morgan and Poulsen 2001).

Many studies, however, have questioned the universal effectiveness of stock options. The stock option may have an unintended effect of leading managers to behave opportunistically (e.g., Baranchuk et al. 2014; Laux 2012; Souder and Bromiley 2012; Quigley et al. 2020). For instance, several studies have documented a positive association between stock options and firms' propensity to engage in earnings management or financial misreporting such that managers can appropriate short-term benefits by exercising their stock options (Burns and Kedia 2006; O'Connor et al. 2006).

Relatedly, according to the behavioral agency perspective (e.g., DesJardine and Shi 2021; Devers et al. 2007; Martin et al. 2016; Pepper and Gore 2015), top managers are more loss averse than risk averse, and their perception of potential gains or losses of personal wealth associated with stock options subsequently affects their risk preferences and behaviors. Managers who perceive opportunities for gains will devote greater effort to realizing the upside potential of their stock options by creating higher shareholder value. In contrast, when managers perceive potential losses to their current wealth from stock options, they tend to engage in self-serving behavior and avoid risk-taking. This model depicts the impact of stock options as dependent on managers' ability to manage the risk inherent in their compensation packages (Martin et al. 2013). When managers are vulnerable to personal losses such as income, reputation, or employment, they tend to focus more on preserving current wealth, thereby weakening the motivational effect of stock options on risk-taking. When managers have higher control and can hedge against such risks—for example, if their base pay is insulated from the uncertainty in future firm performance—the motivational effect of stock options on risk-taking is strengthened (Wiseman and Gomez-Mejia 1998).

Despite these insights, previous studies have not examined how ownership structure may direct a manager's attention to gains or losses associated with stock options and therefore influence the effectiveness of the stock options. In fact, as noted, most studies that find stock option pay effective are based on samples in advanced economies with strong institutions (e.g., Anglo-Saxon countries). In those economies, the main conflict in corporate governance is between shareholders and managers, and stock options can help mitigate such conflicts in interests.

However, in many non-Anglo-Saxon countries, the agency problem is caused by the presence of large blockholders (La Porta et al. 1998; Shleifer and Vishny 1997). Ownership structure is embedded in the institutional context, which provides norms and rules regarding governance practices (Aguilera and Jackson 2003, 2010; Guillen and Capron 2016). Research in comparative corporate governance has found that divergent interests held by different shareholder groups influence a firm's strategies and performance (David et al. 2010), as well as how governance practices such as stock option pay can be adopted (Geng et al. 2016; Sanders and Tuschke 2007). For example, Sanders and Tuschke (2007) have found that the diffusion of stock option pay among large German firms was a result of regulatory legitimization and institutional isomorphism. Geng et al. (2016) found that the adoption of stock option pay in Japanese firms was affected by the owners who carry different institutional logics. Similarly, Chen et al. (2013) found that state-controlled Red Chip firms (Chinese firms incorporated outside China and listed in Hong Kong) granted directors stock option pay because of the institutional environment where foreign investors were powerful in these firms. Powerful large shareholders may adopt stock option pay to signal their efforts to improve corporate governance and to mitigate potential conflicts with minority shareholders (Chen et al. 2013). Despite offering valuable insights, this line of research primarily examines how institutions influence the adoption and diffusion of stock option pay, while giving little attention to its outcomes. In this study we propose that the institutional characteristics of transitional economies, which tend to facilitate large shareholder expropriation, also influence the effectiveness of stock option pay.

2.2 | Stock Option Pay During Corporate Governance Reforms in China

As part of a general capital market reform aimed at increasing the share liquidity held by controlling shareholders, on December 31 of 2005, China's Securities Regulatory Commission (CSRC) issued guidelines entitled "Regulation of Equity Incentive Plans (trial)," which, for the first time allowed publicly listed firms to provide executives and employees with equity incentives through stock option plans. Subsequently, firms began adopting these plans, which were designed to provide top managers with incentives to improve their firms' long-term competitiveness (Fang et al. 2015). Shareholders grant managers stock options to motivate them to create more value and improve financial performance by tying a portion of their income to firm financial outcomes. Top managers in China were underpaid compared with those in developed countries (Chen et al. 2013; Feng and Johansson 2018). For example, Conyon and He (2011) found that U.S. executive pay (salary and bonus) was about 17 times higher than that of comparable Chinese executives during the period of 2001–2005. Thus, the new regulation was passed because a stock option plan was supposed to allow managers to capture additional future wealth gains and motivate them to engage in behaviors aligned with maximizing shareholders' interests. Accordingly, one would expect a positive relationship between stock option value and managerial risk-taking behavior in China. However, given the weak institutional environment in China, we argue that the presence of larger shareholders and their potential expropriation threat will dampen the positive effect of stock option pay on firm risk-taking behavior.

2.3 | Threat of Large Shareholders' Expropriation

We argue that the possible expropriation of minority shareholders by large shareholders might create a situation where managers, despite their efforts to create firm value, might not be able to benefit from stock option pay (e.g., Liu and Liu 2015; Qian et al. 2017). Over 80% of listed companies in China had at least one large shareholder with more than 20% shareholdings in 2018 (Jiang and Kim 2020). Expropriation by large shareholders has been widely documented in economies where the legal system that protects investors from mistreatment is often weak (Doidge 2004; Dyck and Zingales 2004; Li and Qian 2013; Young et al. 2008). Large shareholders can inappropriately extract private benefits from channels such as tunneling or self-serving related party transactions (RPTs) (Johnson et al. 2000; Jiang et al. 2015; Shleifer and Vishny 1997; Young et al. 2008). They may use inter-corporate loans to transfer wealth for their private benefits and thus increase the probability that a firm will suffer financial distress in subsequent years (Jiang et al. 2010). Even after continuous efforts by Chinese security regulatory bodies, RPTs remain the most common channel for expropriation (Jiang and Kim 2020). RPTs include asset sales, equity transfers, payments, loan guarantees, and trademark right transfers, which are difficult to identify and verify. In China, scandals regarding large shareholders' expropriation are frequently reported in the media. A typical example is tunneling transactions by controlling shareholders to transfer wealth from a publicly listed firm to their own private entities (Jiang et al. 2010), such as the case of New Wave Energy (Stock code: 600777).[3]

Large shareholders may have various reasons to adopt stock option pay for managers. First, they could symbolically adopt stock option pay without implementing it. Given widespread criticism of large shareholder expropriation, it is in the interest of these large shareholders to issue stock option pay for managers, even symbolically, to appease minority shareholders because stock option pay is perceived to align the interest of managers with the interest of all shareholders. The pressure may also come from large shareholders who do not have controlling power. For example, Chen et al. (2013) found that large foreign investors in Hong Kong pressure the state-controlled firms to adopt executive stock option pay. This is the phenomenon found in other countries as well (Geng et al. 2016; Sanders and Tuschke 2007). Second, large shareholders may adopt stock option pay for its instrumental benefits. Large controlling shareholders still need to attract managerial talent capable of engaging in risk-taking activities, such as R&D investments, that require professional judgment. Meanwhile, substantial information asymmetry exists between large shareholders and managers, and incentive pay such as stock options can serve as an effective mechanism to regulate managerial behavior (He and Wang 2009).

Regardless of the reasons that large shareholders adopt stock option pay, we argue that the managerial risk-taking tendency derived from stock option pay will decrease as the possibility of expropriation by large shareholders increases for the following reasons. First, the realization of such compensation carries additional uncertainty because the stock option can be canceled. For instance, about 23% of stock option plans were canceled between 2006 and 2014 (Zhao and Wang 2016). The cancellation is more likely if the stock option plans are symbolically adopted by large shareholders to appease minority shareholders without substantive intention to exercise these plans. In addition, the stock option could be canceled at different stages of the plan (from waiting period to vesting period). Unfortunately, China's "Corporate Accounting Standards Interpretation" No. 3 and No. 11 for stock option plans did not provide direct stipulation regarding the accounting treatment of the cancellation of stock option plans. The guidance is simply that companies should make the best estimate of the expenses and adjust accordingly. As a result, upon cancellation, a firm manipulates the expenses in different ways. This appears to provide room for large shareholders to manipulate the adoption and exercise of stock option plans to their private benefits. For instance, the firm can take the reversal recorded before the cancellation, which can result in a significant expense reduction in the current period. Alternatively, a firm can manipulate the cancellation to reduce the profit for the current year. An illustrating example is Shenzhen World Union Properties Consultancy Co. Ltd (002285.SZ) that had granted stock options for the management team on February 21 of 2011, and the vesting period would start 1 year later for the stock options to be exercised over the next 4 years up to 2015. However, the plan was canceled in December 2011 (i.e., before the vesting period). The company could have taken the reversal of the expenses, thereby reducing the total expenses reported for that period. Instead, it opted for an accelerated exercise, resulting in an expense that accounted for about 24% of the profit in 2011. Because the stock option exercise criteria can be manipulated for the private interest of large shareholders, managers may regard such incentive pay as an empty promise.

Second, even if the stock option pay is for instrumental rather than symbolic purposes, its interest alignment effect may diminish when there is a threat of large shareholder expropriation. We suggest that prospective wealth gains associated with stock option pay are desirable for managers only if their risk-taking efforts to improve firm performance increase the value of the stock options. However, with the presence of large shareholders, managerial risky rent-generating efforts (e.g., investment in R&D) may not be positively reflected in the stock price (Qian et al. 2017). The fundamental reason is that large shareholders have different ways to engage in self-serving behavior that may hurt the stock price and firm performance (Jiang et al. 2010; Jiang and Kim 2020). For instance, cash-flow tunneling by large shareholders has a significant negative impact on firms' accounting-based performance (Atanasov et al. 2010; Jiang et al. 2010). Large shareholders may manipulate information disclosure to hide their self-serving deals, making the stock price less reflective of firms' true value (Jiang and Kim 2020). If the large shareholder expropriation makes the stock price less reflective of managerial effort, managers might expect lower returns from their stock option compensation. As a result, managers are not sufficiently motivated to take higher risks. In a sample of listed firms between 2006 and 2013, Liu and Liu (2015) found that more than 99% of the stock option plans used accounting-based financial performance targets (e.g., net profits or ROA) as the vesting condition, yet one-fifth of managers who were granted stock option compensation did not exercise their vested stock options because the stock price was below the exercise price despite fulfilling accounting-based financial performance targets. For those exercised stock options, the returns from the stock options were deemed low (due to the low stock price) relative to the risk-taking efforts of many managers (Liu and Liu 2015). As a result, managers are not likely to fully realize gains from their increased efforts and thus have reduced incentives to take on risky projects.

In conclusion, we argue that ambiguous security laws and accounting treatment guidance on this matter create sufficient leeway that allows large shareholders' potential expropriation. Accordingly, managers awarded stock options may view themselves as competent, yet they are exposed to greater risk and uncertainty and potentially lower expected returns, therefore experiencing the feeling of heightened potential losses to their personal wealth. When taking risks may not lead to a future increase in wealth (e.g., non-increase in stock price or manipulated cancellation of the stock option plan due to large owners' expropriation), managers would therefore avoid taking risks that could jeopardize their non-equity-based compensation, reputation, or career. As a Chinese proverb says, "the more you do, the more mistakes you could make." Therefore, in a context where the possibility of large shareholders' expropriation is high, managers face heightened uncertainty in realizing gains from their higher-value stock options, making them feel less motivated to take additional risks (i.e., investing less in risky projects such as R&D activity and fixed assets acquisition).

H1. *Large shareholder expropriation threat negatively moderates the relationship between stock option value and corporate risk-taking such that this relationship is more positive when the likelihood of large shareholder expropriation is lower.*

2.4 | Institutional Constraints on Large Shareholders' Expropriation Threat

Going a step further, if previous arguments that large shareholders' expropriation threat decreases risk-taking for managers with high stock option value are correct, then we would expect that institutional factors that constrain large shareholders' power would serve as contingencies for the relationships stated in H1. We specifically identify two such factors that provide a counterbalance to the power of large shareholders: institutional ownership within a firm and the development of market institutions in the regions where a firm is headquartered.

2.4.1 | Institutional Investors

Institutional investors play an important role in affecting the quality of corporate governance, serving as a form of checks and balances to the large shareholders, especially in environments with weak institutions (Rong et al. 2017; Useem 1996; Yuan et al. 2008). In China, institutional investors usually include mutual funds, banks, insurance companies, and security companies. Scholars have documented a steady increase in market power exerted by institutional investors in China, which mitigates the threat of financial fraud and insider expropriation behavior (Wu et al. 2016). For instance, in our study context, the average (or highest) ownership level of mutual funds has reached 7% (or 42%) of a firm's outstanding shareholdings by the end of 2016, which allows them to voice their "concerns" and perform the monitoring duty according to prior scholarly work (Firth et al. 2016).

We argue that although institutional investors' ownership levels generally tend to be much smaller compared with the large, controlling shareholders in China (Firth et al. 2016), their existence will help mitigate the negative influence of large shareholders' expropriation threat on the relationship between managerial stock option value and risk-taking behaviors for the following reasons. First, institutional ownership may increase a firm's transparency, leading to more monitoring of large shareholders. It has been found that analysts and firm managers tend to cater to institutional investors by increasing their information production (Boone and White 2015). With increased information disclosure, it is difficult for large shareholders to expropriate corporate rents for private benefits as the risk of being exposed is high.

Second, different from minority shareholders, institutional investors have the opportunity, motivation, and resources to monitor and discipline firm behavior (Monks and Minow 1995; Useem 1996). For example, they often attend investor meetings (Schmidt and Fahlenbrach 2017) and visit corporate sites (Jiang and Yuan 2018). Compared with small, dispersed investors, they are also more long-term oriented, and trade much less frequently in the stock exchange market (Wang et al. 2021). As a result, institutional investors' ownership provides some assurance for managers to protect their interests against the expropriation threat of large shareholders. Thanks to effective monitoring of institutional investors, the design and implementation of stock option pay will be heavily scrutinized, making large shareholders less likely to expropriate managers' interests through stock option pay. In conclusion, when there is a high level of institutional ownership, the impact of large shareholders' expropriation threat is lower, so managers with higher-value stock options may have more incentive to take risks.

H2. *The level of institutional ownership moderates the negative interactive effect between stock option value and large shareholders' expropriation threat on corporate risk-taking such that the negative interaction is weaker when the level of institutional ownership is higher.*

2.5 | Level of Regional Market Development

One of the critical conditions for the expropriation threat of large shareholders is the weak institutions that do not provide enough protection of minority shareholders' interests. A meta-analysis of the relationship between ownership concentration and performance in multiple countries provides evidence of minority shareholders being expropriated in countries where the legal protection is weak (Heugens et al. 2009). Thus, institutional development will provide a key constraint to the expropriation behavior of large shareholders.

China provides a context with substantial within-country variation in the development of market and legal institutions.

Chinese firms in different geographic regions (e.g., provinces) face dramatically different institutional environments in terms of local governmental, regulatory, legal, and institutional support for the competitive markets (Fan et al. 2011). We argue that the impact of large shareholders' expropriation threat on the relationship between stock option value and risk-taking varies with the development of market and legal institutions in the locations where firms are headquartered. In regions with more developed institutions, there will be better legal enforcement that ensures greater property rights protection and better contract enforcement, leading to higher protection for minority shareholders, weakening the rent expropriation threats of the large shareholders. As a result, in contexts with more advanced institutions such as functional market intermediaries and legal institutions, it becomes more difficult for large shareholders to expropriate rents, mitigating managers' concerns about their prospective wealth gains associated with stock options. In such contexts, stock option incentives are more likely to fulfill their behavioral alignment purpose.

On the contrary, large shareholder expropriation could be a prominent problem in regions with weaker and less developed institutions. For example, Qian et al. (2017) found that in firms located in regions with weaker institutions that provide insufficient protection of minority shareholders' rights, large shareholder expropriation is more likely to occur, and as a result, the investments in the knowledge-based assets are less likely to be reflected in the stock price of the firm. Examining the intellectual property protection (IPR) using patent data, Huang et al. (2017) found that different regions in China have different strengths in IPR protecting institutions. Using some concrete patent infringement examples, they showed that in regions with weak institutions, firms may use norm-based informal approaches (e.g., personal connections to government and negotiation) to solve the conflict instead of using judicial enforcement through a lawsuit which is insufficient to solve the problem under weak institutions. Following this logic, we suggest that firms located in regions with weak institutions might be more likely to be exposed to expropriation by large shareholders who may be more connected, resourceful, and powerful in pursuing their private interest at the expense of minority shareholders. Thus, the incentives of stock options will be less likely to achieve their behavioral alignment purpose.

H3. *The level of market development of the firm's location moderates the negative interactive effect between stock option value and large shareholders' expropriation threat on corporate risk-taking such that the negative interaction is weaker when the level of market development is higher.*

3 | Method

3.1 | Research Context and Sample

These hypotheses were tested using data from a sample of publicly listed Chinese firms. The data were collected from the China Stock Market and Accounting Research (CSMAR) database, which is the primary source of information for publicly listed Chinese firms (e.g., Li and Qian 2013). Since December 31 of 2005, publicly listed firms in China were allowed to provide executives with equity incentives through stock option plans.[4] To adopt a stock option plan, the firm's compensation committee initiates the process by formulating a proposal for board approval. At the same time, the proposed plan is submitted to the CSRC for endorsement, after which it undergoes review and approval during a shareholders' meeting. The final stage is the firm's completion of the option plan's registration at the China Securities Depository and Clearing Corporation (CSDC), along with the deposition of the stock under the same plan at the CSDC (Fang et al. 2015). The guidelines on stock option design and implementation follow internationally recognized accounting standards (e.g., FASB in the United States).

In total, 394 firms were identified as having adopted 469 stock option plans during the period 2006–2016. On average, these stock options constituted approximately 3% of a firm's outstanding equity shares and had an average validity period of 5 years. For comparison, Murphy (1999) found that stock option plans had an average validity period of 10 years within US firms, whereas Kato et al. (2005) showed that option plans in Japanese firms featured an average validity period of five years. Additionally, the average size of the stock in the Japanese stock option plans studied by Kato was approximately 1% of a firm's outstanding equity shares (Kato et al. 2005), which is a smaller proportion compared with the size of the stock in the Chinese stock option plans examined in this study.

To analyze the incentive effect of managerial stock options on firm risk-taking behavior, we extracted the Black–Scholes option value from the firm's stock option plan(s). We excluded firm-year observations when there was missing information regarding the Black–Scholes option value. Further, due to a one-year lag between dependent and independent variables, we could not use data pertaining to managerial stock option value in 2016. Consequently, our final sample comprised 829 firm-year observations.

3.2 | Measures

3.2.1 | Dependent Variables

Following Sanders and Hambrick (2007), we measured *corporate risk-taking behavior* as a composite measure of R&D expenditures and capital expenditures related to plant, property, and equipment. R&D and capital expenditures were directly extracted from the CSMAR database. We used the sum of these two expenditures, scaled by firm assets, to quantify corporate risk-taking (e.g., Hoskisson et al. 2017).

3.2.2 | Independent Variables

Stock option value was the Black–Scholes option value linked to managerial stock options within a given year (Larraza-Kintana et al. 2007). The standard Black–Scholes option value was calculated by the firm under the guidance of Chinese GAAP. Stock options are considered long-term incentives and their effect should carry over for a long period of time. We used data on managerial stock option values from $t-4$ to $t-1$ (a four-year time window) as a means to predict managers' risk-taking behavior in year t (Sanders and Hambrick 2007). Because we used a lagged design when predicting risk-taking, we constructed the lag by computing a simple average value of stock options for the prior 4 years $[(t-4)+(t-3)+(t-2)+(t-1)]/4$. Specifically, for a stock option granted in year $t-4$, the stock option value would be calculated in $t-4$ and would be the same for $t-3$, $t-2$, and $t-1$ if no additional stock options were granted during that 4-year time window. For firms granting multiple stock options, we calculated the stock option value based on a moving 4-year time window, spanning from $t-4$ to $t-1$. Therefore, for additional stock options granted in year $t-1$, the stock option value in $t-1$ would be the value of the stock options that are granted in $t-4$ plus the value of the stock options that are granted in $t-1$.

3.2.3 | Moderating Variables

To capture large shareholders' expropriation threat, we used *wedge*, which is the difference (or discrepancy) between the large shareholder's control rights and its cash flow rights (e.g., Lin et al. 2011). In our sample, the minimum difference between the control rights and the cash flow rights of the large shareholder is 0, and the maximum difference is 43%. The higher value of the wedge indicates more expropriation threat from the large shareholders. The large shareholder of the firm can be the state, a family/individual, or a privately owned business group. Despite the general tendency of large shareholders to expropriate minority shareholders in a weak institutional environment, we acknowledge potential differences in motives among the various types of large shareholders, such as the pursuit of social objectives by state owners and the preservation of socioemotional wealth by family owners. As part of our robustness checks, we have performed additional analyses to discern the effects of different types of large shareholders.

Institutional ownership was measured as the percentage of a firm's equity shares held by institutional investors such as banks, pension funds, insurance companies, and other types of financial institutional investors (Firth et al. 2016) over the total tradable equity shares of the firm.[5] We excluded foreign institutional investors when calculating institutional ownership to avoid overlap with the "foreign ownership" variable (the correlation between institutional ownership and foreign ownership is −0.08). Specifically, the QFII (Qualified Foreign Institutional Investor) data in the CSMAR database was used to identify the equity shares of foreign institutional investors. In our sample, institutional investors are not the firms' largest controlling shareholders. On average, they hold 14% of the firms' tradable shares (standard deviation = 13%).

To capture *the level of market development* across different regions in China, we used the index developed by the National Economic Research Institute (NERI) (Wang et al. 2007). The NERI index has five components, including government and market relations, non-state enterprise sector development, product market development, factor market development, and market intermediary and legal environment (Wang et al. 2007). Prior scholars have used the NERI index to study the impact of market development level at the regional level (e.g., Chang and Wu 2014). All the moderating variables were mean-centered before they were used to create the interaction terms.

3.2.4 | Control Variables

We included the following control variables in models predicting corporate risk-taking. Firm size was measured as the logarithm of each firm's total assets. Firm age was the number of years since a firm was incorporated. Financial slack was measured as current assets divided by current debt. Advertising intensity was measured by a firm's advertising expense divided by its total sales. Firm profitability (i.e., return to sales) was measured by a firm's net profits divided by its total sales.

We further controlled several governance variables. Foreign and state ownership were measured as the percentage of shareholdings owned by foreign and state investors, respectively. Foreign investors are thought to play an important role in enhancing the governance quality of domestic firms (Chung and Luo 2008). In our sample, foreign ownership averages 1% of the firms' total shareholdings. Meanwhile, high state ownership is normally associated with salient agency issues (Cuervo-Cazurra and Dau 2009). In our sample, state ownership (ownership held by state agencies) averages 1% of the firms' total shareholdings, which is largely consistent with the distribution of state ownership in the existing studies on stock option pay in China such as Fang et al.'s (2015) work. As part of the robustness check, we additionally captured state ownership using a dummy variable, indicating whether the firm is state-controlled or not.[6] We then used a binary variable to capture whether the firm is family-controlled. Family-controlled firms have different risk-taking preferences compared with their non-family-controlled counterparts.

In addition, managerial ownership was measured as the percentage of shares owned by top managers. Managerial compensation was measured as the average compensation of the top three managers of a firm, consistent with prior studies (e.g., Jiang et al. 2019).[7] Using the top three managers for the compensation variable is based on the fact that the regulatory body of listed firms in China (i.e., CSRC) requires the disclosure of *total cash compensation* of the three highest paid executives (Jiang et al. 2019). This variable is logarithmically transformed to deal with its skewness. Both managerial ownership and compensation were included as control variables to capture the alignment of managerial interests with those of the firm. The independent director ratio was measured as the number of independent directors divided by the total number of board directors within a firm. Analyst coverage was measured as the number of analysts that followed the firm (Zorn et al. 2017). Both independent director ratio and analyst coverage are associated with governance quality. We then controlled for the number of board committees, as board committees are set up to monitor the top management team's (TMT) decision making (Kolev et al. 2019). We also controlled for the size of the firm's TMT and the average age of its top managers. A larger and more experienced management team is associated with greater capability in managing risks (Wiersema and Bantel 1992). Finally, we controlled for industry concentration, measured using sales of all the publicly listed firms within the same industry at the two-digit SIC level. A higher level of industry concentration means less competition, which may reduce corporate risk-taking.

3.3 | Modeling Technique

To test the hypothesized effect of stock option values, we checked whether managers receiving higher values of stock options initiate more risk-taking behaviors. Because our sample only includes firms with stock option plans during our study period, sample selection issues may arise because firms with certain characteristics (e.g., the presence of large shareholders) may be more or less likely to adopt a stock option plan. For instance, large shareholders' expropriation threat may reduce the chance that a stock option plan is adopted. We address the potential endogeneity and sample selection issue by applying the Heckman two-stage modeling technique.

In the first stage of the Heckman's two-stage model, we ran a probit regression model predicting whether a firm adopted a stock option plan in a particular year (the first-stage results are presented in Table S1).[8] The predictors included firm size, age, debt ratio, independent director ratio, foreign ownership, state ownership, the average age of TMT members, firm profitability, and industry and year dummies. The inclusion of these variables in the first stage model is well supported by prior studies (e.g., Devers et al. 2007; Fang et al. 2015). We also included the large shareholders' expropriation threat (or wedge) in the first stage, which is consistent with the theoretical argument that large shareholders may affect how the stock option plan is designed and adopted. There is a negative coefficient of large shareholders' expropriation threat ($b = -0.502$, $p < 0.1$) in the first stage equation, implying that firms with large shareholders are less likely to adopt stock option plans. The instrumental variable we used in the probit model was the regional-level adoption rate of a stock option plan, which was measured as the number of firms in the same province of China that have adopted stock option plans. This regional-level adoption rate reflects the mimetic pressure on the focal firm to adopt a similar practice of its peers that are located in a nearby region (Keister 2002). We notice that the instrument is a significant predictor of firms' likelihood of adopting stock option plans ($b = 0.003$, $p < 0.001$). At the same time, the instrument is not significant in the models predicting our dependent variable—risk-taking behavior. Diagnostic tests also confirm the relevance of the instrument (e.g., the first-stage F statistic is larger than 10, suggesting a strong instrument).

After running the first-stage model, we calculated an inverse Mills ratio and included it as an additional control in the second-stage regression models. We employed feasible generalized least squares (GLS) regression models for the second-stage analysis. This technique is appropriate for situations where the presence of heteroskedasticity across panels cannot be disregarded (Desender et al. 2016). In all regression models, independent, moderating, and control variables were lagged by 1 year to strengthen causal inference.

Besides correcting for sample selection bias, we ran empirical models that controlled for firm fixed effects. Here, the endogeneity concern is that the risk preferences of a firm's large shareholders may influence both the value of stock options and the firm's level of risk-taking. By controlling for firm fixed effects, we mitigate endogeneity concerns arising from potential omitted variables.

4 | Results

Table 1 shows the summary statistics and correlations for the full sample. We find significant correlations between corporate risk-taking and several control variables in Table 1. For instance, corporate risk-taking is significantly correlated with firm size, age, and financial slack. No pair of variables is highly correlated. We further checked variance inflation factors (VIFs) for all the models. The maximum VIF is smaller than 4, implying that multicollinearity may not be a serious issue (Neter et al. 1990).

Table 2 reports results testing the effect of stock option value on corporate risk-taking. Both Model 1 and Model 7 of Table 2 indicate that higher stock option value does not significantly increase corporate risk-taking activities. These results do not support the classic agency theory, which posits that managers respond to higher stock option values by engaging in greater risk-taking. These results provide an opportunity to explore the potential boundary conditions of the relationship between stock options and corporate risk-taking.

H1 predicts that the incentive alignment effect of stock options on corporate risk-taking is weakened by a higher likelihood of large shareholders' expropriation. Model 2 of Table 2 shows that the interaction term between large shareholders' expropriation threat (i.e., *wedge*) and stock option value has a negative coefficient on predicting corporate risk-taking ($b = -0.003$, $p < 0.01$). Based on Model 2 of Table 2, we draw a figure that shows how stock options affect corporate risk-taking under different scenarios of large shareholders' expropriation threat. Figure 1a indicates that in scenario where the threat of large shareholders' expropriation is relatively high (e.g., wedge = 6%), the effect of stock option value on corporate risk-taking is less likely to be positive than it is in the scenario where the threat of large shareholders' expropriation is relatively low (e.g., wedge = 0). Hence, H1 is supported.

Again, H1 is supported based on the results from Model 8 of Table 2. We then draw a figure to visualize the interaction effect of large shareholders' expropriation threat and stock option value ($b = -0.005$, $p < 0.05$) from Model 8 of Table 2. We notice that as large shareholders' expropriation threat increases (e.g., the value of "wedge" increases from 0% to 6%), the effect of stock option value on corporate risk-taking shifts from positive to neutral (Figure 1b).

In H2, we further predict that institutional investors would help address large shareholders' expropriation threat. To test H2, we compare firms possessing higher institutional ownership and those with lower institutional ownership, and split the sample based on the median value of institutional ownership. Model 4 of Table 2 (firms with lower institutional ownership) suggests that the two-way interaction of stock option value with large shareholders' expropriation threat has a significant and negative impact on corporate risk-taking ($b = -0.004$, $p < 0.05$), but the same two-way interaction term

TABLE 1 | Descriptive statistics and correlation.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Corporate risk-taking	0.08	0.05																				
2. Firm size	21.99	1.08	−0.13																			
3. Firm age	13.52	5.44	−0.11	0.31																		
4. Financial slack	2.74	2.72	0.07	−0.31	−0.13																	
5. Foreign ownership	0.01	0.06	−0.03	0.26	0.20	−0.03																
6. State ownership	0.01	0.04	0.00	0.11	0.06	−0.02	0.08															
7. Managerial ownership	0.11	0.16	0.13	−0.25	−0.14	0.18	−0.07	−0.08														
8. Managerial compensation	14.42	0.73	0.05	0.55	0.25	−0.12	0.22	0.03	−0.15													
9. Independent director ratio	0.38	0.05	0.01	−0.01	0.02	−0.00	−0.02	−0.02	0.12	0.06												
10. Analyst coverage	2.41	0.99	0.18	0.34	0.06	−0.10	0.08	0.01	0.06	0.26	−0.00											
11. Whether family-controlled	0.22	0.42	−0.01	−0.15	−0.12	0.06	−0.06	−0.06	−0.01	−0.15	−0.01	−0.02										
12. Return to sales	0.10	0.11	0.12	−0.07	0.01	0.35	−0.03	−0.10	0.15	0.06	0.02	0.23	0.04									
13. Number of board committees	3.91	0.41	−0.02	0.00	−0.00	−0.08	−0.06	−0.08	0.06	−0.03	0.02	−0.03	−0.05	−0.01								
14. TMT size	1.85	0.37	0.06	0.24	0.02	−0.05	0.08	0.04	0.04	0.28	0.03	0.13	−0.17	−0.05	0.09							
15. TMT average age	45.83	3.36	−0.13	0.24	0.27	−0.05	0.21	0.11	−0.14	0.18	−0.05	−0.05	−0.17	−0.10	−0.01	0.10						
16. Advertising intensity	0.09	0.08	0.09	−0.08	−0.03	0.22	−0.04	−0.09	0.10	0.06	0.04	0.09	0.11	0.16	−0.04	−0.05	−0.16					
17. Industry concentration	0.08	0.07	−0.18	0.15	0.07	−0.19	0.11	0.10	−0.11	−0.01	0.00	0.08	−0.01	−0.16	−0.00	0.01	0.15	−0.11				
18. Level of market development	8.47	1.36	0.08	−0.04	0.00	0.06	0.06	−0.06	0.11	0.19	0.07	0.04	0.06	0.11	−0.10	−0.07	−0.11	−0.07	−0.08			

(Continues)

TABLE 1 | (Continued)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
19. Institutional ownership	0.14	0.13	0.17	−0.02	−0.08	0.02	−0.08	0.01	0.16	−0.01	0.00	0.41	0.02	0.22	−0.03	−0.05	−0.11	0.01	−0.02	0.05		
20. Wedge	0.06	0.09	−0.07	0.21	0.09	−0.10	0.03	−0.04	−0.37	0.07	−0.10	0.07	0.12	−0.05	−0.02	0.00	0.08	−0.06	0.07	−0.16	−0.10	
21. Stock option value	6.82	16.74	−0.09	0.41	0.18	−0.09	0.08	−0.03	−0.13	0.22	−0.06	0.10	−0.07	−0.05	−0.03	0.02	0.05	−0.03	0.01	0.01	−0.03	0.11

Note: $N = 829$, $p < 0.05$ if |correlations| > 0.07. Stock option value was measured in units of millions (Yuan).

becomes insignificant in Model 3 of Table 2 (firms with higher institutional ownership). The magnitude of the interaction effect is also larger in Model 4 than in Model 3. Similarly, Models 9 and 10 of Table 2 show that the two-way interaction term between stock option value and large shareholder expropriation threat has a significant and negative impact on corporate risk-taking (b = −0.011, $p < 0.01$) in the subsample of firms with lower institutional ownership, but it becomes insignificant in the subsample of firms with higher institutional ownership. The magnitude of the interaction effect is larger in Model 10 than in Model 9. Such findings support H2.

Finally, for H3, we predict that the level of market development mitigates large shareholders' expropriation threat. To test H3, we compare higher market development regions with lower market development regions, and split the sample based on the median value of the level of market development. Model 6 of Table 2 (lower market development regions) shows that the two-way interaction of stock option value with large shareholders' expropriation threat has a significant and negative impact on corporate risk-taking (b = −0.004, $p < 0.001$), but the same two-way interaction term is not statistically significant in Model 5 of Table 2 (higher market development regions). The magnitude of the interaction effect is larger in Model 6 (lower market development regions) than in Model 5 (higher market development regions). These findings of Models 5 and 6 provide support for H3. However, we did not find support for H3 when we compared higher market development regions with lower market development regions in Models 11 and 12 of Table 2. The two-way interactions of stock option value with large shareholder expropriation threat are not statistically significant in both models (Models 11 and 12 of Table 2).

4.1 | Robustness Analyses

In addition to the Heckman two-stage modeling and firm fixed-effect modeling approach, we have performed various additional analyses to further show the robustness of our results. First, we use PSM and difference-in-differences (DID) models as an additional test. As noted, environmental factors that precede firms' adoption of stock option plans may also affect corporate risk-taking. Thus, we use PSM to construct a set of control firms (e.g., firms that face the same environmental conditions but do not adopt any stock option plans) and compare changes in their risk-taking behavior with those of treatment firms (e.g., firms adopting stock option plans) over the same time period. PSM helps to rule out the confounding influences that may cause spurious correlations between our independent (i.e., stock option adoption) and dependent variables (i.e., corporate risk-taking). The DID analysis is to estimate the difference in corporate risk-taking between firms that have a stock option plan (before and after) and those that do not have one. The results in Table 3 support our hypothesis that the threat of large shareholders' expropriation weakens the effect of stock options on corporate risk-taking. We also test the parallel trends assumption for the DID analysis and do not find any violation of such assumption.

Second, in addition to the different estimation methods, we also include RPTs as a proxy for potential tunneling behavior

TABLE 2 | The impact of stock option value on corporate risk-taking.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
	GLS regression models correcting for selection bias						Firm fixed effect models					
	All firms	All firms	Institutional ownership		Market development		All firms	All firms	Institutional ownership		Market development	
			High (≥ 10%)	Low (< 10%)	High	Low			High (≥ 10%)	Low (< 10%)	High	Low
Stock option value × wedge		−0.003**	0.001	−0.004*	0.001	−0.004***		−0.005*	0.000	−0.011**	0.009	−0.001
		(0.001)	(0.002)	(0.002)	(0.002)	(0.001)		(0.003)	(0.006)	(0.004)	(0.007)	(0.004)
Stock option value	−0.00004	0.00001	−0.0004***	0.001**	−0.0002	0.00004	−0.00001	−0.00004	−0.0003	0.0005	−0.001*	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0002)	(0.0002)	(0.0004)	(0.0005)	(0.0004)	(0.0004)
Wedge	−0.032**	−0.036**	−0.049**	−0.017	−0.037*	0.003	0.006	0.008	0.083	0.010	−0.201	0.006
	(0.012)	(0.012)	(0.017)	(0.014)	(0.017)	(0.016)	(0.047)	(0.047)	(0.073)	(0.067)	(0.150)	(0.056)
Firm size	−0.007***	−0.007***	−0.003	−0.015***	−0.005***	−0.007***	−0.004	−0.005	−0.004	−0.003	−0.006	−0.000
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)	(0.010)	(0.010)	(0.008)	(0.012)
Firm age	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***	−0.002***	−0.011**	−0.011**	−0.007	−0.012*	−0.003	−0.013**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.004)	(0.007)	(0.005)	(0.005)	(0.004)
Financial slack	−0.000	0.000	0.001**	−0.001*	−0.002***	0.001*	0.001	0.001	0.001	0.000	0.001	0.001
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
Foreign ownership	−0.014	−0.014	−0.042	−0.025	−0.053***	0.085**	0.024	0.022	−0.007	0.204	0.063	0.361*
	(0.011)	(0.010)	(0.047)	(0.015)	(0.013)	(0.031)	(0.053)	(0.053)	(0.064)	(0.128)	(0.054)	(0.174)
State ownership	0.067***	0.068***	0.027	0.105***	0.001	0.158***	0.038	0.038	−0.013	0.062	−0.015	0.086
	(0.019)	(0.019)	(0.040)	(0.025)	(0.007)	(0.022)	(0.045)	(0.044)	(0.075)	(0.061)	(0.067)	(0.062)
Managerial ownership	0.005	0.006	−0.012	0.003	0.011	0.009	0.007	0.010	0.057	−0.017	−0.044	0.013
	(0.006)	(0.006)	(0.009)	(0.009)	(0.009)	(0.007)	(0.022)	(0.022)	(0.045)	(0.029)	(0.031)	(0.031)
Managerial compensation	0.011***	0.012***	0.015***	0.016***	0.009***	0.013***	0.009	0.009	0.029**	−0.008	−0.007	0.026**
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.006)	(0.006)	(0.011)	(0.010)	(0.011)	(0.010)
Independent director ratio	−0.012	−0.015	−0.016	−0.048*	−0.015	−0.048*	−0.008	−0.016	0.047	−0.032	0.148	−0.108
	(0.015)	(0.014)	(0.021)	(0.023)	(0.015)	(0.019)	(0.049)	(0.049)	(0.093)	(0.064)	(0.080)	(0.070)

(Continues)

TABLE 2 | (Continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Analyst coverage	0.008***	0.008***	0.011***	0.007***	0.010***	0.006***	0.007**	0.007**	0.010	0.005	0.003	0.005
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.005)	(0.003)	(0.003)	(0.004)
Whether family-controlled	−0.011***	−0.011***	−0.013***	−0.009**	−0.004	−0.015***	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Return to sales	−0.014*	−0.015*	−0.019*	0.006	0.014	−0.011	0.048**	0.048**	0.019	0.056*	0.032	0.069**
	(0.007)	(0.007)	(0.010)	(0.014)	(0.014)	(0.011)	(0.018)	(0.018)	(0.029)	(0.027)	(0.025)	(0.027)
Number of board committees	0.003	0.002	−0.003	0.004	0.002	0.002	0.003	0.003	0.004	0.016	0.031*	−0.010
	(0.002)	(0.002)	(0.004)	(0.003)	(0.003)	(0.003)	(0.010)	(0.010)	(0.013)	(0.020)	(0.016)	(0.015)
TMT size	0.006*	0.005	0.008*	0.006	0.016***	−0.002	0.005	0.004	0.009	0.005	0.010	0.007
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.008)	(0.008)	(0.014)	(0.010)	(0.011)	(0.013)
TMT average age	−0.000	−0.000	−0.000	−0.000	0.000	−0.001**	0.001	0.001	0.001	0.003	−0.001	0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Advertising intensity	0.048***	0.046***	0.025	0.072***	0.054*	0.064**	0.075	0.076	−0.006	0.379**	0.183*	0.142
	(0.014)	(0.014)	(0.022)	(0.019)	(0.021)	(0.023)	(0.059)	(0.059)	(0.086)	(0.120)	(0.092)	(0.122)
Industry concentration	−0.053	−0.065	−0.138**	−0.157	−0.285***	−0.037	−0.077	−0.078	−0.114	−0.170	−0.450*	−0.044
	(0.047)	(0.047)	(0.042)	(0.083)	(0.083)	(0.064)	(0.063)	(0.063)	(0.082)	(0.119)	(0.182)	(0.072)
Level of market development	0.003	0.003	0.011**	−0.002			0.009	0.009	0.005	0.006		
	(0.002)	(0.002)	(0.004)	(0.003)			(0.005)	(0.005)	(0.010)	(0.007)		
Institutional ownership	0.014*	0.012			0.019*	0.025*	−0.005	−0.006			−0.020	0.036
	(0.007)	(0.007)			(0.009)	(0.011)	(0.015)	(0.015)			(0.020)	(0.025)
Inverse Mills ratio	0.005	0.003	−0.013*	0.014*	−0.007	0.031***	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(Continues)

TABLE 2 | (Continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Firm fixed effect	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Observations	814	814	406	408	407	407	829	829	417	412	413	416
Within firm R-squared	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.130	0.137	0.145	0.245	0.203	0.217

Note: Standard errors in parentheses. $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. Due to missing values of Inverse Mills ratio, the number of observations reduces from 829 to 814 in the GLS regression models.

in the analysis (e.g., Cheung et al. 2009). We scale the value of RPTs by the firm's equity value. The regression results show that when large shareholders' expropriation threat is high, higher stock option value is associated with a higher extent of potential tunneling behavior. This provides some evidence for the large shareholders' expropriation mechanism under the condition of high stock option value.

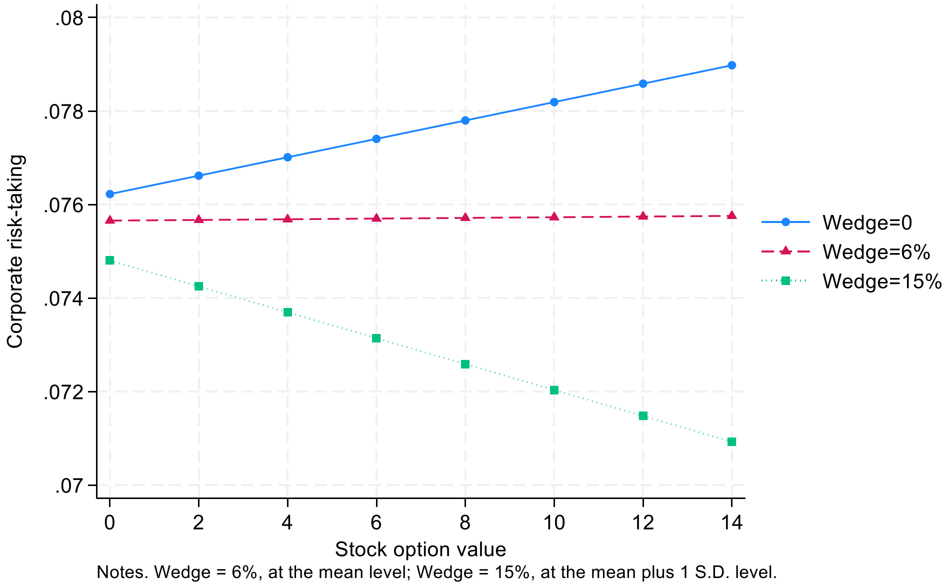
Third, our results remain consistent when we employ alternative measures of stock option pay. We calculated stock option value using the total amount of unexercisable options granted to managers by the end of that year multiplied by their corresponding spread (i.e., the difference between stock price at the end of that year and options' exercise price). We also measure corporate risk-taking using R&D and capital expenditures scaled by firm sales (instead of firm assets). In addition, we test the robustness of our findings by eliminating firms whose managers already hold substantial ownership stakes. Stock options may not be extremely useful for managers who already possess substantial ownership stakes in their firm (Sanders 2001). We use different threshold levels of managerial ownership for sample exclusion, such as the 90th and 95th percentile values of the sample. Excluding samples with managerial ownership above a certain threshold level yields consistent findings with what we report here. We then add the independence of the board compensation committee as an additional control and notice the results are robust.

Finally, we run analyses investigating the effects of different types of large shareholders. Specifically, we run analyses by comparing firms with high versus low levels of state ownership and comparing firms that are family-controlled versus those that are not, and we do not identify any differences in terms of the impact of stock options in those subsamples. Those results imply that different types of large shareholders may not determine the heterogeneous impact of stock options on risk-taking behavior.[9]

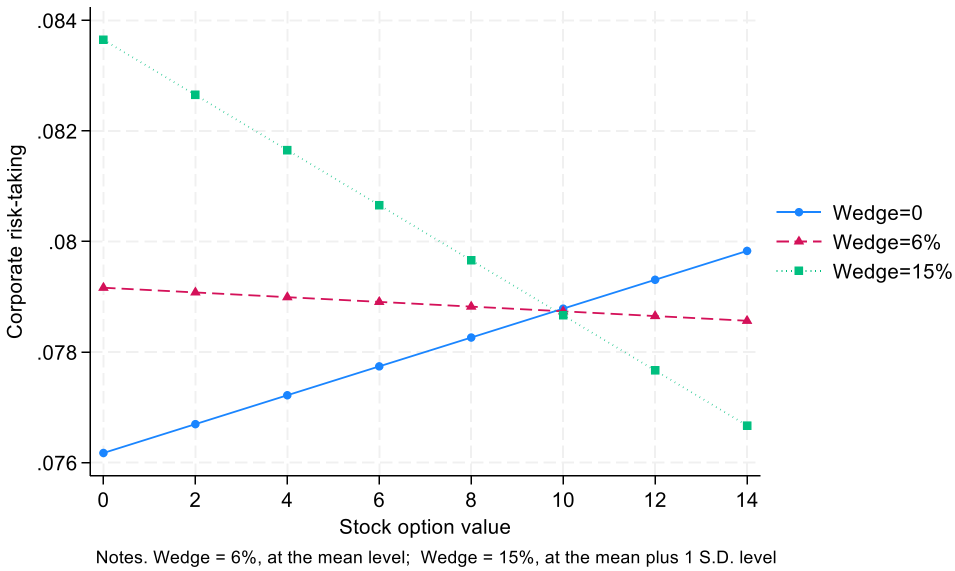
5 | Discussion

This study examines managerial behavioral consequences of stock options in the weak institutional context of China. In the context of large shareholder dominance and potential expropriation, the incentive-alignment mechanism might not function as expected, as managers perceive less potential for upside gains due to expropriation by large shareholders. More specifically, in China, ownership structures that enable large shareholders to extract private benefits at the expense of minority shareholders reduce the effectiveness of stock option pay. As a result, managers make less risky corporate investments such as R&D. Moreover, the threat of large shareholders' expropriation on the effectiveness of stock options is mitigated when there are institutional constraints on large shareholders' power. The analysis of a sample of Chinese publicly listed firms has provided support for these predictions.

We highlight the important role of managers and large shareholders in shaping the outcomes of new governance practices (i.e., stock option pay) in the presence of weak institutions, which has received limited attention in the current literature.



a. The interaction effect of large shareholder expropriation threat and stock option value on corporate risk-taking (GLS model)



b. The interaction effect of large shareholder expropriation threat and stock option value on corporate risk-taking (firm fixed-effect model)

FIGURE 1 | (a) The interaction effect of large shareholder expropriation threat and stock option value on corporate risk-taking (GLS model). (b) The interaction effect of large shareholder expropriation threat and stock option value on corporate risk-taking (firm fixed-effect model). [Colour figure can be viewed at wileyonlinelibrary.com]

Our study illustrates how the interplay between institutions and firm-level actors (i.e., the relationship between large shareholders and managers) shapes firm strategies and outcomes. Though previous studies have documented evidence of interest alignment and rent extraction associated with adopting stock option plans, these studies have mostly focused on Anglo-American or continental European corporate governance systems (Aguilera and Jackson 2003, 2010) and have failed to sufficiently explore how corporate governance is shaped by its embeddedness in other, less-developed institutional contexts. To address this gap, our study demonstrates that the interest-alignment function of stock options works differently in environments with weak institutions.

There has been a significant increasing trend in managerial pay in Chinese firms since 2013, although corporate performance did not show similar improvement (Zhang et al. 2025). Large shareholder expropriation has been identified as one of the key factors. For example, pay-performance sensitivity has been found to be negatively associated with controlling shareholders' tunneling behavior (Wang and Xiao 2011). While principal–principal conflicts have been well documented in developing countries like China (e.g., Jiang and Kim 2020 for a recent survey), the examination of the effect of CEO compensation under such conflicts has remained surprisingly scarce. For example, among voluminous studies surveyed by Jiang and Kim (2020), only a few discussed stock option pay

TABLE 3 | DID estimation: the impact of stock option pay adoption on corporate risk-taking.

	Model 1	Model 2	Model 3	Model 4
	DV: Corporate risk-taking (scaled by sales)		DV: Corporate risk-taking (scaled by asset)	
	High threat of large shareholder expropriation	Low threat of large shareholder expropriation	High threat of large shareholder expropriation	Low threat of large shareholder expropriation
Treatment × after stock option pay	−0.037*	−0.018	−0.012†	0.001
	(0.015)	(0.013)	(0.006)	(0.006)
Constant	−0.749*	−0.165	0.196	0.298**
	(0.297)	(0.255)	(0.126)	(0.112)
Control variables	Included	Included	Included	Included
Firm and Year Fixed effects	Included	Included	Included	Included
Observations	1278	1641	1279	1641
Within-firm R^2	0.056	0.074	0.098	0.077

Note: Standard errors in parentheses. ***$p<0.001$, **$p<0.01$, *$p<0.05$, †$p<0.1$. We split the sample based on the median value of large shareholder expropriation threat. Control variables included firm size, firm age, debt ratio, foreign ownership, state ownership, TMT average age, performance, and the "after stock option pay" indicator.

in Chinese state-owned enterprises (SOEs) and found that SOE managers are not incentivized by stock option pay. We contribute by providing systematic empirical evidence that managerial risk-taking behavior can be constrained and the incentive alignment effect of stock option pay can be distorted by large shareholder expropriation.

The conventional wisdom is that in China, controlling shareholders dominate corporations and can effectively control the behavior and decision-making of managers (Jiang and Kim 2020). It has been assumed that managers are on the side of large shareholders who can expropriate minority shareholders. However, it is unclear how managers would change their behavior when they are granted stock option pay, which would align their interests with those of minority shareholders. Nevertheless, our empirical analysis reveals a less optimistic finding: managers' behavior remains significantly influenced by the presence of large shareholders, unless effective and robust constraints are imposed on large shareholders' power. Our findings suggest institutional ownership and regional market development are effective means to reduce large shareholders' impact.

The findings from this study provide an initial step toward illustrating how a particular corporate governance practice influences managerial behavior and firm outcomes in different institutional contexts. The complexity of different governance dynamics in a weak institutional environment like China—between managers and shareholders and between controlling shareholders and minority shareholders—adds to the difficulties of analyzing governance issues. When stock option pay, as a popular governance practice, is transferred into a market with weak institutions, it may lead to unexpected consequences. The findings of this study provide insights into the dynamics among managers, powerful shareholders, and the institutional environment that affect the effectiveness of governance practices in economies with weak shareholder rights protection.

This study thus advances research in comparative corporate governance by incorporating the effect of institutional context. We add to this literature by highlighting the effect of managerial vulnerability to large shareholders' expropriation due to the weak institutional environment. In particular, the existence of large shareholders' expropriation affects managers' motivations and behaviors. These findings help unravel the boundary conditions of incentive and behavioral alignment effects of stock options in weak institutional environments. We provide evidence that the existence of better protection of minority shareholders (i.e., better institutional development) does mitigate the negative impact of large shareholders. This finding has important policy implications, as policy makers should exercise caution when recommending governance remedies commonly used in developed economies to address governance challenges in weak institutional environments. They must take into consideration the differences in institutional contexts. Without improving institutions and shareholder right protection, many corporate governance mechanisms might become dysfunctional. Moreover, we suggest that policy makers in China, and other developing countries could improve the effectiveness of stock option pay by reducing policy ambiguity in accounting treatment, thereby limiting opportunities for large shareholders' expropriation.

The findings in this study also have practical implications for companies that aim to improve corporate governance in environments with weak institutions. The perceived large shareholders' expropriation can cause managers to be more risk-averse and self-protecting. This will not be easily solved unless more trust can be established between large shareholders and managers (as well as other stakeholders). While it might be tempting to engage in expropriation actions, our results imply that the long-term consequences can be detrimental for the firms, and large shareholders as well, when managers are not motivated appropriately. Large shareholders should not assume that they can outsmart managers by implementing stock option pay without execution. The expropriation threat may make managers take responsive reactions that may make all parties worse off. Even in environments with weak institutions, managers are key drivers for value creation, and the appropriate incentivization of managers is critical. Our findings on the moderating effects of institutional investors and regional institutional environment are consistent with prior literature, which collectively suggests that stronger shareholder rights protection and more effective external monitoring can serve as fundamental mechanisms for mitigating principal-principal conflicts in China (e.g., Hu and Sun 2019; Jiang and Kim 2020; Li and Qian 2013). Moreover, designing effective CEO compensation remains an important concern for corporate and regulatory agencies in countries with weak institutions. Policies regarding exercise condition, or stock option duration might affect the effectiveness of stock option pay in the institutional environment of China.

5.1 | Limitations and Future Research

Even though China provides an ideal context for studying the impact of stock options when large shareholders' expropriation prevails, and our theoretical arguments may be applied to other economies with similar institutional environments, as reflected in studies using multiple country contexts (e.g., Johnson et al. 2000; van Essen et al. 2012), the fact that this study was conducted entirely within the Chinese context may raise concerns about the generalizability of its results. Thus, future studies could fruitfully explore whether these results hold in other institutional contexts. Indeed, it is plausible that managers' risk preference is affected by the country's culture (Hofstede et al. 2005). Chinese culture might be a latent factor that underlies the response of managers to stock option compensation. This could be a fruitful direction for future research because culture is a key part of the informal institutions that can affect managerial behavior as significantly as the formal institutions such as the legal system or regulatory regimes (Huang et al. 2017). Future work might also explore other contextual factors such as the level of market competition to better understand the impact of stock options. In some harsh business environments, managers may resort to rent extraction rather than interest alignment after receiving stock options. In a favorable business environment, by contrast, managers are more likely to act in shareholders' interests to capture personal wealth gains from rising stock prices.

Academics have also been discussing stock option adoption in contexts where the shareholder-centered logic is less pertinent. Sanders and Tuschke (2007) have shown that firms apply impression management tactics to manage the legitimacy of their stock options when a stakeholder-orientation prevails. Geng et al. (2016) found that self-interested managers in Japanese firms can manipulate shareholder-oriented logic to justify issuing stock options in a stakeholder-oriented environment. China represents a context in which shareholder- and stakeholder-orientation coexist. The institutional logics (shareholder vs. stakeholder) held by managers may also play a role in their behavior. How would stock option pay affect those managers with different institutional logics? It would also be interesting to explore how managers may potentially manipulate stock option pay to benefit themselves through other practices.

Furthermore, we demonstrate that managers' interests are embedded in the institutional environment, which shapes the effectiveness of stock option pay as a governance mechanism. We acknowledge that our current research setting cannot fully capture the underlying process that affects managers' responses to stock options in weak institutions. Such a weak managerial response to stock options may be driven by different reasons such as their detection of large shareholders' symbolic gestures of using stock option pay to appease minority shareholders or by their concern for the actual rent expropriation behavior of large shareholders. Given that the data in our study cannot fully capture these mechanisms, we encourage future research to further investigate the issue with more relevant data. A recent line of research examines how social media can be an effective informal institution that can constrain large shareholder expropriation (Luo and Xiong 2021). Similarly, the heterogeneous nature of large shareholders (e.g., family owners and the state) may be associated with different degrees or types of social and institutional pressures to adopt stock options. Hence, future research can examine the different mechanisms underlying the weak managerial response to stock options by distinguishing among different types of large shareholders.

Our sample covers a period 2006–2016, during which China is moving toward a market-oriented economy. In such a transitional context, rules and laws regulating the practice of stock option pay are evolving. As noted, when rules about stock option pay are incomplete, it may leave room for large shareholders' manipulation and make stock option pay serve more as an impression management tool rather than a motivational tool. Future studies can further investigate the coevolution of stock option practice and large shareholders' expropriation threat to understand the effectiveness of stock option pay in China's institutional context.

Lastly, in this study, we adopt multiple methods (e.g., Heckman two-stage models, firm fixed-effect models, and PSM) to address potential endogeneity concerns. Even though our results are consistent throughout different estimation methods, we would like to call for future studies to explore and leverage natural exogenous shocks (e.g., policy shocks) to identify the effect of stock options and large shareholders' expropriation threat on corporate risk-taking behavior. For example, measures by the China Securities Regulatory Commission (CSRC) and the newly amended Company Law were enacted in 2023, which aim to enhance corporate governance and shareholder protection for Chinese corporations. Future studies can utilize these policy shocks to reveal the mechanisms underlying the effectiveness of stock option pay and other governance tools.

In summary, our study focuses on an understudied governance practice concerning stock option pay in a weak institutional environment. We find that stock options are less likely to motivate managers when large shareholders possess unconstrained power. By highlighting the potential role of weak institutions and large shareholders' expropriation threat, this study advances comparative corporate governance research on the effectiveness of stock option pay in different institutional contexts.

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The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Endnotes

[1] When we mention large shareholders in China, we specifically refer to the state, families/individuals, or privately-owned business groups. Financial institutional investors (e.g., mutual funds) are not large, controlling shareholders in China, and we separate institutional investors from other large shareholders because we assume institutional investors are less likely to engage in expropriation behavior as suggested by the literature (Yuan et al. 2008).

[2] Please note that the focus of our study is about the effectiveness of stock option pay on corporate risk-taking. We have run the analysis of the adoption of stock option pay in the first stage of Heckman models to control for the adoption effect. Please refer to the details in our method section.

[3] News about large shareholders' tunneling behavior at New Wave Energy can be accessed online (https://daydaynews.cc/en/technology/66375.html).

[4] According to Chinese government regulation, equity-based incentive plans issued by Chinese publicly listed firms can include either restricted stocks or stock options (Fang et al. 2015). Restricted stocks mean managers are directly granted shares whose sales are prohibited unless a certain set of performance criteria is met. Stock options, on the other hand, mean that managers have the right to buy company stocks at a pre-determined price when performance criteria are met. In our analysis, we only focused on stock option plans.

[5] In China, not all the firm's outstanding shares are tradable in the open market. In a robustness check, we used the total number of the firm's outstanding shares as the denominator for the calculation of institutional ownership. The results are the same.

[6] Using a dummy variable for state-controlled firms in the analysis does not change the findings. In our sample, the dummy variable for state-controlled firms has a mean value of 0.10 and a standard deviation of 0.29.

[7] Using top five managers' total compensation does not change the findings. Although the law only requires the disclosure of the total compensation of top three highest paid managers, we can calculate the total compensation of top five highest paid managers by manually extracting data about each individual manager's annual compensation from the annual reports and summing up the compensation of the top five highest paid managers.

[8] In our Heckman first-stage model, the sample includes 16,441 firm-year observations that are in the risk set for adopting a stock option plan during 2006–2016.

[9] These results are not reported due to space limits, and they are available upon request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Table S1** Heckman First-stage Probit Model: Predicting Whether to Adopt a Stock Option Plan