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Collusion or governance? Common ownership and corporate risk-taking

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Abstract

Research Question: Disputes over the corporate governance impacts of common ownership continue. Differentiating from existing studies, we focus on the Chinese stock market, exploiting the Top 10 Shareholding File, which includes various investors besides institutional investors, to study the impact of common ownership built through blockholders on corporate risk-taking behavior.

Research Findings: We find that firms with higher common ownership are less likely to engage in corporate risk-taking, with concomitant decreases in future growth rates. Mechanism analysis shows that blockholders' common ownership exerts its influence through increasing market concentration, with concomitant lessening of market competition. Interestingly, further analyses indicate that, in contrast to blockholders, ownership connectedness built by mutual fund families significantly raises corporate risk-taking along with growth. However, individual investors' common ownership does not show the significant statistical relationship with corporate risk-taking.

Theoretical Implications: We add to the debate on common ownership on corporate governance. Consistent with the anti-competition stream of literature, the risk-taking-reduction role we identify for blockholder common ownership supports the theory of anti-competition. Our results highlight the need to consider the heterogeneity of common ownership.

Policy Implications: While blockholder common ownership is evidenced to have a negative effect on corporate risk-taking, with, by extension, a negative impact on economic development, our results also suggest that efficient monitoring mitigates these effects. We also document an interesting heterogeneity in investor types. Mutual fund common ownership, in contrast to blockholder common ownership, is associated with higher risk-taking and more robust firm growth. This suggests the positive role of institutions in corporate governance and the necessity of considering the heterogeneity of common ownership.

KEYWORDS

corporate governance, blockholders, common ownership, risk-taking

1 | INTRODUCTION

Common ownership, which occurs when common blockholders simultaneously own a large proportion of at least two competing firms in the same industry, has gained influence in the market, attracting considerable scholarly interest (Azar et al., 2018; Gilje et al., 2020; Park et al., 2019). Common blockholdings create linkages between independent competing firms. Such common ownership seems to be the opposite of the conventional theory of diversifying investment portfolios to minimize specification risks. However, common blockholders concentrate their investments by purchasing firms in selected industries, based on the belief that this concentration can compensate for the cost of under-diversification (Hemphill & Kahan, 2019). Previous studies on the US stock market focus on whether the common ownership of institutional investors inhibits market competition (Antón et al., 2023; Azar et al., 2018; Cheng et al., 2022; Lu et al., 2022). However, the existing conclusions are controversial (Dennis et al., 2022; Koch et al., 2021; Lewellen & Lowry, 2021). More importantly, existing studies explored the influence of common ownership on corporate governance and the relevant economic consequences (Brooks et al., 2018; Cheng et al., 2022; Edmans et al., 2019; He & Huang, 2017; Kang et al., 2018; Park et al., 2019; Ramalingegowda et al., 2021).

Our study follows from a general call for more studies investigating the role of ownership types and structures on corporate governance and, by extension, to firm and investor characteristics. Guedhami et al. (2022) highlight that investigating the impact of ownership structure and ownership type is challenging in corporate governance studies. From a corporate governance perspective, studying how ownership structure affects firms is currently very important (Castañer et al., 2022). This includes considering the conditioning roles of institutional differences (Tran & Freel, 2023), ownership concentration (Ramírez et al., 2022), foreign institutional ownership (G. Huang et al., 2023), managerial ownership (Bian et al., 2023), foreign direct ownership (W. Huang et al., 2021), nonprofit versus for-profit ownership structures (Goodell et al., 2020), and state ownership (Tran & Freel, 2023). These studies also consider investment decisions (Ramírez et al., 2022), firm and investor risk-taking (G. Huang et al., 2023), and cross-ownership (Fu et al., 2022). However, by synthesizing prior studies, we investigate the impacts of a broader variety of cross-ownership.

Disputes over the impact of common ownership on corporate governance continue. Existing studies typically focused on the role of institutional investors' common ownership in developed capital markets, typically in the United States, with few investigations in emerging capital markets. Further, as Hemphill and Kahan (2019) note, previous studies focusing on US markets rely on ownership data that omit the holdings of certain categories of blockholders. These ownership data are always drawn from Form 13F and quarterly reports filed by large institutional investors who are less likely to disclose the holdings of non-institutional corporate holders, such as individuals and firm managers. Institutional investors differ from non-institutions in terms of fund availability, investment horizon, risk preference, and so on (Clifford & Lindsey, 2016; Cornett et al., 2007; Hadlock & Schwartz-Ziv, 2019; Lin & Fu, 2017) and are more concerned about profitability rather than control power because of restraint by performance appraisals and strict market regulation (Yuan et al., 2008). This may partly explain why existing findings diverge. Additionally, as several studies mention, such as those by Edmans et al. (2019), Hemphill and Kahan (2019), He et al. (2019), Iselin et al. (2021), and Y. Chen et al. (2021), in any analysis of anti-competitive effects, it is of great significance to distinguish the economic consequences of dedicated institutional common owners, such as common mutual fund ownership, from blockholder common ownership, because mutual funds have weaker incentives and the ability to generate anti-competitive effects. However, a comparison between common ownership connected by mutual funds and other blockholders has not yet been conducted.

To address the aforementioned research gaps and different from existing studies, we focus on the Chinese stock market, exploiting the Top 10 Shareholding File, which includes various investors beyond institutional investors, as the research sample to study the impact of common ownership built through blockholders from the perspective of corporate risk-taking behavior.[1] To examine the potential economic channels, we also explore whether common ownership constrains firm competition. Notably, we also compare and distinguish the above impacts and effects of common ownership built through individual majority shareholders from those built through mutual funds. This comparison provides additional contextual insights into the significance and market power impacts of common ownership.

Specifically, corporate risk-taking is a significant driving force of financial performance and growth (John et al., 2008; Lewellyn & Muller-Kahle, 2012). Risk-averse firms may be more conservative in making investment decisions and forgoing profit opportunities. Although risks are omitted, firms may bypass value-enhancing projects that are crucial for long-term growth. Based on the findings of existing literature, we conjecture that two opposing arguments exist regarding the impact of blockholders' common ownership on corporate risk-taking. One view is that there is a positive relationship between blockholders' common ownership and corporate risk-taking behavior. Existing research, primarily in the US market, which typically exhibits highly diversified ownership structures, has demonstrated the beneficial influence of common institutional ownership on firm performance. Thus, firms may benefit from improvements in monitoring to help them better understand risk–return trade-offs and be more willing to undertake higher risk to raise firm value (E. H. Kim & Lu, 2011).

An alternative view is that a negative relationship exists between blockholders' common ownership and corporate risk-taking behavior. Antón et al. (2023) suggest that firms with common ownership tend to reduce their managerial incentives to avoid competition. In this vein, investors' utility functions are such that the expected losses from risk increase with increases in the intra-industry concentration of

allocations. Therefore, encouraging individual firms to assume less risk is optimal for the common blockholders' intra-industry portfolios. These two competing hypotheses suggest that the influence of common ownership on corporate risk-taking remains an empirical issue worth investigating.

Taking China as the research setting, we examine our conjectures using blockholder common ownership data derived from the Top 10 Shareholding File of Chinese nonfinancial firms of listed A shares. Our results show a significant negative effect between common blockholder ownership and corporate risk-taking after controlling for two-way firm and year fixed effects. A series of robustness tests, including adopting alternative measurements, adding additional control variables, and controlling for time-varying industry fixed effects, were conducted to confirm reliability. Using propensity score matching and Heckman's corrections, we demonstrate that our findings hold potential endogeneity concerns. Mechanistic analyses show that common blockholder ownership exerts its influence by increasing market concentration with concomitant decreases in market competition. In addition, the results show that our identified negative relationship between common blockholder ownership and risk-taking can be alleviated among firms with better corporate governance mechanisms, such as firms appointing Big-4 auditors as well as firms with higher board independence and analyst coverage.

We also extend the investigation of the impact of common ownership on risk-taking by comparing cross-held firms with individual investors and cross-holding by mutual fund families. We seek to draw a comparison with common ownership of block shareholders. The results show that in contrast to common ownership built by blockholders, mutual funds are significantly and positively associated with corporate risk-taking, despite mutual funds typically owning a much smaller proportion of shares than common blockholders. Furthermore, we find that in contrast to blockholder common ownership, ownership connectedness built by mutual fund families significantly increases future growth.

Additionally, by investigating the impact of individual common ownership, we find that this form of common ownership has no significant impact on corporate risk-taking behavior. In other words, although individual majority shareholders are common in China, few individual majority shareholders have cross-holdings. Highly decentralized individual majority shareholders may not have a significant control effect on a single industry, which may explain why the common ownership of individual majority shareholders has no significant effect on risk-taking.

This study contributes to the literature in several ways. First, we contribute to the debate on the impact of common ownership on corporate governance in emerging markets. Consistent with the anti-competition stream of literature, the risk-taking-reduction role we identify for blockholders' common ownership supports the theory of anti-competition (Azar et al., 2018; Cheng et al., 2022). Meanwhile, in contrast to existing studies analyzing the impacts of institutional blockholding common ownership relying on ownership data that omit non-institutional corporate holders (Azar et al., 2018; He & Huang, 2017; Kang et al., 2018), we take the Top 10 Shareholding File. This allows us to include various types of investors beyond institutional investors. Therefore, our findings allow a more comprehensive and integrated understanding of the market consequences of blockholders' common ownership rather than examining the single impact of institutional common ownership.

Furthermore, Azar et al. (2018) and Dennis et al. (2022) dispute the anti-competition role of common ownership in a single industry, specifically, airlines. By contrast, we contribute to the corporate governance literature by conducting cross-industry analyses. As Hemphill and Kahan (2019) indicate, the specific structure of the tests performed in single-industry studies limits their ability to detect the mechanisms of common ownership. Therefore, Azar et al.'s (2018) and Dennis et al.'s (2022) conclusions may stem from the specific focus on the airline industry and its characteristics. Our cross-industry study offers new findings that are more broadly applicable than those from single-industry studies in detecting the economic channel between blockholder ownership and corporate behavior.

Additionally, we compare the common ownership effects of different types of blockholders, including pure institutional shareholders, individual majority shareholders, and mutual funds. As Cornett et al. (2007), Clifford and Lindsey (2016), Lin and Fu (2017), and Hadlock and Schwartz-Ziv (2019) indicate, there are significant differences in fund availability, investment horizons, and risk preferences between institutional shareholders and other types of investors. In addition, recent studies by Edmans et al. (2019) and Hemphill and Kahan (2019) show that it is necessary to distinguish between the different types of common ownership effects. Our findings suggest that the common ownership effect of individual majority shareholders is much weaker than that of institutional investors and mutual funds. Further, through this distinction, we identify strikingly opposite impacts of institutional common ownership and mutual funds on common ownership in the Chinese stock market. Thus, our study highlights the need to further consider common ownership heterogeneity.

Finally, the influence of the ownership structure is a mainstay of risk-taking studies. Previous studies concentrate on state and foreign owners (Boubakri et al., 2013), institutional shareholders (Sakawa et al., 2021), board size (Y. S. Huang & Wang, 2015; Nakano & Nguyen, 2012), multiple large shareholders (Mishra, 2011), and large shareholder diversification (Faccio et al., 2011). As our study tests how blockholder common ownership influences firm decisions, we contribute to the governance literature by illustrating that risk-taking is reduced in the presence of blockholders who simultaneously own shares of competitors in the same industry.

The remainder of this paper is structured as follows. Section 2 develops the research hypotheses. Section 3 describes our data sources, variables, and model specifications. Section 4 reports the baseline results, robustness testing, and additional analyses to address endogeneity concerns. Section 5 presents the results of further analyses. Section 6 concludes.

2 | INSTITUTIONAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1 | Why China?

We base our study on the Chinese market for several reasons. First, the Chinese market has a significant influence on the global economy and is distinct from the United States in terms of shareholder structure, governance style, and monitoring efficiency (Armitage et al., 2017; Yao et al., 2023). Considering this, our findings provide a new contribution beyond studies that focus on US data. Particularly relevant to this study, blockholding in the Chinese market is no longer limited to institutional investors; individual investors and nonfinancial entities hold considerable stakes in competing firms (Zheng et al., 2014).

Second, using the Top 10 Shareholding File as a research sample, significant differences can be observed in investor types and shareholdings among large shareholders. Specifically, as connectedness built by nonfinancial investors and mutual fund families is common in the Chinese market, our sample selection provides an opportunity to make comparisons across blockholder types, beyond simply considering common ownership built through institutions.

Finally, as China is an emerging market with weak formal institutional development following an economic transition (Cui et al., 2021; Zhan, 2012), corporate governance and external monitoring of Chinese firms are less efficient than those in developed markets (J. B. Kim et al., 2020). Thus, China provides an interesting opportunity to study the interaction between common ownership and corporate risk-taking in an emerging environment with low institutional monitoring and weak legal enforcement.

2.2 | Literature review

Previous studies on the US stock market concentrate on whether common ownership among institutional investors inhibits market competition. For example, as a representative study of the effects of common ownership, Azar et al. (2018) consider the US airline industry as a research sample and find that common ownership induces reduced incentives to compete, which brings higher airline prices and lower firm outputs. Similarly, Antón et al. (2023), Cheng et al. (2022), and Lu et al. (2022) document that common institutional ownership conditions managerial incentives to be less performance sensitive and has significantly negative impacts on the level of corporate social responsibility (CSR) and corporate advertising expenditure, consistent with an anti-competitive view.

As a powerful riposte to Azar et al. (2018), Dennis et al. (2022) point out that the common institutional ownership effect documented in Azar et al. (2018) is driven by the merged market share component of the common ownership measure, rather than the ownership and control components.[2] Lewellen and Lowry (2021) and Koch et al. (2021) affirm an insignificant relationship between common ownership and market competition (or cooperation).

In addition, prior studies explore the influence of common ownership on corporate governance and its relevant economic consequences. Some find that firms benefit from improvements in monitoring, facilitating better control of the risk–return trade-off. Kang et al. (2018) indicate that the information advantages and governance experience generated from institutions' multiple blockholdings assist in effective corporate monitoring. Similarly, Brooks et al. (2018), Ramalingegowda et al. (2021), and Cheng et al. (2022) verify that common ownership among institutional investors encourages firms to disclose more transparent financial statement information, leading to higher quality analyst forecasts. Edmans et al. (2019) further point out that common ownership can strengthen corporate governance through voice and the threat of exit, even for firms in unrelated industries. Park et al. (2019) find that anti-competitive incentives created by firms with common ownership incentives reduce proprietary cost concerns regarding information disclosure, thereby improving firm information disclosure. He and Huang (2017) show that common ownership can significantly boost firms' market share growth by improving innovation productivity and operating profitability.[3]

2.3 | Hypothesis development

Competing streams of literature consider how common ownership shapes firm behavior and how firms may benefit from improvements in monitoring, which helps them have better control over risk–return trade-offs. E. H. Kim and Lu (2011) illustrate that strong external governance mitigates agency problems and prevents managers from harming shareholder value. Therefore, managers under enhanced external monitoring by common blockholders may be pushed to increase shareholder value by raising profits, which requires higher risk-taking.

Specifically, the literature suggests that the management advantages gained from common ownership are threefold. The first is information production (Kacperczyk et al., 2005), in which blockholders invest in multiple businesses in a specific industry. Kacperczyk et al. (2005) find that, after controlling for risk and style differences, mutual funds with a more concentrated investment strategy outperform others, consistent with superior information regarding specified industries.

Second, common blockholders can obtain management wisdom from the holding firms and apply it to improve corporate governance and efficiency. Edmans et al. (2019) conclude that common ownership can have positive effects on governance through voice and exit. Corporate governance is positively linked with risk-taking. For example, John et al. (2008) report a positive relationship between corporate governance and risk-taking and future growth rates. The combined evidence from these studies suggests that common ownership may improve corporate governance, which previous research has linked to corporate risk-taking.

Given the above literature, the effect of common blockholder ownership on corporate risk-taking may be positive because of improvements in management information and corporate governance,

especially in monitoring potential agency problems (Mishra, 2011). Thus, we propose the following hypothesis:

> **Hypothesis 1a.** Common blockholder ownership raises corporate risk-taking, ceteris paribus.

Considering the risk-taking constraint view, common blockholders are experienced and knowledgeable investors with more insight into portfolio firms, especially their corporate operations and governance. Common blockholders do not want managers to take risky actions due to the concentration of their assets. Instead, they are motivated to promote coordination among competing firms in their portfolios to lower risk by reducing market competition. In addition, profits to common blockholders come not only from the performance of a single firm but also from the overall profitability of competing firms in their portfolio. As mentioned, when there are negative externalities of market competition among firms in an industry, common blockholders who jointly own the stocks of competing firms may want managers to take actions that maximize the value of aggregate portfolios instead of individual firms (Azar et al., 2018). Pan et al. (2020) study blockholders' common ownership using Chinese data and find market collusion with underinvestment because of this connectedness. Similarly, Cheng et al. (2022) support the anti-competition role of common ownership by illustrating the negative relationship between common ownership and corporate CSR levels, finding that this effect is more prominent in industries with severe competition. Therefore, encouraging individual firms to assume less risk is optimal for the common blockholders' intra-industry portfolios.

The investments of common blockholders, although consisting of a series of competing firms, are often non-diversified because of their concentration in specific industries. According to Faccio et al. (2011), firms with concentrated blockholders have a lower investment risk than firms with diversified blockholders. Poorly diversified shareholders are more sensitive to risk and may forgo profitable investment opportunities. Due to resource limitations, common blockholders lack the ability to further diversify when they already hold a significant proportion of competing firms in an industry. Consistent with this view, blockholders concentrated in specific industries may manifest risk avoidance. Therefore, common blockholders may be motivated to reduce corporate risk-taking to reduce the risk of poorly diversified portfolios.

> **Hypothesis 1b.** Common blockholder ownership reduces corporate risk-taking, ceteris paribus.

3 | DATA SELECTION AND RESEARCH DESIGN

3.1 | Data and sample

We restrict our sample to Chinese listed A shares from 2010 to 2019. Following Hemphill and Kahan (2019) and Lewellen and Lowry (2021), we select 2010 as the start year to avoid capturing effects caused by industrial responses to the 2008 financial crisis. In addition, we exclude financial firms. Firm-level data are derived from the China Stock Market and Accounting (CSMAR) database. All continuous variables are winsorized at 1%.

Our proxy for blockholders' common ownership is built from the top 10 shareholder information available from the CSMAR database. In our specification, common ownership exists when a blockholder who owns at least 3% of one firm's share simultaneously holds at least 3% of one or more firms in the same industry. Following Pan et al. (2020), the classification of China Securities Regulation Commission is applied to define industries. As manufacturing firms account for a very large proportion of the whole sample, industry codes in our setting denote classes for manufacturing firms and categories for others.

Unlike the usage of 5% as the threshold in the US context, we relax the standards and measure common ownership using the 3% proportion because shareholders with 3% of shares of the company have the right to submit written proposals to the board of directors for deliberation under the Company Law of the People's Republic of China (Gao et al., 2019). Whether the shareholder has 3% shares thus can be considered a measurement of control power. Following Gao et al. (2019), we employ three common ownership proxies with 3% proportion of shareholding as a threshold: (1) a dummy variable that equals to 1 if the firm has any blockholders who simultaneously own at least 3% shares of competing firms in the same industry in any quarter of the year (*Cross*); (2) the natural logarithm of 1 plus the annual average of the quarterly number of common blockholders who simultaneously own at least 3% shares of competing firms (*Cross_Num*); and (3) the natural logarithm of 1 plus the average number of shares cross-held in each quarter (*Cross_Share*).

For the dependent variable, we follow John et al. (2008) to measure corporate risk-taking by the variation in industry-adjusted return on assets (ROA), building two proxies: (1) the 3-year (year t to $t + 2$) standard deviation of the adjusted ROA (*Risk1*) and (2) the difference between the maximum and minimum of adjusted ROA covering the year t to $t + 2$ (*Risk2*).

Following Boubakri et al. (2013) and Faccio et al. (2011), we control for several firm characteristics that may have a direct impact on corporate risk-taking, including firm size (*Size*), leverage ratio (*Lev*), capital expenditure (*Cap_Ex*), revenue growth (*Growth*), return on equity (*ROE*), and the age of the firm (*Firm_Age*). In addition, some studies point out that variables related to corporate governance are closely related to corporate risk-taking. In robustness testing, we also control for a set of board features following Nakano and Nguyen (2012), including the proportion of shares owned by the largest shareholder (*Top1*), board size (*Board*), number of independent directors (*Indep*), and CEO–Chair duality (*Dual*). Appendix A presents variable definitions.

3.2 | Methodology

To test whether and how blockholder common ownership exerts influence on corporate risk-taking, we develop the following fixed-effect model:

$$Risk1_{i,t}(Risk2_{i,t}) = \alpha_0 + \beta_1 Cross_{i,t} + \gamma' Control_{i,t} + Firm\,FE + Year\,FE + \varepsilon_{i,t}, \quad (1)$$

where i denotes the firm and t denotes the fiscal year. Two-way fixed-effect dummies control for unobservable firm-specific and time-varying factors. Following Petersen (2009), we cluster standard errors at the firm level to account for possible correlation in the error term within a given firm. The proxy of blockholder common ownership, *Cross*, is measured, in turn, as the three variables described in the previous section. Blockholder common ownership is identified as raising (reducing) corporate risk-taking if the coefficient β_1 is significantly positive (negative). The problem of the standard R^2 under fixed effect model is that its value will mostly be driven by the fixed effects and not by the regressors of interest. As a solution, the within-R^2 computes the R^2 of the regression where every variable has already been demeaned with respect to all the fixed effects. Therefore, following Hatton (2016), and Huber (2018), we use the within-R^2 in the report of the regression.

4 | RESULTS

4.1 | Descriptive statistics

Panel A of Table 1 presents the summary statistics of the variables within the observation period, including the number of observations, mean values, standard deviations, and quantiles. For common ownership variables, a mean value of *Cross* of 0.164 indicates that 16.4% of the sample relates to same-industry competitors through multiple blockholdings. The means of the other two common ownership proxies, *Cross_Num* and *Cross_Share*, are 0.105 and 0.031, respectively. The 3-year standard deviation of industry-adjusted ROA, *Risk1*, has a smaller mean of 3.420 compared with 6.453 for *Risk2*, which captures the range of ROA fluctuation. The natural logarithm of firm age is 2.825 on average, indicating that the average age of firms in the sample is approximately 16 years. The sample firms have a history of at least 4 years. The mean *Board* size is 2.133, which implies 8.440 directors for each firm. The average proportion of independent directors is 37.5%. Approximately 27.6% of the observations appointed the same person as the CEO and board chair.

The right-hand side of Panel A reports the summary statistics regarding whether the firm is commonly held. We find that firms with blockholders are generally larger and older and have higher leverage ratios and returns on equity. The risk-taking variables, *Risk1* and *Risk2*, are both approximately 22% lower in the commonly held group than in firms without common ownership, significant at the 1% level.

The Spearman (Pearson) correlation coefficients (not reported for brevity) indicate strong, significant correlations between common ownership variables and risk-taking variables, supporting our selection of proxies. Consistent with the anti-competition hypothesis, we find negative correlation coefficients between common ownership and risk-taking, preliminarily supporting Hypothesis 1b. We find that risk-taking, measured by the variance or range of adjusted ROA, decreases when firms have a larger size, ROE, board size, and proportion of shares owned by the largest shareholder. Risk-taking increases with firm age, leverage, the presence of more independent directors, and separation between the CEO and Chair.

Panel B of Table 1 provides the descriptive statistics with the industry and trend features of common ownership reported to aid in understanding the distribution. This table contains information from 17 industries that combine all manufacturing industry classes. The highest levels of common ownership are in the electric power, heat, gas, water production, and supply industries. We find that 41.08% of the observations are connected. The lowest mean value of 4.38% is recorded for the cultural, sports, and entertainment industries. There are considerable differences in common ownership across industries. The mean values of *CrossM*, which refers to the common ownership dummy of mutual fund blockholders, are reported after the column for *Cross*. Unlike the industrial distribution of common blockholder ownership, the highest mean of *CrossM* is 71.93% in the education industry.

Panel C reports the trends in common ownership in China from 2010 to 2019. The common ownership level measured by *Cross* at the beginning of the observation period, 2010, is approximately 16%. It dropped below 14% in 2012 and then increased.[4] We did not find any obvious trends in the number of common blockholders. The average share held by each common blockholder shows a significant downward trend, decreasing from 22% in 2010 to 17% in 2019. In contrast to common blockholder ownership, common mutual fund ownership shows a decreasing trend over time, decreasing from 55.93% in 2010 to 22.26% in 2019.

4.2 | Baseline results

Table 2 presents the baseline regression results. We focus on the coefficients of the common ownership variables. Individual and time-period two-way fixed-effect models were employed. We control for a vector of corporate finance variables in columns 1–3 and regress risk-taking (proxied by *Risk1*) on common ownership. The coefficients of the common ownership variables are negative and significant at the 1% level. The common ownership variable, measured by the average number of common blockholders (*Cross_Num*), has the largest t-value (−4.228). The results support Hypothesis 1b, indicating that common blockholder ownership decreases corporate risk-taking behavior, consistent with the anti-competitive hypothesis and with Azar et al. (2018), Antón et al. (2023), Cheng et al. (2022), and Lu et al. (2022).

Regarding the control variables, we find that firm size, leverage, and firm age significantly increase risk-taking, while ROE and capital expenditure lower it. Inspired by studies on corporate governance and risk-taking (Nakano & Nguyen, 2012), we include a set of additional governance features, including the proportion of shares owned by the largest shareholder, number of directors, proportion of independent directors, and CEO–Chair duality, into our baseline modeling. Columns 4–6 report the results of the two-way fixed-effect estimation. After

TABLE 1 Summary statistics and correlation coefficient matrix.

Panel A. Summary statistics

	Whole sample ($N = 26{,}818$)							Observations without common ownership ($N = 22{,}413$)	Observations with common ownership ($N = 4405$)	Difference in mean	*p*-value of difference
	Mean	SD	Min	P25	Median	P75	Max	Mean	Mean		
Cross	0.164	0.370	0.000	0.000	0.000	0.000	1.000	0.000	1.000		
Cross_Num	0.105	0.258	0.000	0.000	0.000	0.000	1.609	0.000	0.641	−0.641***	.000
Cross_Share	0.031	0.102	0.000	0.000	0.000	0.000	0.650	0.000	0.190	−0.190***	.000
Risk1	3.420	4.592	0.113	1.021	1.913	3.762	33.671	3.547	2.761	0.787***	.000
Risk2	6.453	8.573	0.218	1.949	3.642	7.144	63.172	6.691	5.221	1.470***	.000
Size	22.063	1.296	19.310	21.120	21.889	22.804	26.369	21.907	22.863	−0.956***	.000
Lev	0.423	0.213	0.026	0.249	0.413	0.583	0.933	0.412	0.477	−0.065***	.000
ROE	0.066	0.141	−1.183	0.031	0.075	0.124	0.417	0.064	0.079	−0.015***	.000
Cap_Ex	5.017	4.768	0.014	1.521	3.595	7.034	27.895	5.008	5.066	−0.058	.465
Growth	0.201	0.518	−0.643	−0.011	0.116	0.281	5.422	0.204	0.188	0.017*	.053
Age	2.825	0.359	1.099	2.639	2.890	3.091	3.555	2.813	2.882	−0.070***	.000
Top1	0.347	0.149	0.083	0.231	0.327	0.449	0.759	0.346	0.353	−0.007***	.002
Board	2.133	0.197	1.609	1.946	2.197	2.197	2.708	2.123	2.184	−0.060***	.000
Indep	0.375	0.053	0.286	0.333	0.333	0.429	0.600	0.375	0.374	0.001	.295
Dual	0.276	0.447	0.000	0.000	0.000	1.000	1.000	0.291	0.202	0.089***	.000

Panel B. Common ownership distribution over industry

Industry	Number of firms	Number of obs.	Mean of *Cross*	Mean of *CrossM*
Agriculture, forestry, animal husbandry, and fishery	50	397	0.0479	0.4181
Mining industry	90	654	0.2339	0.2859
Manufacturing industry	2527	17,421	0.1451	0.4109
Industry of electric power, heat, gas, and water production and supply	121	869	0.4108	0.2892
Construction industry	115	709	0.1128	0.3103
Wholesale and retail industry	203	1409	0.2505	0.4474
Transport, storage, and postal service industry	112	807	0.3903	0.2020
Accommodation and catering industry	12	97	0.1959	0.1546
Industry of information transmission, software, and information technology services	326	1683	0.1777	0.5446
Real estate industry	169	1208	0.1349	0.3564
Leasing and commercial service industry	80	326	0.0859	0.4110
Scientific research and technical service industry	64	257	0.0973	0.2879
Water conservancy, environment, and public facility management industry	66	295	0.0475	0.4305

(Continues)

TABLE 1 (Continued)

Panel B. Common ownership distribution over industry				
Industry	**Number of firms**	**Number of obs.**	**Mean of *Cross***	**Mean of *CrossM***
Industry of resident service, repair, and other services	8	21	0.0476	0.2857
Education	12	57	0.1228	0.7193
Health and social work	64	349	0.0946	0.3897
Industry of culture, sports, and entertainment	69	251	0.0438	0.2311

Panel C. Common ownership distribution over year			
Year	**Number of firms**	**Mean of *Cross***	**Mean of *CrossM***
2010	1851	0.1594	0.5593
2011	2131	0.1492	0.5075
2012	2289	0.1398	0.4202
2013	2308	0.1508	0.3962
2014	2439	0.1595	0.4850
2015	2652	0.1731	0.5498
2016	2878	0.1616	0.5139
2017	3306	0.1636	0.3026
2018	3403	0.1754	0.2374
2019	3571	0.1885	0.2226

Note: Panel A presents the summary statistics of the whole sample and subsamples grouped by common ownership. Mean value, standard deviation, and the sample distribution of the whole sample are reported. The differences in mean between subsamples and the statistical significance are reported on the right-hand side. In Panels B and C, we report the common ownership distribution over industry and year, respectively.

***Statistically significant at the 1% level.

*Statistically significant at the 10% level.

TABLE 2 Baseline regression.

	Risk1					
Dependent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Cross	−0.382***			−0.427***		
	(−3.798)			(−4.232)		
Cross_Num		−0.724***			−0.786***	
		(−4.228)			(−4.550)	
Cross_Share			−1.840***			−1.626**
			(−2.598)			(−2.346)
Size	0.392***	0.390***	0.390***	0.398***	0.395***	0.394***
	(2.868)	(2.855)	(2.856)	(2.959)	(2.940)	(2.930)
Lev	1.153**	1.143**	1.144**	1.230**	1.219**	1.222**
	(2.115)	(2.095)	(2.097)	(2.303)	(2.283)	(2.288)
ROE	−8.599***	−8.599***	−8.607***	−8.411***	−8.412***	−8.426***
	(−20.448)	(−20.452)	(−20.442)	(−20.293)	(−20.298)	(−20.295)
Cap_Ex	−0.037***	−0.037***	−0.037***	−0.032***	−0.032***	−0.033***
	(−4.076)	(−4.069)	(−4.131)	(−3.670)	(−3.665)	(−3.743)
Growth	−0.026	−0.026	−0.025	0.000	−0.001	0.000
	(−0.360)	(−0.369)	(−0.352)	(0.002)	(−0.009)	(0.005)
Age	1.382**	1.356**	1.379**	0.686	0.660	0.703
	(2.186)	(2.141)	(2.180)	(1.112)	(1.068)	(1.138)
Top1				−5.947***	−5.940***	−5.846***
				(−7.156)	(−7.147)	(−7.051)
Board				0.585	0.597	0.593
				(1.254)	(1.279)	(1.270)
Indep				2.327**	2.338**	2.337**
				(1.970)	(1.980)	(1.976)
Dual				−0.007	−0.006	−0.011
				(−0.051)	(−0.042)	(−0.076)
Constant	−8.809***	−8.672**	−8.754***	−7.085**	−6.966**	−7.106**
	(−2.602)	(−2.562)	(−2.587)	(−2.026)	(−1.992)	(−2.032)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,627	26,627	26,627	26,627	26,627	26,627
Within-R^2	.097	.097	.096	.105	.106	.105

Note: This table presents the results of baseline regressions. The dependent variable is *Risk1*. The two-way fixed-effect model is applied in each regression. Standard errors are clustered at the firm level.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

adding the governance variables, the magnitudes and statistical significance for *Cross* and *Cross_Num* increase, whereas they decrease for *Cross_Share*. Firm age is no longer significant after controlling for governance. Interestingly, the proportion of shares owned by the largest shareholder significantly reduces risk-taking, consistent with the concentration of assets that reduces risk-taking.

We also note the economic effect sizes in terms of a 1-standard-deviation increase in the main explanatory variable relative to the sample mean of the dependent variable. These results are economically significant. A 1-standard-deviation increase in *Cross*, *Cross_Num*, and *Cross_Share* decreases *Risk1* by 4.62%, 5.46%, and 4.85% of its mean, respectively. Notably, the economic significance of our common ownership measures is significantly greater than that of other common ownership effects. For instance, a 1-standard-deviation increase in common ownership decreases voluntary disclosure by 4.15% of its mean (Park & Oh, 2022).

To further confirm the role of large shareholders in common ownership, we exclude the top 1, 3, and 5 largest shareholders in the construction of the common ownership variable for a robustness check. The results, which are not tabulated here, show that when excluding these shareholders, the negative impact of common ownership on corporate risk-taking exhibits a measured decrease. Moreover, compared with the other two exclusion methods, after excluding only the largest shareholder, the negative effect of common ownership on risk-taking decreased the most from the baseline results versus other exclusions.

The above results not only further validate the role of large shareholders in common ownership but also indicate that shareholders with more ownership have a greater impact on corresponding corporate decisions. As mentioned, it is reasonable to consider that the negative effect of common ownership on risk-taking comes from anti-competitive conditions. In such cases, the larger the ownership, the stronger the anti-competition effect of common ownership by large shareholders. This view is consistent with our empirical result that the negative effect lessens the most when excluding only the largest shareholder. This indirectly supports the need to test the role of the anti-competition effect in future analyses.

4.3 | Robustness tests

These findings may be driven by the measurement of our key variables. In this section, we address this concern by adopting alternative measures for the dependent and independent variables. Table 3 presents the estimation results regressing the alternative risk-taking proxy *Risk2* on the common ownership variables. We repeat the same regression model and controls used in the baseline analysis, except for the changes in the dependent variable. All the other settings remain unchanged. The *t*-values of the independent variables do not change after the substitution. A 1-standard-deviation increase in *Cross*, *Cross_Num*, and *Cross_Share* increases *Risk2* by 4.51%, 5.81%, and 4.79% of its mean, respectively, close to the effect on *Risk1*.

We further test the robustness of our findings using alternative common ownership variables and report the results in Table 4. In Panels A–C, we change the common ownership threshold to 2%, 4%, and 5%, respectively. The coefficients on the new common ownership variables should remain significant if previous findings are robust to the measurement. We include the control variables used in the previous modeling in the regressions for both *Risk1* and *Risk2*.

As reported in Panel A, the coefficients of the common ownership variables are all negative and significant at the 1% level. These results show that the effect of common ownership, even when established through lower levels of common blockholding, is meaningful for corporate risk-taking behavior. Panel B uses 4% common shareholdings as the threshold, with all other settings unchanged. The coefficients of the common ownership measurements, *Cross4* and *Cross4_Num*, increase in magnitude and are significant at the 1% level, whereas the coefficient of *Cross4_Share* decreases and is significant at the 5% level. Panel C reports the regression results using 5% as the threshold. We see a decrease in the common ownership coefficients and corresponding *t*-values compared with the previous results, although the signs remain negative.

In Panel D, we present an alternative type of common ownership. We conduct this as a placebo test to mitigate concerns about blockholders' self-selection. Specifically, unlike the mean proxies used in the baseline regression, we view two firms as commonly held only if they do *not* come from the same industry. Consistent with expectations, the coefficients of the common ownership variables were not statistically significant.

Additionally, we include industry and time-varying industry fixed effects to control for the time-invariant industrial characteristics and trends of industries. Table 5 presents the results. The coefficients of the common ownership variables decrease in magnitude compared with those in the firm–year fixed-effect models because they control for unobservable time trends. The results indicate that industry-common factors affect common ownership and corporate risk-taking behaviors. However, the significant negative correlation between common ownership and corporate risk-taking does not change.

4.4 | Endogeneity assessment

We employ propensity score matching to mitigate self-selection concerns that common ownership is determined by nonrandom assignment. In Panel A of Table 6, we report the results showing that possible confounding variables are significant in predicting whether firms are selected for the treatment group. The results are consistent with common blockholders preferring large firms with good profitability and having less preference for firms with greater control by the largest shareholder and CEO–Chair duality. To address concerns about self-selection bias, we match every cross-held observation with two control firms in the same industry in the same year. The right side of Panel A in Table 6 reports the post-matching summary statistics. We select 3725 treated firms and 7164 control firms for the matched sample, and the differences in most of the control variables between the two groups after matching are not statistically significant.

Following Yuan et al. (2016), we conduct regressions using the matched samples. Comparability can be ensured between the treated and control groups in terms of the selected attributes. Although the control firms are from the same industry–year combination as the treated firms, we control for firm and year fixed effects in these regressions. The results of regressions using matched data are reported in Panel B and are consistent with the baseline modeling.

However, there is an additional concern regarding self-selection caused by unobserved factors. We apply the Heckman selection model to address this issue. Following the literature (Fu & Qin, 2021; Gao et al., 2019; Xu et al., 2023), we use the external shocks of having a firm newly added to or removed from the Shanghai Shenzhen 300 Stock Market Index (CSI 300 index) to construct the exogenous variables.[5] Then, we use probit modeling to estimate the inverse Mills ratios in the first stage, with *CSI300in* and *CSI300out* as exogenous variables to predict the probability of firms having a common

TABLE 3 Robustness testing: adopting alternative dependent variables.

	Risk2					
Dependent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Cross	−0.705***			−0.787***		
	(−3.770)			(−4.201)		
Cross_Num		−1.339***			−1.452***	
		(−4.203)			(−4.524)	
Cross_Share			−3.426**			−3.032**
			(−2.568)			(−2.320)
Size	0.708***	0.705***	0.705***	0.719***	0.714***	0.712***
	(2.784)	(2.771)	(2.772)	(2.871)	(2.853)	(2.842)
Lev	2.228**	2.208**	2.209**	2.367**	2.346**	2.352**
	(2.196)	(2.177)	(2.178)	(2.383)	(2.362)	(2.368)
ROE	−16.347***	−16.346***	−16.362***	−16.001***	−16.002***	−16.028***
	(−20.698)	(−20.703)	(−20.692)	(−20.562)	(−20.568)	(−20.563)
Cap_Ex	−0.065***	−0.065***	−0.066***	−0.057***	−0.057***	−0.058***
	(−3.878)	(−3.871)	(−3.932)	(−3.472)	(−3.468)	(−3.544)
Growth	−0.055	−0.056	−0.054	−0.007	−0.009	−0.007
	(−0.412)	(−0.421)	(−0.404)	(−0.055)	(−0.065)	(−0.052)
Age	2.563**	2.513**	2.557**	1.281	1.232	1.311
	(2.163)	(2.119)	(2.157)	(1.107)	(1.064)	(1.132)
Top1				−10.927***	−10.914***	−10.740***
				(−7.006)	(−6.997)	(−6.902)
Board				1.081	1.102	1.094
				(1.238)	(1.263)	(1.254)
Indep				4.436**	4.456**	4.454**
				(2.001)	(2.012)	(2.008)
Dual				−0.027	−0.024	−0.033
				(−0.101)	(−0.091)	(−0.125)
Constant	−15.843**	−15.591**	−15.742**	−12.743*	−12.524*	−12.782*
	(−2.508)	(−2.469)	(−2.493)	(−1.953)	(−1.919)	(−1.959)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,627	26,627	26,627	26,627	26,627	26,627
Within-R^2	.100	.100	.100	.109	.109	.108

Note: This table presents the results of baseline regressions. The dependent variable is substituted by *Risk2*. The two-way fixed-effect model is applied in each regression. Standard errors are clustered at the firm level.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

*Statistically significant at the 10% level.

blockholder. Panel A of Table 7 affirms this selection, as the statistical significance of *CSI300in* and *CSI300out* exceeds the 5% threshold. The second-stage estimation uses two-way fixed-effect modeling, identical to the baseline specifications. Panel B of Table 7 presents the results of the estimations of corporate risk-taking after controlling for unobserved factors. The coefficients of the inverse Mills ratio are statistically significant and negative. Controlling for the unobserved factors did not affect our findings.

4.5 | Economic mechanism analysis

The mechanism underlying the anti-competition hypothesis is that the connectedness of market rivals reduces market competition. Laksmana and Yang (2015) demonstrate the risk-taking improvement role of product market competition. Chhaochharia et al. (2012) find that firms in more competitive environments are more efficient. If managers waste valuable resources or investment opportunities, firms in

TABLE 4 Robustness testing using alternative independent variables.

Panel A. Measure cross-ownership using 2% proportion of shareholding as the threshold						
Dependent variable	*Risk1* (1)	*Risk1* (2)	*Risk1* (3)	*Risk2* (4)	*Risk2* (5)	*Risk2* (6)
Cross2	−0.288***			−0.541***		
	(−3.551)			(−3.586)		
Cross2_Num		−0.530***			−0.989***	
		(−4.148)			(−4.160)	
Cross2_Share			−1.820***			−3.400***
			(−2.780)			(−2.753)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,627	26,627	26,627	26,627	26,627	26,627
Within-R^2	.105	.106	.105	.109	.109	.108
Panel B. Measure cross-ownership using 4% proportion of shareholding as the threshold						
Dependent variable	*Risk1* (1)	*Risk1* (2)	*Risk1* (3)	*Risk2* (4)	*Risk2* (5)	*Risk2* (6)
Cross4	−0.520***			−0.970***		
	(−3.815)			(−3.826)		
Cross4_Num		−0.864***			−1.610***	
		(−3.793)			(−3.807)	
Cross4_Share			−1.438**			−2.703**
			(−1.980)			(−1.976)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,614	26,614	26,614	26,614	26,614	26,614
Within-R^2	.105	.105	.105	.109	.109	.108
Panel C. Measure cross-ownership using 5% proportion of shareholding as the threshold						
Dependent variable	*Risk1* (1)	*Risk1* (2)	*Risk1* (3)	*Risk2* (4)	*Risk2* (5)	*Risk2* (6)
Cross5	−0.409**			−0.767**		
	(−2.464)			(−2.498)		
Cross5_Num		−0.672**			−1.278**	
		(−2.486)			(−2.559)	
Cross5_Share			−1.168*			−2.228*
			(−1.690)			(−1.718)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,627	26,627	26,627	26,627	26,627	26,627
Within-R^2	.105	.105	.105	.108	.108	.108

TABLE 4 (Continued)

Panel D. Measure cross-ownership among *different* industries using 3% proportion of shareholding as the threshold						
Dependent variable	***Risk1*** **(1)**	***Risk1*** **(2)**	***Risk1*** **(3)**	***Risk2*** **(4)**	***Risk2*** **(5)**	***Risk2*** **(6)**
CrossN	−0.088			−0.169		
	(−1.017)			(−1.049)		
CrossN_Num		−0.167			−0.308	
		(−1.254)			(−1.237)	
CrossN_Share			−0.626			−1.217
			(−1.508)			(−1.564)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,623	26,623	26,623	26,623	26,623	26,623
Within-R^2	.105	.105	.105	.108	.108	.108

Note: This table presents the results using the alternative independent variables to support robustness. Common ownership variables in panel A are defined to exist when common blockholders simultaneously own at least 2% shares of firms in the same industry. Panels B and C further change this threshold to 4% and 5%, respectively. In panel D, common ownership is defined as the connection of firms that are in different industries using the 3% threshold. The two-way fixed-effect model is applied in each regression. The rich set of control variables used in prior tests are controlled for. Standard errors are clustered at the firm level.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

*Statistically significant at the 10% level.

competitive environments lose market share and become less competitive (Aghion & Griffith, 2008).

As common ownership creates linkages among firms in the same industry through common blockholders, we expect a decrease in market competition in industries with more common ownership, which, in turn, reduces firm incentives to take risks. We use the Herfindahl competition index (Herfindahl–Hirschman index [HHI]) to measure competition.

The HHI measures the extent to which industrial output is concentrated among firms. To calculate this, we take the market share of each firm in the industry, square it, and add them. The higher the Herfindahl index, the more concentrated is the market power (less competition). Following Pevzner et al. (2015) and Demerjian et al. (2020), we use the HHI as a mediating variable to conduct a path analysis. We adopt a three-step approach in this study. The first step is to estimate the direct effect of common ownership on corporate risk-taking; in the second step, we estimate the indirect effect of common ownership on the mediating variables (HHI); and in the third step, we incorporate common ownership into the regression model and estimate the indirect effect of the mediating variable (HHI) on corporate risk-taking. We estimate the significance of the indirect effect using Sobel's (1982) test statistics (H0: The indirect effect of Steps 2 and 3 does not exist).

Table 8 presents the results, which show both the direct and indirect effects. In columns 1–3 of Table 8, the direct effect of common ownership on corporate risk-taking is −0.414 (statistically significant at the 1% level), whereas the indirect effect of anti-competition through the HHI is −0.014 (statistically significant at the 10% level). Specifically, the coefficient of *Cross* on HHI is 0.004 (*t*-statistics = 2.112), while the coefficient of *HHI* for *Risk1* is −3.565 (*t*-statistics = −2.449). Both coefficients are statistically significant, with an indirect coefficient of *Cross* on *Risk1* that is −0.014 with a *t*-statistic of −1.686 (SE = 0.020).

We find similar results in columns 4–6 of Table 8. We note that the magnitude and significance of the indirect effect are small relative to the direct effect. One reason for the relatively low indirect effect could be that our proxy for the mediating variable is measured with noise and imperfectly captures anti-competition.[6] Overall, however, the evidence is consistent with common ownership decreasing corporate risk-taking because common ownership decreases market competition within industries.

5 | FURTHER ANALYSIS

5.1 | Mutual fund common ownership versus common individual investors

The literature on shareholder heterogeneity documents that different types of shareholders have different influences on firms (Clifford & Lindsey, 2016; Cornett et al., 2007; Lin & Fu, 2017). Institutional blockholders can be categorized into two subtypes based on their

TABLE 5 Robustness test controlling for industrial and time-varying industrial features.

Panel A. Industry fixed effect						
Dependent variable	***Risk1*** **(1)**	***Risk1*** **(2)**	***Risk1*** **(3)**	***Risk2*** **(4)**	***Risk2*** **(5)**	***Risk2*** **(6)**
Cross	−0.283***			−0.308***		
	(−3.211)			(−3.507)		
Cross_Num		−0.408***			−0.425***	
		(−3.108)			(−3.238)	
Cross_Share			−0.815**			−0.464**
			(−2.498)			(−2.039)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,818	26,818	26,818	26,818	26,818	26,818
Within-R^2	.173	.173	.173	.181	.181	.180
Panel B. Time-varying industry fixed effect						
Dependent variable	***Risk1*** **(1)**	***Risk1*** **(2)**	***Risk1*** **(3)**	***Risk2*** **(4)**	***Risk2*** **(5)**	***Risk2*** **(6)**
Cross	−0.324***			−0.367***		
	(−3.271)			(−3.685)		
Cross_Num		−0.578***			−0.644***	
		(−3.424)			(−3.773)	
Cross_Share			−1.318**			−1.190**
			(−2.041)			(−2.073)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,623	26,623	26,623	26,623	26,623	26,623
Within-R^2	.090	.090	.089	.097	.097	.096

Note: This table presents the results controlling for industrial and time-varying industrial features to support robustness. Fixed effects of regressions in Panel A are industry and year, where the industry code is defined as class for manufacturing firms and category for others. Panel B controls for firm and time-varying industrial fixed effects. The rich set of control variables used in prior tests are controlled. Standard errors are clustered at the firm level.
***Statistically significant at the 1% level.
**Statistically significant at the 5% level.

business relationships with portfolio firms (Cornett et al., 2007; Lin & Fu, 2017). The first subcategory is "pressure sensitive." Companies in this category (e.g., banks and insurance companies) have business relations with firms and, accordingly, may be less willing to challenge management decisions to maintain harmonious relationships. In contrast, "pressure-insensitive" blockholders have no business relationship with the portfolio firms and are therefore motivated to monitor management. This type includes both mutual funds and hedge funds.

Using this classification, we hypothesize that common ownership by pressure-insensitive institutional investors may have a prominent positive effect on corporate governance and improve risk-taking. Specifically, Clifford and Lindsey (2016) report that mutual fund and hedge fund blockholders are more likely to be associated with effective monitoring. Lin and Fu (2017) show that the positive effect of pressure-insensitive institutional investors on firm performance is greater than that of pressure-sensitive institutions. Inspired by these studies, we compare the effect of common ownership established through common blockholders consisting of various investor types with that by common ownership established through mutual fund investors. We consider the latter group to be pressure insensitive because they have no business relations with portfolio firms and are less subject to them (Cornett et al., 2007). Previous studies demonstrate that ownership by pressure-insensitive institutions is conducive to corporate governance, as it improves the discipline of executive compensation (Almazan et al., 2005) and leads to better acquisition decisions (Chen et al., 2007).

TABLE 6 Results from the propensity score matching approach.

Panel A. Results of first-stage regression and summary statistics						
	Results of the first-stage regression		Control group (*Cross* = 0, *N* = 7164)	Treatment group (*Cross* = 1, *N* = 3725)		
	Cross	*t*-value	Mean	Mean	Difference in mean	*p*-value of difference
Size	0.546***	(33.153)	22.372	22.492	−0.120	.000
Lev	−0.459***	(−4.535)	0.436	0.459	−0.022	.000
ROE	0.458***	(3.111)	0.077	0.074	0.003	.255
Cap_Ex	0.011***	(3.024)	5.239	4.987	0.252	.009
Growth	−0.117***	(−3.169)	0.200	0.195	0.005	.585
Age	0.252***	(4.743)	2.840	2.875	−0.035	.000
Top1	−0.807***	(−6.743)	0.344	0.344	0.001	.908
Board	0.737***	(7.027)	2.158	2.161	−0.003	.480
Indep	0.886**	(2.376)	0.372	0.373	−0.001	.365
Dual	−0.195***	(−4.528)	0.232	0.225	0.007	.456

Panel B. Results of regression using matched sample						
Dependent variable	*Risk1* (1)	*Risk1* (2)	*Risk1* (3)	*Risk2* (4)	*Risk2* (5)	*Risk2* (6)
Cross	−0.380***			−0.699***		
	(−3.127)			(−3.081)		
Cross_Num		−0.689***			−1.272***	
		(−3.013)			(−2.979)	
Cross_Share			−2.008*			−3.750*
			(−1.846)			(−1.817)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,889	10,889	10,889	10,889	10,889	10,889
Within-R^2	.072	.072	.072	.074	.074	.075

Note: Panel A of this table presents the first-stage results of propensity score matching and the corresponding summary statistics of the control and treatment groups. The coefficients and *t*-values of the first-stage logit regression are reported on the left-hand side. The difference in mean between subsamples and the statistical significance are reported on the right-hand side. Panel B reports results from regressing risk-taking on common ownership and the set of additional control variables using matched data. The two-way fixed-effect model is applied in each regression. Standard errors are clustered at the firm level.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

*Statistically significant at the 10% level.

To begin this analysis, we first build mutual fund common ownership proxies using the same methodology we used to investigate blockholders. However, we change the threshold from 3% to 1% because mutual fund families in China typically own a smaller proportion of portfolio firms. Our reasoning is twofold. First, for compliance purposes, the concentration in any given firm is restricted for mutual companies, and the 4% shareholding of a firm is a common alert level. Second, the "double 10" principle introduced by the China Securities Regulatory Commission (CSRC) requires that a fund holding a stock shall not have that same stock exceeding 10% of fund assets and that all funds managed by the same manager shall hold a stock in common across all funds, not in excess of 10% of the market value of the respective stock. If the fund size is not sufficiently large, liquidity requirements will require low shareholdings of each portfolio firm. Furthermore, because the results are possibly driven by the share of mutual fund ownership (Dennis et al., 2022), we also control for mutual fund ownership (*M_Inst*) in the model.

We estimate risk-taking using mutual fund data to test whether mutual fund common ownership has the same or opposite impact on risk-taking as our findings for blockholding. Panel A of Table 9

TABLE 7 Results from Heckman's correction test.

Panel A. Results of first-stage Heckman's correction		
	Cross	***t*-value**
CSI300in	0.025***	(3.462)
CSI300out	−0.013**	(−2.013)
Size	0.328***	(5.343)
Lev	−0.216***	(−3.453)
ROE	0.359***	(3.909)
Cap_Ex	0.002***	(2.713)
Growth	−0.101***	(−3.223)
Age	0.183***	(3.662)
Top1	−0.234**	(−2.123)
Board	0.241***	(3.823)
Indep	0.352**	(2.091)
Dual	−0.113***	(−4.2139)
Observations	22,519	
Pseudo-R^2	.103	

Panel B. Results of Heckman's correction						
Dependent variable	***Risk1*** **(1)**	***Risk1*** **(2)**	***Risk1*** **(3)**	***Risk2*** **(4)**	***Risk2*** **(5)**	***Risk2*** **(6)**
Cross	−0.411***			−0.761***		
	(−3.756)			(−3.750)		
Cross_Num		−0.795***			−1.482***	
		(−4.239)			(−4.260)	
Cross_Share			−1.789**			−3.374**
			(−2.328)			(−2.327)
IMR	−6.191***	−6.190***	−6.095***	−9.363***	−9.362***	−9.185***
	(−4.603)	(−4.601)	(−4.545)	(−4.633)	(−4.631)	(−4.575)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,046	22,046	22,046	22,046	22,046	22,046
Within-R^2	.104	.105	.103	.107	.107	.107

Note: Panel A of this table presents the first-stage results of the Heckman method with an exogenous variable *CAR*, which refers to the 3-year ahead abnormal return. The coefficients and *t*-values of the first-stage logit regression are reported on the left-hand side. Panel B reports results of regression with control of the inverse Mills ratio (*IMR*). The two-way fixed-effect model is applied in each regression. The rich set of control variables used in prior tests are controlled. Standard errors are clustered at the firm level.

***Statistically significant at the 1% level.

**Statistically significant at the 5% level.

presents the results. Consistent with expectations, the coefficients of common ownership built by mutual fund families and the proxies of mutual fund common ownership are all significantly *positive*. The results show that a 1-standard-deviation increase in *CrossM*, *CrossM_Num*, and *CrossM_Share* increases mean risk-taking by 1.68%, 3.70%, and 4.91%, respectively, as measured by *Risk1*, and 1.68%, 3.76%, and 4.94%, respectively, as measured by *Risk2*. This imbalance in the magnitude of influence suggests that the number of shareholdings is an important driver for mutual fund shareholders to play their role.

Heterogeneity at the level of institutions versus non-institutions, as well as within non-institutional investors, provides another angle to better understand common ownership. Common blockholder ownership may differ in its impact on corporate governance. For instance, individual blockholders (i.e., persons) are common in the Chinese market.

TABLE 8 Mediation analysis.

Dependent variable	*Risk1* (1)	*HHI* (2)	*Risk1* (3)	*Risk2* (4)	*HHI* (5)	*Risk2* (6)
Cross	−0.427***	0.004**	−0.414***	−0.787***	0.004**	−0.564***
	(−4.232)	(2.112)	(−4.106)	(−4.201)	(2.112)	(−4.189)
HHI			−3.565**			−3.513**
			(−2.449)			(−2.437)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,627	26,627	26,627	26,627	26,627	26,627
Within-R^2	.105	.014	.107	.109	.014	.121
Indirect effect (path effect)	−0.014* (*t*-statistics = −1.686)			−0.014* (*t*-statistics = −1.683)		

Note: This table presents the results of the three-stage mediation effect of market competition using both *Risk1* and *Risk2* as outcome variables. Indirect effects of the Sobel test are reported. The two-way fixed-effect model is applied in each regression. Standard errors are clustered at the firm level.
***Statistically significant at the 1% level.
**Statistically significant at the 5% level.
*Statistically significant at the 10% level.

Thus, this study can explicitly acknowledge how common individual investors who are likely to be less efficient monitor and shape corporate risk-taking. We then measure individual investors' common ownership using a method similar to that for blockholder common ownership. Our proxy for individual investors' common ownership is built from the top 10 shareholders available in the CSMAR database. In our specification, individual investors' common ownership occurs when an individual investor who owns at least 3% of a firm's shares simultaneously holds at least 1% of one or more firms in the same industry. We change the threshold from 3% to 1% because individual investors in China typically own a small proportion compared with institutions. As the results are possibly driven by the mere share of individual investor ownership (Dennis et al., 2022), we also consider investor ownership in the model. As shown in Panel B, although negative, the statistical significance for the first two variables, *CrossI* and *CrossI_Num*, is below the 10% critical value. The coefficients after regressing risk-taking on the total shares held by the common individual blockholder *CrossI_Share* in both models are significant at the 10% level. These results do not support the risk-taking reduction role of individuals. We note that compared with the 16% mean value of blockholder common ownership, the mean of individual common ownership *CrossI* is only approximately 3%. Hence, the existence of individual blockholders is highly diversified, and they may lack the necessary controlling power to influence firm behavior.

Panel C reports the results of tests that include individual investors' common ownership, *CrossI_Share*; mutual fund common ownership, *CrossM_Share*; and nonfinancial institution blockholders' common ownership, *CrossC_Share*, simultaneously in the same model. We also control for the shares of mutual funds and individual investors. Considering other types of common ownership, the coefficients on the nonfinancial institution blockholders and mutual fund proxies have the same signs and significance.

5.2 | Moderating effects

Given China's weak external monitoring environment, blockholders can indirectly profit through related transactions and resource occupation. Therefore, powerful blockholders may avoid protecting firm value by appeasing their blockholding portfolios (Edmans, 2014). Considering these distinctions, we are interested in the factors that condition the negative effect of common ownership on risk-taking. As poorly governed firms are more vulnerable to expropriation by large shareholders, we expect that firms with stronger external monitoring mechanisms, as measured by appointing a Big-4 auditor (*Big4*), hiring more independent directors (*Indep*), and receiving more analyst coverage (*Analyst*), will suffer fewer consequences of common ownership. Table 10 presents the empirical results of these models. The interaction terms with common ownership of the monitoring variables *Big4* and *Indep* are significant at the 5% level, consistent with external monitoring disincentivizing the enhanced risk-taking stemming from common ownership. The results show that analysts' external attention has a conditioning role similar to that of Big-4 auditors and independent directors.

5.3 | Long-term effect on market share growth

Profits to common blockholders come not only from the performance of a single firm but also from the overall profitability of competing firms in their portfolio. As mentioned previously, when there are

TABLE 9 Regressing risk-taking on various types of common ownership.

Panel A. Regressing risk-taking on mutual fund common ownership						
Dependent variable	***Risk1*** **(1)**	***Risk1*** **(2)**	***Risk1*** **(3)**	***Risk2*** **(4)**	***Risk2*** **(5)**	***Risk2*** **(6)**
CrossM	0.117*			0.221*		
	(1.650)			(1.677)		
CrossM_Num		0.301***			0.577***	
		(3.133)			(3.223)	
CrossM_Share			5.886***			11.186***
			(4.378)			(4.441)
M_Inst	−0.644***	−0.744***	−0.839***	−1.223***	−1.419***	−1.596***
	(−3.009)	(−3.421)	(−3.816)	(−3.065)	(−3.502)	(−3.894)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,601	26,601	26,601	26,601	26,601	26,601
Within-R^2	.106	.105	.106	.110	.109	.109
Panel B. Regressing risk-taking on individual common ownership						
Dependent variable	***Risk1*** **(1)**	***Risk1*** **(2)**	***Risk1*** **(3)**	***Risk2*** **(4)**	***Risk2*** **(5)**	***Risk2*** **(6)**
CrossI	−0.128			−0.238		
	(−0.590)			(−0.592)		
CrossI_Num		−0.308			−0.557	
		(−1.209)			(−1.393)	
CrossI_Share			−0.282*			−0.248*
			(−1.679)			(−1.739)
I_Ownership	−0.537***	−0.538***	−0.540***	−1.025***	−1.026***	−1.029***
	(−2.580)	(−2.582)	(−2.591)	(−2.636)	(−2.638)	(−2.646)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,627	26,627	26,627	26,627	26,627	26,627
Within-R^2	.086	.086	.086	.088	.088	.088
Panel C. Regressing risk-taking on various types of common ownership						
Dependent variable	***Risk1*** **(1)**	***Risk1*** **(2)**	***Risk2*** **(3)**	***Risk2*** **(4)**		
CrossC_Share	−2.503***	−1.512**	−4.696***	−2.822**		
	(−3.073)	(−2.195)	(−3.062)	(−2.172)		
CrossI_Share	−1.162	−1.401	−1.468	−1.786		
	(−1.075)	(−1.082)	(−1.067)	(−1.058)		
CrossM_Share	1.546**	4.387***	2.943**	8.389***		
	(1.977)	(2.853)	(2.032)	(2.907)		
Mere share control	Yes	Yes	Yes	Yes		
Other controls	No	Yes	No	Yes		
Firm FE	Yes	Yes	Yes	Yes		
Year FE	Yes	Yes	Yes	Yes		

TABLE 9 (Continued)

Panel C. Regressing risk-taking on various types of common ownership				
Dependent variable	***Risk1*** **(1)**	***Risk1*** **(2)**	***Risk2*** **(3)**	***Risk2*** **(4)**
Observations	26,601	26,601	26,601	26,601
Within-R^2	.001	.106	.001	.109

Note: This table presents the results of regressing risk-taking variables on mutual fund common ownership, individual common ownership, and common ownership built by nonfinancial institution blockholders. The two-way fixed-effect model is applied in each regression. The rich set of control variables used in prior tests are controlled in panels A and B. Standard errors are clustered at the firm level.
***Statistically significant at the 1% level.
**Statistically significant at the 5% level.
*Statistically significant at the 10% level.

TABLE 10 Moderation effect.

Dependent variable	***Risk1*** **(1)**	***Risk1*** **(2)**	***Risk1*** **(3)**	***Risk2*** **(4)**	***Risk2*** **(5)**	***Risk2*** **(6)**
Cross_Share	−1.837**	−1.387**	−3.068***	−3.448**	−3.826***	−3.650***
	(−2.356)	(−2.064)	(−2.839)	(−2.347)	(−3.186)	(−2.750)
Big4_Cross	1.125**			2.226**		
	(2.134)			(2.291)		
Big4	0.370*			0.687*		
	(1.762)			(1.709)		
Indep_Cross		0.475**			1.489**	
		(2.036)			(2.152)	
Indep		2.538**			1.838**	
		(2.048)			(2.083)	
Analyst_Cross			1.543*			1.067*
			(1.847)			(1.803)
Analyst			1.760**			1.350**
			(2.098)			(2.138)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,627	26,627	26,627	26,627	26,627	26,627
Within-R^2	.105	.105	.106	.108	.108	.109

Note: This table presents the results of regressing risk-taking variables on a series of interaction terms between monitoring and common ownership. The two-way fixed-effect model is applied in each regression. The rich set of control variables used in prior tests is controlled. Standard errors are clustered at the firm level.
***Statistically significant at the 1% level.
**Statistically significant at the 5% level.
*Statistically significant at the 10% level.

negative externalities of market competition among firms in an industry, common blockholders may want managers to take actions that maximize the value of aggregate portfolios instead of individual firms (Azar et al., 2018). Therefore, common ownership may lead firms to be relatively conservative and to take lower investment risks. Pan et al. (2020) find that market collusion induces underinvestment because of this connectedness. Further, risk-averse firms make more conservative investment decisions. They forgo projects with a more positive net present value (NPV) (John et al., 2008) and consequently have lower growth rates in future market shares.

TABLE 11 Future market share growth on blockholder common ownership.

	MS_Growth					
Dependent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Risk1_Hat1	−0.001*					
	(−1.701)					
Risk1_Hat2		−0.001*				
		(−2.053)				
Risk1_Hat3			−0.002**			
			(−2.184)			
Risk2_Hat1				−0.001*		
				(−1.943)		
Risk2_Hat2					−0.001**	
					(−2.101)	
Risk2_Hat3						−0.001**
						(−2.063)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,625	26,625	26,625	26,599	26,599	26,599
Within-R^2	.113	.109	.112	.095	.107	.112

Note: This table presents the results of regressing market share growth on the predicted value of risk-taking. Blockholder common ownership variables *Cross* (corresponding to *Hat1*), *Cross_Num* (corresponding to *Hat2*), and *Cross_Share* (corresponding to *Hat3*) are used to predict the level of risk-taking along with the rich set of control variables. The two-way fixed-effect models are applied in each regression. Standard errors are clustered at the firm level.

**Statistically significant at the 5% level.

*Statistically significant at the 10% level.

We develop a two-step model to disentangle the effects of common ownership on future growth rates. In the first stage, we predict risk-taking levels using common ownership variables and a rich set of control variables. In the second stage, we regress the future market share growth rate on the predicted value of risk-taking to capture the pure effect of the variation in common ownership. *Cross*, *Cross_Num*, and *Cross_Share* were used to predict *Risk_Hat1*, *Risk_Hat2*, and *Risk_Hat3*, respectively. Columns 1–3 of Table 11 report the results of our estimations regressing contemporaneous market share growth on the 1-year lagged values of the predicted value of *Risk1*. The slopes of the explanatory variables are negative and significant. Columns 4–6 report similar results when estimating the predicted value of *Risk2*. These tests support the hypothesis that common blockholder ownership reduces firms' risk-taking levels and can even harm long-term performance.

6 | CONCLUSIONS

The widespread occurrence of common ownership or investors owning block cross-holdings within an industry is of increasing interest to accounting and finance scholars (Azar et al., 2018; Koch et al., 2021; Lewellen & Lowry, 2021). However, disputes over the impact of corporate governance and, by extension, the market impact of common ownership continue. How common ownership influences corporate governance and the ensuing firm decisions remains unclear, as is the specific role of common ownership.

We study the impact of common ownership built through blockholders on corporate risk-taking behavior. In contrast to prior studies, we focus on the Chinese stock market by exploiting the Top 10 Shareholding File, which include various investors in addition to institutional investors. The evidence shows that cross-held firms with common blockholders are associated with lower risk-taking, supporting the anti-competition hypothesis of common ownership. A series of alternative tests and methods to mitigate endogeneity robustly confirmed our findings. The mechanistic analyses show that common ownership reduces risk-taking by lowering market competition. Furthermore, the analysis shows that this effect harms firms' future market share growth, particularly in poorly governed firms.

Importantly, we find an interesting heterogeneity in the common ownership type identified, wherein the influences of connectedness by blockholders versus mutual fund families have the opposite effect on risk-taking. While blockholders reduce risk-taking and impede growth, mutual fund family common ownership engenders risk-taking and encourages growth. These results highlight the positive role of institutions in corporate governance and the need to consider the

heterogeneity of common ownership. Additionally, while blockholder common ownership has a negative effect on corporate risk-taking and, by extension, a negative impact on economic development, our results suggest that efficient monitoring mitigates these effects. These results have important policy implications. Our findings suggest that common ownership may negatively impact corporate governance. Therefore, market regulators, especially in markets with weak institutions, such as emerging markets, should pay special attention to preventing the negative effects of common ownership and its anti-competitive effects. The relevant markets can mitigate these negative effects by strengthening their external governance mechanisms. Importantly, our findings show corresponding heterogeneity in the different types of common ownership. Common ownership by mutual fund families (financial institutional investors) positively affects corporate governance. Therefore, developing institutional investors to enhance market governance and efficiency is of special importance.

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data are not publicly available because of privacy or ethical restrictions.

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NOTES

[1] We explain our choice of the Chinese stock market in Section 2.1.

[2] Interestingly, these papers were both published by *The Journal of Finance*. This validates the urgency of exploring the effect of common ownership in the capital markets.

[3] Several studies investigate the market impacts of common ownership in US markets. For example, Jang et al. (2022) argue that common ownership has a positive effect on information production and firms' price informativeness.

[4] In untabulated data consisting of all available observations, the mean value of *Cross* rises to around 21.51% in 2020 and 23.28% in 2021.

[5] The CSI 300 index consists of the 300 largest and most liquid Chinese A-share stocks and is the most representative Chinese stock index. We expect that new additions to the CSI 300 index attract more investor attention and thus are more likely to have common state ownership, while firms removed from this index are less likely to have common state owners. The CSI 300 index is reconstituted semi-annually, in June and December. China Securities Index Co. Ltd uses the average daily market capitalization and trading volumes in the most recent year of all stocks in the Shanghai and Shenzhen stock exchanges to identify the index constituents (Li & Selvam, 2021). Therefore, the decisions of stock exchanges to add or remove a stock in the CSI 300 index are not driven by the level of corporate risk-taking. Thus, *CSI300in* and *CSI300out* are unlikely to affect the risk-taking of listed firms directly.

[6] The HHI combines the advantages of both the absolute and relative concentration indexes while avoiding their drawbacks. Also, the HHI can calculate the level of competition within the industry through simple and effective logic. However, the HHI may not reflect market complexity or accurately evaluate competitive or monopolistic market conditions. In addition, the HHI is more sensitive to the market share of larger upper-tier firms, while it is less sensitive to small changes in the market share of many small firms. If more detailed transaction data are available or more detailed dimensions such as the firm's mastery of upstream and downstream resources in the supply chain can be used to evaluate and capture the true competition situation in the industry, the measurement may be better. Future research can attempt to develop more accurate indicators to measure the degree of competition within an industry.

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APPENDIX A: VARIABLE DEFINITIONS

Variable name	Definition	Source
Proxy variables of common ownership		
Cross	Whether the firm has common blockholders who simultaneously own at least 3% shares in the firm and any firms in the same industry in any quarter of the fiscal year; 0 for no and 1 for yes	CSMAR
Cross_Num	Natural logarithm of 1 plus the annual average of the quarterly number of common blockholders who simultaneously own at least 3% shares in the firm and any firms in the same industry	CSMAR
Cross_Share	Natural logarithm of 1 plus the annual average of the quarterly proportion of shares owned by common blockholders who simultaneously own at least 3% shares in the firm and any firms in the same industry	CSMAR
Cross2	Whether the firm has common blockholders who simultaneously own at least 2% shares in the firm and any firms in the same industry in any quarter of the fiscal year; 0 for no and 1 for yes	CSMAR
Cross2_Num	Natural logarithm of 1 plus the annual average of the quarterly number of common blockholders who simultaneously own at least 2% shares in the firm and any firms in the same industry	CSMAR
Cross2_Share	Natural logarithm of 1 plus the annual average of the quarterly proportion of shares owned by common blockholders who simultaneously own at least 2% shares in the firm and any firms in the same industry	CSMAR
Cross4	Whether the firm has common blockholders who simultaneously own at least 4% shares in the firm and any firms in the same industry in any quarter of the fiscal year; 0 for no and 1 for yes	CSMAR
Cross4_Num	Natural logarithm of 1 plus the annual average of the quarterly number of common blockholders who simultaneously own at least 4% shares in the firm and any firms in the same industry	CSMAR
Cross4_Share	Natural logarithm of 1 plus the annual average of the quarterly proportion of shares owned by common blockholders who simultaneously own at least 4% shares in the firm and any firms in the same industry	CSMAR
Cross5	Whether the firm has common blockholders who simultaneously own at least 5% shares in the firm and any firms in the same industry in any quarter of the fiscal year; 0 for no and 1 for yes	CSMAR
Cross5_Num	Natural logarithm of 1 plus the annual average of the quarterly number of common blockholders who simultaneously own at least 5% shares in the firm and any firms in the same industry	CSMAR
Cross5_Share	Natural logarithm of 1 plus the annual average of the quarterly proportion of shares owned by common blockholders who simultaneously own at least 5% shares in the firm and any firms in the same industry	CSMAR
CrossN	Whether the firm has common blockholders who simultaneously own at least 3% shares in the firm and any firms in different industries in any quarter of the fiscal year; 0 for no and 1 for yes	CSMAR
CrossN_Num	Natural logarithm of 1 plus the annual average of the quarterly number of common blockholders who simultaneously own at least 3% shares in the firm and any firms in different industries	CSMAR
CrossN_Share	Natural logarithm of 1 plus the annual average of the quarterly proportion of shares owned by common blockholders who simultaneously own at least 3% shares in the firm and any firms in different industries	CSMAR
CrossM	Whether the firm has mutual fund family shareholders who simultaneously own at least 1% shares in the firm and any firms in the same industry in any quarter of the fiscal year; 0 for no and 1 for yes	CSMAR
CrossM_Num	Natural logarithm of 1 plus the annual average of the quarterly number of mutual fund families who simultaneously own at least 1% shares in the firm and any firms in the same industry	CSMAR

Variable name	Definition	Source
CrossM_Share	Natural logarithm of 1 plus the annual average of quarterly proportion of shares owned by mutual fund families who simultaneously own at least 1% shares in the firm and any firms in the same industry	CSMAR
CrossI	Whether the firm has individual shareholders who simultaneously own at least 1% shares in the firm and any firms in the same industry in any quarter of the fiscal year; 0 for no and 1 for yes	CSMAR
CrossI_Num	Natural logarithm of 1 plus the annual average of quarterly number of individuals who simultaneously own at least 1% shares in the firm and any firms in the same industry	CSMAR
CrossI_Share	Natural logarithm of 1 plus the annual average of the quarterly proportion of shares owned by individuals who simultaneously own at least 1% shares in the firm and any firms in the same industry	CSMAR
CrossC_Share	Natural logarithm of 1 plus the annual average of the quarterly proportion of shares owned by nonfinancial institution blockholders who simultaneously own at least 3% shares in the firm and any firms in the same industry	CSMAR
Proxy variables of risk-taking		
Risk1	The standard deviation of adjusted ROA during the period of t to $t + 2$, where adjusted ROA is the difference between firm-specific ROA and industrial average ROA	CSMAR
Risk2	The range of adjusted ROA during the period of t to $t + 2$, where adjusted ROA is the difference between firm-specific ROA and industrial average ROA	CSMAR
Control variables		
Size	Natural logarithm of total assets	CSMAR
Lev	Total assets/total liability	CSMAR
ROE	EBIT/shareholders' equity	CSMAR
Cap_Ex	Capital expenditure/total assets	CSMAR
Growth	Revenue growth rate	CSMAR
Age	Natural logarithm of firm age	CSMAR
Top1	Proportion of shares owned by the largest shareholder	CSMAR
Board	Natural logarithm of number of directors	CSMAR
Indep	Proportion of independent directors	CSMAR
Dual	Whether CEO and Chairman are the same person; 0 for no and 1 for yes	CSMAR
Other variables		
MS_Growth	Market share growth rate, where market share is the firm-specific revenue divided by industrial average revenue	CSMAR
M_Inst	Proportion of shares held by mutual fund	CSMAR
I_Ownership	Proportion of shares held by individual investors	
Big4	Whether the firm appoints a Big-4 auditor; 0 for no and 1 for yes	CSMAR
HHI	Herfindahl–Hirschman index calculated by total assets	CSMAR
Analyst	Natural logarithm of the number of analysts who publish reports on the firm	CSMAR
CAR	Two-year prior abnormal return calculated by the three-factor model	CSMAR

Abbreviations: CSMAR, China Stock Market and Accounting; ROA, return on assets.