ORIGINAL ARTICLE

Minority state ownership and firm performance: Evidence from the Chinese stock market crash in 2015

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Abstract

We examine the effect of minority state ownership on firm performance using the Chinese stock market crash in 2015. We find that treatment firms with minority state ownership accumulated from governmental purchases of equities experience significant reductions in operating performance. The negative impact is more severe in firms with higher riskiness and firms with less powerful large shareholders. We also find that treatment firms' risk decreases and their employment increases after minority state shareholders step in, providing supportive evidence on the government's motives of reducing risk and preventing mass layoffs. Further tests reveal the channels through which minority state ownership impedes investment efficiency, productivity, and innovation. The negative impact diminishes when government institutions divest their shares in a timely manner. Overall, our results suggest there are unintended negative consequences of minority state ownership arising from the governmental rescue package in a market crisis.

KEYWORDS
firm performance, innovation, investment efficiency, minority state ownership

JEL CLASSIFICATION
G18, G32, G38

1 | INTRODUCTION

Despite the worldwide wave of privatizations in state-owned enterprises (SOEs) over the past decades, state ownership continues to serve as an important way for governments to exert their influence over firms and the economy (Megginson & Netter, 2001). In contrast to SOEs, in which governments maintain majority control, a new variety of state ownership in which governments play minority roles has become more pervasive (Bruton et al., 2015; Inoue et al., 2013).[1] Several major market crises over the past few decades, during which governments accumulate ownership in private sectors via rescue packages, further increase the presence of minority state ownership (Beuselinck et al., 2017; Borisova et al., 2015). Unlike the extensive research on SOEs, it is unclear whether and how minority state ownership affects firm performance, especially during a market crisis.[2]

In this paper, we examine the impact of minority state ownership on firm performance by exploiting an exogenous source of variation in minority state ownership arising from direct purchases of equities by the Chinese government during the Chinese stock market crash in 2015. Specifically, the Chinese stock market tumbled by about 50% within 2 months starting from June 15, 2015. To rescue the market, China Securities Finance Corporation (CSF), China Central Huijin Investment Company (CCH), and the State Administration of Foreign (SAF) (referred to as the national team) lent money to 21 brokerages for direct purchases of stock equities through customized funds. These governmental stock purchases covered almost half of the firms in the market at the end of 2015, significantly extending the scale of minority state ownership in China. Using these governmental stock purchases, we investigate whether minority state ownership improves or harms firm performance. We also examine the potential channels through which minority state ownership affects firm performance. Finally, we verify the effect of minority state ownership by examining the instances when government institutions divest their shares in a timely manner.

Governmental stock purchases during the Chinese market crash in 2015 provide an opportune setting to investigate the role of minority state ownership. First, the breadth of governmental purchases is substantial but the increase in state ownership resulting from the purchases is modest. As of the end of September 2015, the number of public firms held by the national team is 1404, almost half of all publicly listed firms in China. The corresponding market capitalization held by the national team is also large, about 10% of the total market capitalization in China. In contrast, the mean and median ownership of the national team at the end of September 2015 is 4.92% and 3.27%, respectively. Both are less than 5%, which is conventionally considered a threshold for blockholders with significant incentives to monitor and influence a company's decisions. Moreover, the national team's ownership continues to exist even 4 years after the market crash, covering 30% of all public firms with an average of 3.07% ownership.

Second, both the 2015 stock market crash in China and the governmental rescue strategies are largely unrelated to firm fundamentals, suggesting an exogenous change in minority state ownership. Before the crash, China's stock market experienced a dramatic surge due to various favorable policies, such as strengthened reform of shareholder structure diversification in SOEs, loose monetary policies, and market speculations under imperfect supervision. The bursting of this bubble was triggered by a strong regulation imposed by the China Security Regulator Committee (CSRC) on June 13, 2015 that banned all security companies from providing facilities for off-market or shadow margin lending. The fact that more than one third of public firms in the Chinese stock market continuously reached the daily limit-down indicates a systematic risk that is unrelated to specific firm characteristics.[3] Given that the

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[1] For example, Inoue et al. (2013) find that firms with more than 10% of state ownership represent 33% of the largest 100 publicly traded corporations in Brazil in 2007 and 50% in China. Among such firms, 39% are those whose state ownership is less than 50% of company equity.

[2] For example, based on a sample of 367 Brazilian firms, Inoue et al. (2013) find a positive effect of minority state ownership on firms' returns on assets and on the capital expenditures of financially constrained firms with investment opportunities. In contrast, Borisova et al. (2015) find that government ownership is generally associated with a higher cost of debt due to state-influenced investment distortions.

[3] China's equity market imposes daily price limits of 10% on regular stocks and 5% on special treatment (ST) stocks based on the closing price on the last trading day. Trading will be halted once the stock price reaches the limits (up or down).

governmental purchases cover almost half of the firms in the market, there is no clear evidence that the government selectively invested in firms with certain characteristics, alleviating the selection bias concern.[4]

The impact of minority state ownership on firm performance is unclear. On one hand, the presence of minority state ownership may jeopardize firm performance. Similar to SOEs, firms with minority state ownership face severe agency problems due to the misalignment of interests between bureaucrats and other shareholders. Prior studies show that government bureaucrats prioritize political goals instead of the maximization of shareholder value (Boubakri et al., 2013; Hao & Lu, 2018; Hart et al., 1997; Mengistae & Xu, 2004; Shapiro & Willig, 1990). Specific to the governmental purchase in 2015, the primary goal is to attenuate the market crash risk. With this motive, the bureaucrats are incentivized to take action to reduce firm-level risk, for example, by forcing their holding firms to withhold value-increasing but risky investments that are likely to escalate the crisis.[5] In addition, the bureaucrats also have the motivation to prevent mass layoffs and maintain social stability (Bai et al., 2006; Hao & Lu, 2018; Lin & Tan, 1999). The 2015 stock market crash is likely to cause firms to reduce employment due to poor stock performance and potential financial constraints. Thus, the bureaucrats are also incentivized to force firms to maintain high employment that may be suboptimal for firms. Therefore, the presence of minority state ownership with political motivations can reduce investment efficiency, increase operating costs, and eventually jeopardize firm performance.[6]

On the other hand, minority state ownership may be beneficial to firm performance. Prior studies show that the presence of state ownership helps firms build connections to the government with implicit government guarantees and preferential access to credit, resulting in reduced costs of debts (e.g., Borisova & Megginson, 2011). Relatedly, Schuler et al. (2017) find that investors respond positively to firms hosting high-ranking government officials because of the signal received about the possibility of firms accessing government-controlled resources via promotion or protection. Political connections stemming from minority state ownership may also enable firms to obtain more government resources (e.g., subsidies) and lighter taxes (Faccio, 2006). In our setting, the additional capital provided to the firms by the national team may implicitly help the firms develop a linkage to the government and enhance their ability to obtain more resources from the government. Moreover, such capital directly helps the firms recover from financial constraints due to the market crash. Therefore, minority state ownership may affect firm performance in a positive way.

To test the impact of minority state ownership on firms' operating performance, we use a sample of 1103 firms listed in the Shanghai Stock Exchange and the Shenzhen Stock Exchange from 2012 to 2018. Specifically, we adopt a difference-in-differences approach in which treatment firms are defined as firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018. Control firms are defined as firms with zero ownership by the national team in the same period. We find that operating performance measured by return on assets (ROA) and return on equity (ROE) of treatment firms is significantly lower within 3 years after the 2015 stock market crash compared to control firms. These results hold using propensity-score-matched samples, alternative measures of firm performance, alternative definitions of treatment firms held by the national team for more than 3% (5%), and subsamples excluding firms affected by other major financial and regulatory events happening in China around the summer of 2015 (the announcements of the Made in China 2025 policy and the Supply-side Reform policy). The results are consistent with the view that the presence of minority state ownership jeopardizes firm performance. We also perform parallel trend analysis for the

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[4] To further alleviate the selection bias concern, we conduct propensity score matching approach and find that our results remain qualitatively unchanged as indicated in our robustness tests.

[5] Consistent with this motive, Cheng et al. (2022) find that the intervention from such government institutions indeed lowers the stock price crash risk for their holding firms.

[6] Though corporate theory predicts that minority ownership has limited power in affecting firm policies through ownership-based voting, government institutions with minority ownership may affect firm policies through ways other than voting. For example, government institutions possess great resources and have strong enforcement power to affect firm policies through regulatory, administrative, and soft channels (Duchin et al., 2020; Piotroski & Zhang, 2014). However, it is challenging to empirically examine how government institutions affect firm polices as their interventions tend to be behind the scenes. To shed light on this question, we directly interview managers of treatment firms from our sample about the roles of SBFIs in their firms. In addition, to increase the generalizability of the inquiry, we interview students enrolled in the Executive Master of Business Administration (EMBA) program in our affiliated universities. Appendix A provides detailed description about the questions and the summary of responses. The responses lend significant support to the notion that government institutions with minority ownership have unneglectable power in influencing corporate policies.

difference-in-differences approach to verify the exogeneity of the event. We find supportive evidence that the parallel trend assumption holds in our sample, suggesting a causal impact of minority state ownership on firm performance.

We also conduct subsample analyses. If the deterioration in treatment firms' operating performance indeed originates from the national team's minority state ownership, the magnitude of such impact should depend on the national team's incentive and ability. We first develop cross-sectional analyses based on the notion that the national team has stronger incentives to act aggressively in firms with higher risk. The primary aim of the national team is to attenuate the market crash risk. More risky firms naturally stand out and draw more attention from the national team. The national team is more incentivized to take advantage of its ownership to restrain firms' risky investments to a suboptimal level, leading to more damage to firm performance. Consistent with the expectation, we find that the negative impact of minority state ownership on firm performance is more pronounced in firms with higher earnings volatility and firms in high-technology industries.

We next turn to the national team's ability to take advantage of its minority ownership. The influence of government institutions could be more evident when firms' existing large shareholders are not strong enough to bargain with them and oppose the intervention (Cai et al., 2016). Therefore, we expect the negative impact of minority state ownership on firm performance to be more severe in firms whose largest shareholders own less. Our results confirm this prediction. We find that the negative impact of minority state ownership is more severe in firms with lower ownership by their largest shareholder(s).

We further examine the national team's motives to influence their holding firms from two perspectives: (1) the motive of reducing firm-level risk to mitigate the market crash risk, and (2) the motive of preventing mass layoffs to maintain social stability. Using stock return volatility and earnings volatility as measures for firm-level riskiness, we find significant reductions in treatment firms' riskiness after the national team steps in. In contrast, we find significant increases in total employment and excessive employment for treatment firms with minority state ownership. These results support government institutions' motives to influence corporate policies, which eventually affect firm performance.

We further explore the potential channels through which the national team's minority state ownership affects firm performance. First, we investigate whether the downside of minority state ownership resides in the deterioration in investment efficiency. We find that the investment inefficiency of treatment firms significantly increases after purchases by the national team. When we divide the investment inefficiency into underinvestment and overinvestment, we find that the increase in investment inefficiency is evident only for underinvestment, suggesting that the presence of minority state ownership suppresses firms' investments to the extent that firms' investments are below the optimal level. Second, we investigate whether minority state ownership decreases firm efficiency by damaging productivity and innovation. We find that treatment firms experience a significant reduction in total factor productivity, innovation quantity as measured by the number of patents, and innovation quality as measured by the number of patent citations. Consistent with the agency problem view, these results collectively suggest that minority state ownership stresses firms with additional operating costs that reduce firm efficiency and eventually hurt firm performance.

We also examine whether treatment firms benefit from minority state ownership. We find that none of the cost of debt (measured by the ratio of interest expenses to total bank debts), government subsidies (measured by the total amount of subsidies from government institutions scaled by total assets), and tax benefits (measured by an indicator for whether the enterprise receives an income tax credit in which the firm's applicable tax rate is lower than the statutory income tax rate) are significantly different between treatment firms and control firms. These results suggest that firms do not benefit significantly from the presence of minority state ownership.

Finally, if the reduction in firm performance is indeed caused by the national team's minority state ownership, we would expect that such an impact should disappear when government institutions exit from holding the firms.[7] To test this prediction, we perform another difference-in-differences analysis. We define semi-treated firms

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[7] From early 1990s to 2005, there were two types of shares, nontradable and tradable shares, in the Chinese stock market. Nontradable shares are primarily held by state and legal persons and cannot be sold in the secondary market. In April 2005, the Chinese government initiated the split share reform to transform

as those whose minority state ownership of the national team is higher than 1% at the end of 2015 but lower than 1% in years after 2015, and compare semi-treated firms with treated firms in which the national team continuously holds more than 1% ownership from 2015 to 2018. We find that semi-treated firms have significantly higher ROA and ROE compared to treatment firms after the exit of the national team. As another verification test, we compare semi-treated firms with control firms that are not held by the national team from 2015 to 2018 and find no significant difference in firm performance between them. These results echo the negative impact of the national team's minority state ownership on firm performance and provide a useful verification of a way to alleviate such an impact.

Our paper contributes to literature in two important ways. First, it adds to the literature on state ownership, especially on minority state ownership where governments do not entail majority control over the firms. Extant research on state ownership focuses on SOEs and finds that SOEs generally underperform privately owned firms (e.g., Boubakri et al., 2005; Estrin et al., 2009; Gupta, 2005; Megginson & Netter, 2001; Somé et al., 2021). In contrast, empirical evidence on minority state ownership and its impact is limited and mixed (e.g., Borisova et al., 2015; Inoue et al., 2013; Wu, 2011). Using the governmental purchase during the Chinese stock market crash in 2015 as a quasi-shareholder shock to minority state ownership, our findings suggest that state ownership even as a minority role affects firm performance negatively.

Second, our study adds to the strand of literature on government intervention in the stock market, especially in times of crisis. A large body of literature examines government intervention in serval major market crises over the past few decades, such as the Asian financial crisis in the 1990s, the 2008 financial crisis, and China's 2015 stock market crisis (e.g., Agusman et al., 2014; Bond & Goldstein, 2015; Chan et al., 2004; Cheng et al., 2022; Su et al., 2002; Veronesi & Zingales, 2010). However, most studies focus on the consequences of government intervention on the stock market itself regarding pricing efficiency and market risk. We show that the presence of minority state ownership impedes firm efficiency by withholding risky investments, restraining productivity and innovation, and resulting in significant deterioration in firms' real operating outcomes.

2 | BACKGROUND OF THE CHINESE STOCK MARKET CRASH IN 2015

From 2014 to early 2015, China's stock market experienced a dramatic surge. The Shanghai Composite Index, for example, doubled in half a year. Various favorable policies in 2014 and beforehand boosted such an excessive rise in the stock market, including the declaration by the central government to promote the diversification of SOEs' shareholding structure, the continuation of loose monetary policies, and the relaxation of margin financing regulations.

The tipping point of the market surge is when the CSRC imposed a strong regulation that banned all security companies from providing facilities for off-market or shadow margin lending on June 13, 2015. This regulation triggered the first round of stock price declines that occurred in mid-June 2015. However, market participants, including regulators, considered the initial price decline as a spontaneous adjustment of the market's rapid advance. Later, the price decline spread to all listed firms regardless of firm performance. Specifically, since June 15, 2015, the Shanghai Composite Index fell from 5170 points to around 4000 points in 10 trading days, sinking about 20%. The Shenzhen Component Index, another key market index in China, also tumbles by about 20%. As China's stock market imposes daily price limits of 10% on regular stock and 5% on special treatment (ST) stocks, more than 1000 stocks repeatedly reached the limit-down during the market crash period. Investors suffered massive losses due to the continuous decline in stock prices and acute shortage of liquidity.

all nontradable shares into tradable shares. Jiang and Kim (2015) show that all nontradable shares have converted to tradable shares by the beginning of 2012. Thus, government institutions can freely sell their shares during our sample period of 2012–2018.
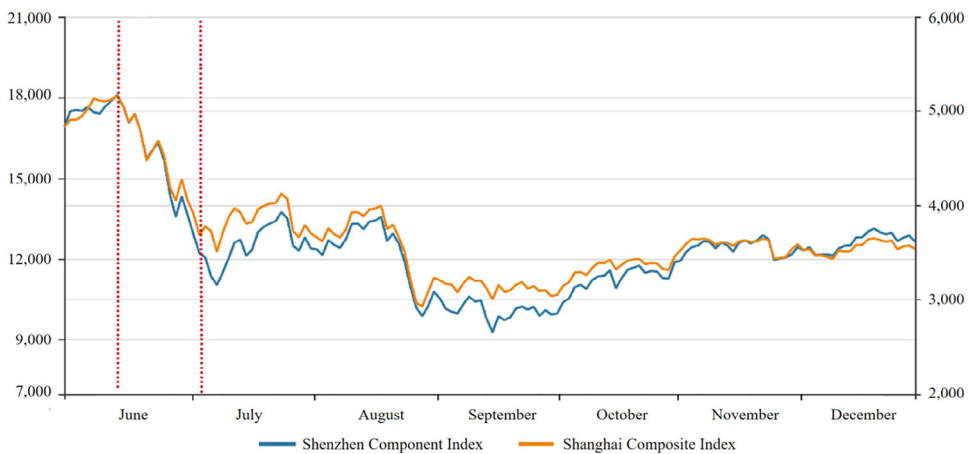
FIGURE 1 Major market indices in China around the 2015 stock market crash. This figure presents the daily changes in two major market indices in China, Shenzhen Component Index and Shanghai Composite Index, from June 2015 to December 2015. The *y*-axis on the left (right) corresponds to the daily points of the Shenzhen Component Index (the Shanghai Composite Index) connected by blue (red) lines. The first vertical dashed line marks the beginning of the market crash on June 12, 2015, while the second one marks the time when the Chinese government starts to purchase stock shares of public firms through specific state-owned entities on July 3, 2015. [Color figure can be viewed at wileyonlinelibrary.com]

To alleviate systemic financial risk and bail out public firms to stabilize the market, regulatory agencies in China have introduced a number of primary policies, including lowering the reserve requirement ratio and interest rate, strictly scrutinizing OTC financing, reducing stock transaction costs, restricting the reduction of stock holdings, and encouraging the increase in stock holdings. However, such policies did not successfully prevent stock prices from plunging. From July 3, 2015, the national team consisting of a few state-linked funds customized by CSF, CCH, and SAF directly purchased stocks in the secondary market as a way of injecting additional capital into the stock market to provide liquidity. Under strong government intervention, the market gradually stabilized, and the stock market crash ended in early February 2016 (Liu et al., 2019).

Figure 1 depicts the historical change in two major market indices around the 2015 stock market crash in China. Both the Shanghai Composite Index and the Shenzhen Component Index experienced a significant decline from June 12 to July 1, reaching the maximum fall of 39.71% and 45.97% around September 14, respectively. The indices became relatively stable in December 2015.

The governmental stock purchase by the national team has greatly changed the equity structure of listed companies in China. Panel A of Table 1 shows the governmental stock purchase across industries at the end of 2015. The largest number of firms held by the national team at the end of 2015 is 809 in the manufacturing industry, accounting for 44.84% of all firms in the industry and 28.47% of all firms in the Chinese stock market. The highest percentage of firms held by the national team across industries is 92.00% in the finance industry.

Panel B of Table 1 presents detailed ownership of the national team resulting from the governmental stock purchase from the third quarter of 2015 to the end of 2018. The ownership of the national team is both substantial and long lasting. For example, there are 1404 companies whose stock shares are purchased by the national team in the third quarter of 2015, accounting for 50.14% of the total listed companies in the Chinese stock market. The market capitalization held by the national team is about 3.4 trillion RMB, which translates to 10.07% of the total market capitalization in the market. The average ownership by the national team is 4.92% in the third quarter of 2015. In addition, the national team continues to hold the firms for up to 3 years since the 2015 stock market crash.

TABLE 1 Governmental stock purchases during the Chinese stock market crash in 2015.

Panel A: Firms with governmental stock purchases across industries at the end of 2015			
Industry	N	Proportion in the industry	Proportion in the market
Finance	46	92.00	1.62
Mineral, construction	88	56.77	3.10
Electric, gas, and sanitary services	52	54.17	1.83
Transport, communications	114	46.91	4.01
Manufacturing	809	44.84	28.47
Service industries	127	43.05	4.47
Wholesale trade and retail trade	63	40.91	2.22
Agriculture, forestry, animal husbandry, fisheries	15	33.33	0.53
Total	1314	46.24	46.24

Panel B: Firms with governmental stock purchases in the postcrash period					
	Firms with governmental stock purchases		Value of governmental stock purchases		Ownership of government stock purchases
Date	N	Proportion in the market	RMB (billion)	Proportion in the market	Mean (%)	Median (%)
September 30, 2015	1404	50.14	3415.55	10.07	4.92	3.27
December 31, 2015	1314	46.48	3241.00	7.75	3.60	2.39
December 31, 2016	1173	38.43	3182.83	8.09	3.26	2.26
December 31, 2017	1153	33.08	3308.06	7.36	3.21	2.11
December 31, 2018	1077	30.05	3211.14	9.08	3.07	2.06

Note: Panel A of this table presents the distribution of public firms with governmental stock purchases at the end of 2015 by industries. Firms with governmental stock purchases are firms whose stock shares are purchased by the national team consisting of a few state-linked funds by China Securities Finance Corporation (CSF), China Central Huijin Investment Company (CCH), and the State Administration of Foreign (SAF). We obtain their holding information in public firms from the Wind database. Panel B presents the summary statistics of government bailouts in the postcrash period.

3 | DATA AND MODEL SPECIFICATION

To construct our sample firm, we start with all public companies in the Chinese A-share stock market listed in the Shanghai Stock Exchange and Shenzhen Stock Exchange during the period from 2012 to 2018, excluding the crash year of 2015. Following prior studies, we exclude ST firms and firms in financial industries. We also exclude firms whose IPO dates or delisting dates are after 2015 to avoid unbalanced comparisons between pre- and postcrash periods.[8] We obtain listed firms' financial and stock return data from the China Stock Market and Accounting Research database (CSMAR), the Wind database, and the Chinese Research Data Services database (CNRDS). Firms with missing key variables are excluded from the sample. We then obtain the national team's ownership data from the Wind database. We also exclude firms with positive state ownership from other government institutions that are unrelated to the rescue to minimize the potential confounding effects. These procedures result in 5830 firm-year observations from 1103 unique firms.

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[8] The national team purchases stock equities through open market transactions in the secondary market, not based on partial recapitalization through primary share issues. Nevertheless, in untabulated tests, we re-estimate our Model (1) after excluding firms that ever implement seasoned equity offering during our sample of period from our sample and find similar results.

We use the following difference-in-differences model to test the impact of minority state ownership on firm performance:

$$Firm\ performance_{i,t+1} = \beta \times Treatment_{it} \times Post_{it} + Controls_{it} + Firm_i + Year_t + \varepsilon_{it}. \tag{1}$$

We measure firm performance by ROA computed as the net income divided by the average total assets in a given year and ROE computed as the net income divided by the average total equity in a given year. The key independent variable of interest is an interaction term between *Treatment* and *Post*, where *Treatment* is an indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period, and *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014).

We control for the following firm characteristics, which are shown to influence firm performance (Kato & Long, 2006; Lim et al., 2018; Lin & Fu, 2017; Liu et al., 2014, 2015; Yao et al., 2021). *Log (total assets)* is the natural logarithm of total assets. *Leverage* is the ratio of total liabilities to total assets. *Sales growth* is the annual growth rate of operating income. *Log (firm age)* is the natural logarithm of the company's listing years plus 1. *Intangibility* is the ratio of intangible assets to total assets. *Capital expenditure* is the capital expenses scaled by total assets. *Top one ownership* is the percentage of shares held by the largest shareholder. *Institutional ownership* is the percentage of shares held by all institutional shareholders. *Board independence* is the proportion of independent directors on the board. *CEO–Chair duality* is an indicator variable that takes the value of 1 if the CEO also serves as the chairman of the board and 0 otherwise.

We also include firm fixed effects and year fixed effects to control for unobservable omitted time-invariant firm characteristics and time trends.[9] We use ordinary least squares (OLS) regressions for our analyses, and the standard errors are adjusted for heteroskedasticity and clustered at the firm level. Appendix B provides a detailed description of variable constructions. We winsorize all continuous variables at the 1st and 99th percentiles to mitigate the impact of outliers on the results.

Table 2 presents the summary statistics of firm characteristics in our sample. The mean value of *Treatment* is 0.300, suggesting that treatment firms account for 30% of our sample. The mean values of *ROA* and *ROE* are 0.036 and 0.053, respectively. An average firm in our sample has 0.302 billion RMB in total assets and has been listed publicly for 16 years. The mean value of *Top one ownership* is 0.331, indicating that public firms in China have a relatively concentrated ownership structure. Regarding the board of directors, 37.6% of directors are independent directors for an average firm in our sample and 32.5% of CEOs also serve as the chairman of the board. All the values are comparable to those reported in prior studies using China's market data (e.g., Cheng et al., 2022; Gan et al., 2023).

4 | EMPIRICAL RESULTS

4.1 | Baseline model

To test the impact of minority state ownership on firm performance, we run the regression specified in Model (1). Table 3 reports the results with ROA as the dependent variable in column (1) and ROE as the dependent variable in column (2). We find that the coefficients on the interaction term between *Treatment* and *Post* are both negative and significant at the 1% level in column (1) and at the 5% level in column (2). The coefficient estimate of −0.011 on *Treatment × Post* in column (1) suggests that treatment firms' ROA reduces by 0.011 under the presence of minority state

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[9] We do not include *Treatment* and *Post* separately in the model because they are absorbed by firm and year fixed effects, respectively.

TABLE 2 Summary statistics.

Variables	N	Mean	SD	Minimum	P25	Median	P75	Maximum
Treatment	5830	0.300	0.458	0.000	0.000	0.000	1.000	1.000
Post	5830	0.529	0.499	0.000	0.000	1.000	1.000	1.000
ROA	5830	0.036	0.072	−0.273	0.013	0.038	0.070	0.216
ROE	5830	0.053	0.144	−0.659	0.024	0.065	0.116	0.359
Tobin's q	5830	2.134	1.352	0.898	1.322	1.703	2.404	9.059
EBITDA	5830	0.077	0.065	−0.202	0.047	0.075	0.109	0.263
Log (total assets)	5830	21.830	1.119	19.600	21.010	21.750	22.500	25.050
Leverage	5830	0.385	0.206	0.053	0.218	0.368	0.532	0.865
Sales growth	5830	0.409	1.051	−0.672	−0.018	0.145	0.437	7.027
Log (firm age)	5830	2.829	0.332	1.792	2.639	2.890	3.091	3.434
Intangibility	5830	0.045	0.043	0.000	0.018	0.034	0.056	0.260
Capital expenditure	5830	0.048	0.045	0.000	0.014	0.034	0.067	0.216
Top one ownership	5830	0.331	0.141	0.086	0.222	0.311	0.422	0.704
Institutional ownership	5830	0.375	0.241	0.003	0.156	0.368	0.569	0.864
Board independence	5830	0.376	0.053	0.333	0.333	0.333	0.429	0.571
CEO–Chair duality	5830	0.325	0.468	0.000	0.000	0.000	1.000	1.000

Note: This table presents summary statistics of firm characteristics in a sample of 5830 firm-year observations from 308 treatment firms and 795 control firms from 2012 to 2018. Treatment firms are firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, while control firms are firms with zero ownership by the national team in the same period. Appendix B provides detailed descriptions of the construction of the variables.

ownership within 3 years after the government stock purchase in the 2015 market crash. Given that the average ROA for firms in our sample is 0.036, this number indicates that firms with minority state ownership experience a 30.56% reduction in their ROA relative to the sample mean ROA. In column (2), we replace ROA with ROE as the dependent variable and find similar results. The coefficient on the interaction term between *Treatment* and *Post* is −0.020, indicating an even larger reduction in firms' ROE under the presence of minority state ownership. Overall, the results show that the presence of minority state ownership jeopardizes firm performance.

A key assumption of the difference-in-differences test is that treatment and control firms have parallel trends in dependent variables before the event. To assess the validity of the parallel trend assumption behind our difference-in-differences tests, we follow Agrawal (2013) and replace the interaction term between *Treatment* and *Post* in our baseline model with three indicators, $Treatment \times Before^{-2}$, $Treatment \times Before^{-1}$, and $Treatment \times Post$, where $Before^{-n}$ is an indicator that takes the value of 1 for treatment firms n years before the year of 2015 and 0 otherwise. Thus, the coefficient on $Treatment \times Before^{-n}$ captures how the performance measures of treatment firms in year $t - n$ are different from those of treatment and control firms in year $t - 3$. If the parallel trend assumption holds, we should observe an insignificant coefficient on $Treatment \times Before^{-n}$.

Table 4 reports the results. We find that the coefficients on the interaction terms between *Treatment* and $Before^{-n}$ are all insignificant, suggesting that the performance measures of treatment and control firms move in parallel prior to the market crash year. Moreover, the coefficients on $Treatment \times Post$ remain negative and significant after the inclusion of interaction terms between *Treatment* and $Before^{-n}$. These results support the parallel trend assumption behind our difference-in-differences tests, verifying the exogeneity of the market crash event and the causal effect of minority state ownership on the performance of treatment firms.

TABLE 3 Effect of minority state ownership on firm performance.

Independent variable	ROA (1)	ROE (2)
Treatment × Post	−0.011***	−0.020**
	(−2.808)	(−2.534)
Log (total assets)	−0.029***	−0.061***
	(−7.308)	(−6.891)
Leverage	0.009	0.073**
	(0.652)	(2.224)
Sales growth	0.001	0.003
	(1.112)	(1.043)
Log (firm age)	−0.034	−0.058
	(−1.316)	(−1.103)
Intangibility	0.002	0.058
	(0.038)	(0.564)
Capital expenditure	−0.042	−0.094
	(−1.492)	(−1.454)
Top one ownership	0.025	0.075
	(1.014)	(1.439)
Institutional ownership	0.074***	0.143***
	(5.586)	(5.426)
Board independence	0.010	−0.000
	(0.283)	(−0.002)
CEO–Chair duality	0.001	−0.000
	(0.364)	(−0.007)
Constant	0.715***	1.451***
	(6.514)	(5.989)
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Adjusted R^2	0.372	0.260
Observation	5830	5830

Note: This table presents estimates of difference-in-differences regressions in which the dependent variables are ROA in column (1) and ROE in column (2). The sample consists of 5830 firm-year observations from 308 treatment firms and 795 control firms. *Treatment* is an indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides detailed descriptions of the construction of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. *T*-statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustering at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 4 Pre-trend analysis of firm performance around the 2015 stock market crash.

Independent variable	ROA (1)	ROE (2)
$Treatment \times Before^{-2}$	0.001	0.006
	(0.422)	(0.817)
$Treatment \times Before^{-1}$	−0.006	−0.010
	(−1.571)	(−1.262)
$Treatment \times Post$	−0.013***	−0.022**
	(−2.821)	(−2.426)
Log (total assets)	−0.029***	−0.061***
	(−7.279)	(−6.876)
Leverage	0.009	0.072**
	(0.624	(2.201)
Sales growth	0.001	0.003
	(1.103)	(1.034)
Log (firm age)	−0.033	−0.058
	(−1.308)	(−1.096)
Intangibility	0.003	0.060
	(0.054)	(0.580)
Capital expenditure	−0.042	−0.093
	(−1.478)	(−1.444)
Top one ownership	0.026	0.075
	(1.023)	(1.445)
Institutional ownership	0.073***	0.142***
	(5.512)	(5.358)
Board independence	0.010	−0.002
	(0.261)	(−0.021)
CEO–Chair duality	0.001	−0.000
	(0.357)	(−0.013)
Constant	0.713***	1.448***
	(6.498)	(5.980)
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Adjusted R^2	0.372	0.260
Observation	5830	5830

Note: This figure presents estimates of regressions that examine the pretrend effects of minority state ownership on firms' operating performance around the 2015 stock market crash. The sample consists of 5830 firm-year observations (308 treatment firms and 795 control firms) from 2012 to 2018. *Treatment* is an indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period. *Before*$^{-n}$ is an indicator that takes the value of 1 for firms at year $t - n$ and 0 otherwise, where year t is the year of 2015. *Post* is an indicator that takes the value of 1 for a firm-year in the postcrash period (i.e., the years after 2015) and 0 for a firm-year in the precrash period (i.e., the years before 2015). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. *T*-statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.2 | Robustness tests

4.2.1 | Using propensity-score-matched samples

To mitigate the endogeneity concern associated with observable omitted variable bias, we use a propensity score matching approach. Specifically, we obtain the propensity score using the logit regression of *Treatment* (an indicator that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period) on firm size, leverage, sales growth, firm age, intangibility, capital expenditure, top one ownership, institutional ownership, the proportion of independent directors, and an indicator for CEO–Chair duality. Each treatment firm is matched to one (two) control firm(s) with the closest propensity score. Panel A of Table 5 presents comparisons of firm characteristics between treatment and matched control firms. In the pre-matching sample, firm size, top one ownership, and institutional ownership of treatment firms are significantly larger than those of control firms, while leverage and sales growth of treatment firms are significantly smaller than those of control firms. In post-matching samples, none of the firm characteristics differ significantly between them. Thus, our propensity score matching approach identifies control firms that have very similar characteristics to treatment firms.

Panel B of Table 5 presents the results using one-to-one and one-to-two matching samples. Our results remain qualitatively unchanged using the propensity-score-matched samples. The coefficients on the interaction term between *Treatment* and *Post* remain negative and significant at least at the 5% level in all columns. For example, in the one-to-one matching sample, the coefficients on *Treatment* × *Post* are −0.019 and −0.033 when ROA and ROE are dependent variables, respectively—both larger than the magnitude of coefficients shown in Table 3 in absolute terms. These results suggest that the negative impact of minority state ownership on firm performance is robust to propensity-score-matched samples that alleviate omitted variable bias.

4.2.2 | Other robustness tests

We also conduct several other tests to verify the robustness of our results. First, we use Tobin's q and earnings before interest, taxes, depreciation, and amortization (EBITDA) scaled by total assets as alternative measures for firm performance. Table 6 presents the results. We find that the coefficients on the interaction term between *Treatment* and *Post* are negative and significant at least at the 10% level for all columns. Specifically, the coefficient on *Treatment* × *Post* is −0.199 and significant at the 1% level. Given that the average Tobin's q in our sample is 2.134, the result suggests a 9.32% reduction in Tobin's q of treatment firms under the impact of minority state ownership. In column (2), we find similar results that treatment firms' EBITDA also experiences a significant reduction under the presence of the national team's minority state ownership.

Second, instead of using 1% as the threshold for minority state ownership, we define treatment firms with more than 3% and 5% ownership by the national team and re-estimate the Model (1). Table 7 reports the results, where *Treatment3* (*Treatment5*) is an indicator variable that takes the value of 1 for firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 3% (5%) ownership up to the end of 2018, and 0 for firms with zero ownership by the national team in the same period. We find that the coefficients on the interaction term between *Treatment3* (*Treatment5*) and *Post* are negative and remain statistically significant. The coefficient on *Treatment3* × *Post* in column (1) where ROA is the dependent variable is −0.022 and significant at the 1% level, larger in absolute terms than that reported in column (1) of Table 3 using 1% as the threshold for minority state ownership. These results further support the view that minority state ownership jeopardizes firm performance and the impact tends to be amplified when the national team has more shares of stake in treatment firms.

TABLE 5 Effect of minority state ownership on firm performance using a propensity-score-matched sample.

Panel A: Comparison of firm characteristics between treatment and (matched) control firms

	Pre-matching			Post-matching				
				One-to-one matching			One-to-two matching	
Matching variable	Treatment firms (N = 308)	Control firms (N = 795)	Test of diff.	Treatment firms (N = 138)	Control firms (N = 138)	Test of diff.	Control firms (N = 205)	Test of diff.
	A	B	(A – B)	C	D	(C – D)	E	(C – E)
Log (total assets)	22.146	21.417	0.730***	21.501	21.601	–0.100	21.541	–0.040
Leverage	0.367	0.400	–0.032**	0.334	0.367	–0.033	0.362	–0.028
Sales growth	0.308	0.442	–0.134*	0.189	0.212	–0.023	0.210	–0.021
Log (firm age)	2.747	2.783	–0.036	2.731	2.699	0.032	2.720	0.011
Intangibility	0.043	0.047	–0.004	0.049	0.048	0.001	0.047	0.002
Capital expenditure	0.051	0.049	0.002	0.055	0.052	0.003	0.052	0.003
Top one ownership	0.370	0.335	0.036***	0.369	0.369	0.000	0.363	0.006
Institutional ownership	0.400	0.356	0.044***	0.366	0.365	0.001	0.360	0.006
Board independence	0.373	0.378	–0.005	0.376	0.368	0.008	0.368	0.008
CEO–Chair duality	0.316	0.316	0.000	0.348	0.348	0.000	0.307	0.041

Panel B: Effect of minority state ownership on firm performance using propensity-score-matched samples

| | One-to-one matching | | One-to-two matching | |
| Independent variable | ROA | ROE | ROA | ROE |
	(1)	(2)	(3)	(4)
Treatment × Post	–0.019***	–0.033**	–0.019***	–0.032***
	(–2.634)	(–2.547)	(–2.878)	(–2.711)
Log (total assets)	–0.020***	–0.044***	–0.024***	–0.052***
	(–2.639)	(–3.319)	(–3.530)	(–4.012)

(Continues)

TABLE 5 (Continued)

Panel B: Effect of minority state ownership on firm performance using propensity-score-matched samples

Independent variable	One-to-one matching		One-to-two matching	
	ROA	ROE	ROA	ROE
	(1)	(2)	(3)	(4)
Leverage	0.006	0.067	−0.004	0.042
	(0.222)	(1.379)	(−0.185)	(1.018)
Sales growth	−0.001	−0.004	−0.001	−0.001
	(−0.461)	(−0.501)	(−0.321)	(−0.210)
Log (firm age)	0.006	−0.001	0.021	0.032
	(0.113)	(−0.010)	(0.455)	(0.374)
Intangibility	0.033	0.190	0.047	0.254
	(0.265)	(0.670)	(0.436)	(1.069)
Capital expenditure	0.089*	0.184*	0.062	0.135
	(1.760)	(1.781)	(1.445)	(1.555)
Top one ownership	0.036	0.092	0.053	0.114
	(0.894)	(1.127)	(1.493)	(1.555)
Institutional ownership	0.029	0.036	0.059**	0.097**
	(1.303)	(0.778)	(2.529)	(2.084)
Board independence	0.045	0.079	0.102	0.180
	(0.734)	(0.658)	(1.556)	(1.445)
CEO–Chair duality	0.004	0.009	0.000	0.002
	(0.468)	(0.475)	(0.032)	(0.109)
Constant	0.417*	0.922**	0.431**	0.933**
	(1.959)	(2.287)	(2.247)	(2.571)
Year fixed effects	Yes	Yes	Yes	Yes

(Continues)

TABLE 5 (Continued)

Panel B: Effect of minority state ownership on firm performance using propensity-score-matched samples

Independent variable	One-to-one matching		One-to-two matching	
	ROA	ROE	ROA	ROE
	(1)	(2)	(3)	(4)
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.386	0.282	0.391	0.295
Observation	1572	1572	1954	1954

Note: Panel A of this table presents descriptive statistics for a propensity-score-matched sample of 138 treatment firms and 138 (205) control firms. Treatment firms are firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, while control firms are firms with zero ownership by the national team in the same period. Each treatment firm is matched with one or two control firms in the same industry using a propensity score matching approach with a caliper of 0.001. The propensity score is calculated using a logit regression of *Treatment* (an indicator that takes the value of 1 for treatment firms and 0 for control firms) on the natural logarithm of total assets, leverage, sales growth, the natural logarithm of firm age, intangibility, capital expenditure, top one ownership, institutional ownership, board independence, and CEO–Chair duality. Panel B of this table presents estimates for difference-in-differences regressions using propensity-score-matched samples, where the matching ratios in columns (1)–(2) and columns (3)–(4) are one-to-one and one-to-two, respectively. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. In Panel A, ***, **, and * denote that *t*-tests for mean differences in firm characteristics between treatment firms and control firms are significant at the 1%, 5%, and 10% levels, respectively. In Panel B, *t*-statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 6 Robustness tests using alternative measures for firm performance.

Independent variable	Tobin's q (1)	EBITDA (2)
Treatment × Post	−0.199***	−0.006*
	(−3.302)	(−1.714)
Log (total assets)	−0.892***	0.011***
	(−15.314)	(2.861)
Leverage	0.702***	−0.103***
	(3.692)	(−7.716)
Sales growth	0.012	0.003**
	(0.705)	(2.142)
Log (firm age)	0.836***	0.035
	(2.699)	(1.606)
Intangibility	0.518	−0.002
	(0.871)	(−0.045)
Capital expenditure	−0.188	0.021
	(−0.488)	(0.833)
Top one ownership	−2.196***	0.020
	(−6.789)	(0.839)
Institutional ownership	1.619***	0.035***
	(7.825)	(2.746)
Board independence	0.366	0.040
	(0.767)	(1.134)
CEO–Chair duality	0.022	−0.000
	(0.531)	(−0.087)
Constant	18.968***	−0.251**
	(12.810)	(−2.423)
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Adjusted R^2	0.703	0.433
Observation	5830	5830

Note: This table presents robustness tests for the effect of minority state ownership on firm performance using alternative measures. The sample consists of 5830 firm-year observations from 308 treatment firms and 795 control firms over the period of 2012–2018. The dependent variables in columns (1) and (2) are Tobin's q and EBITDA scaled by total assets, respectively. *Treatment* is an indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. *T*-statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 7 Robustness tests using alternative definitions of treatment firms.

Independent variable	ROA (1)	ROE (2)	ROA (3)	ROE (4)
Treatment3 × Post	−0.022***	−0.037***		
	(−3.937)	(−3.410)		
Treatment5 × Post			−0.018*	−0.041**
			(−1.781)	(−2.197)
Log (total assets)	−0.027***	−0.058***	−0.025***	−0.056***
	(−6.200)	(−5.783)	(−5.818)	(−5.502)
Leverage	0.008	0.060	0.001	0.055
	(0.478)	(1.631)	(0.066)	(1.493)
Sales growth	0.003*	0.005*	0.002	0.004
	(1.700)	(1.650)	(1.543)	(1.379)
Log (firm age)	−0.049	−0.093	−0.043	−0.096
	(−1.628)	(−1.491)	(−1.375)	(−1.456)
Intangibility	0.038	0.091	0.039	0.091
	(0.746)	(0.884)	(0.757)	(0.864)
Capital expenditure	−0.058*	−0.133*	−0.075**	−0.159**
	(−1.786)	(−1.766)	(−2.246)	(−2.052)
Top one ownership	0.042	0.100	0.049	0.111*
	(1.386)	(1.610)	(1.593)	(1.734)
Institutional ownership	0.074***	0.140***	0.072***	0.141***
	(4.804)	(4.460)	(4.405)	(4.302)
Board independence	0.013	−0.008	−0.003	−0.042
	(0.291)	(−0.095)	(−0.056)	(−0.455)
CEO–Chair duality	0.001	−0.001	0.002	0.000
	(0.217)	(−0.104)	(0.408)	(0.039)
Constant	0.703***	1.467***	0.663***	1.440***
	(5.746)	(5.332)	(5.303)	(5.078)
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.329	0.224	0.310	0.209
Observation	4568	4568	4182	4182

Note: This table presents robustness tests for the effect of minority state ownership on firm performance using alternative measures. The sample consists of 5830 firm-year observations from 308 treatment firms and 795 control firms over the period of 2012–2018. *Treatment3* (*Treatment5*) is an indicator variable that takes the value of 1 for firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 3% (5%) ownership up to the end of 2018, and 0 for firms with zero ownership by the national team in the same period. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. *T*-statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Lastly, in untabulated tests, we examine whether our results are affected by other major financial and regulatory events happening in China around the summer of 2015. We first consider the Made in China 2025 policy announced in May 2015.[10] We exclude firms whose core business is one of the top 10 key areas involved in the Made in China 2025 policy from our sample and re-estimate our Model (1). We find that our results of significant reductions in operating performance for treatment firms also hold in firms not targeted by the Made in China 2025 policy. We next consider the Supply-side Reform policy announced in November 2015.[11] Similarly, we exclude firms in seven industries with excess production capacity targeted by the Supply-side Reform policy from our sample and re-estimate our Model (1). Our results are qualitatively similar.

4.3 | Placebo tests

We next design placebo tests to further address the potential endogeneity issue arising from unobservable omitted variables. Specifically, we randomly assign 30% of listed firms in the Chinese stock market as treatment firms where 30% is obtained from the actual proportion of firms whose stock shares are purchased by the national team over all firms in our sample. We again randomly assign a pseudo-event year for each treatment firm. We then run Model (1) using the newly constructed sample. For robustness, we repeat such a procedure 5000 times. Figure 2 reports the distribution of the coefficient estimates on *Treatment* × *Post* from the 5000 regression estimations. We find that estimates of coefficients on the interaction term between *Treatment* and *Post* concentrate near zero, far from the values reported in Table 3, and are not significantly different from zero. These results suggest that our results are not driven by unobservable omitted variables.

4.4 | Cross-sectional heterogeneity in the impact of minority state ownership

In this subsection, we examine cross-sectional heterogeneity in the impact of the national team's minority state ownership on firm performance across firms' riskiness and ownership structure.

Given that the priority of the national team is to reduce the systematic risk and attenuate the market crash, it is likely that they have stronger incentives to intervene in firms with higher riskiness, resulting in a more pronounced impact on firm performance. To test this prediction, we divide the sample into two subgroups according to whether the firm is in high-technology industries and reestimate Model (1) separately for the subgroups, where high-technology industries include telecommunication and computer products (CSRC industry classification code 39 or C39), electronic and electrical equipment (C38), chemical products (C28), pharmaceutical products (C27), machinery and equipment products (C37), and instrument-related products (C40).

Panel A of Table 8 presents the results. In columns (1) and (2) where ROA is the dependent variable, we find that the coefficient on *Treatment* × *Post* remains negative and statistically significant at the 1% level for the subgroup of firms in high-technology industries, whereas the coefficient is negative but insignificant for the subgroup of other firms. The difference in coefficients on the interaction term between the two subgroups is significant at the 1% level. We also find similar results in columns (3) and (4) where ROE is the dependent variable.

Alternatively, we use earnings volatility computed as the standard deviation of industry-adjusted ROA over the past 5 years as another measure for firms' riskiness. The results are reported in Panel B of Table 8. Again, we find that the coefficients on *Treatment* × *Post* are negative and significant only in the subgroups of firms with high earnings volatility.

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[10] The Made in China 2025 policy aims to substantially develop 10 high-tech areas such as aerospace, biotech, information technology, and smart manufacturing with the goal of achieving independence from foreign suppliers and prominence in domestic industries. The policy provides companies in such industries with great competition advantages including government subsidies, reduced tax rates, and direct state funding, which in turn could affect their investment decision and operating performance.

[11] One of the key components in the Supply-side Reform policy is to reduce excess production capacity in the coal and steel industries. Industries with excess production capacity are strictly guided to cut the production capacity, which certainly has dramatic impacts on firms' investment decision and operating performance.

TABLE 8 Cross-sectional heterogeneity based on firms' riskiness.

Panel A: Subsample analyses according to high-technology industries				
	ROA		ROE	
	Subsample of firms in high-tech industries	Subsample of firms not in high-tech industries	Subsample of firms in high-tech industries	Subsample of firms not in high-tech industries
Independent variable	(1)	(2)	(3)	(4)
Treatment × Post	−0.025***	−0.003	−0.042***	−0.006
	(−3.487)	(−0.572)	(−3.179)	(−0.624)
Test for coefficient difference (*p*-value)	0.007	0.024		
Control variables	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.369	0.379	0.232	0.281
Observation	2072	3758	2072	3758

(Continues)

TABLE 8 (Continued)

Panel B: Subsample analyses according to earnings volatility

Independent variable	ROA		ROE	
	Subsample of firms with high earnings volatility	Subsample of firms with low earnings volatility	Subsample of firms with high earnings volatility	Subsample of firms with low earnings volatility
	(1)	(2)	(3)	(4)
Treatment × Post	−0.021***	0.002	−0.043***	0.008
	(−2.683)	(0.472)	(−2.723)	(0.953)
Test for coefficient difference (p-value)	0.009	0.005		
Control variables	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.354	0.526	0.228	0.432
Observation	3113	2717	3113	2717

Note: This table presents estimates of difference-in-differences regressions in which the dependent variables are ROA in columns (1) and (2) and ROE in columns (3) and (4) in subsamples. The full sample consists of 5830 firm-year observations from 308 treatment firms and 795 control firms. In Panel A, the full sample is divided into two subsamples according to whether the firm is in high-technology industries, where high-technology industries include telecommunication and computer products (CSRC industry classification code 39 or C39), electronic and electrical equipment (C38), chemical products (C28), pharmaceutical products (C27), machinery and equipment products (C37), and instrument-related products (C40). In Panel B, the full sample is divided into two subsamples based on the median earnings volatility of the firm, and earnings volatility is calculated as the standard deviation of industry-adjusted ROA over the past 5 years. *Treatment* is an indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period and 0 for firm-years in the precrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. *T*-statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and *** , ** , and * denote significance at the 1%, 5%, and 10% levels, respectively.

FIGURE 2 Placebo tests for effects of minority state ownership on firm performance. This figure presents the placebo tests for the impact of minority state ownership on firm performance. We randomly classify firms in our sample into pseudo-treatment firms and control firms with a fixed percentage of pseudo-treatment firms (30%). We then repeat difference-in-differences regressions of ROA in Panel A (ROE in Panel B) on *Pseudo-treatment × Post* and control variables used in Table 3 for 5000 times, where *Pseudo-treatment* is an indicator that takes the value of 1 for pseudo-treatment firms and 0 otherwise; *Post* is an indicator that takes the value of 1 for a firm-year in the postcrash period (i.e., the years after 2015) and 0 for a firm-year in the precrash period (i.e., the years before 2015). We include firm and year fixed effects and adjust standard errors for heteroskedasticity and clustering at the firm level. We plot the probability density of estimated coefficients on *Pseudo-treatment × Post* from the above 5000 simulations. The vertical dashed line in Panel A (Panel B) marks the coefficient estimate from the true regression in column (1) (column [2]) in Table 3. [Color figure can be viewed at wileyonlinelibrary.com]

(a) ROA as the dependent variable

(b) ROE as the dependent variable
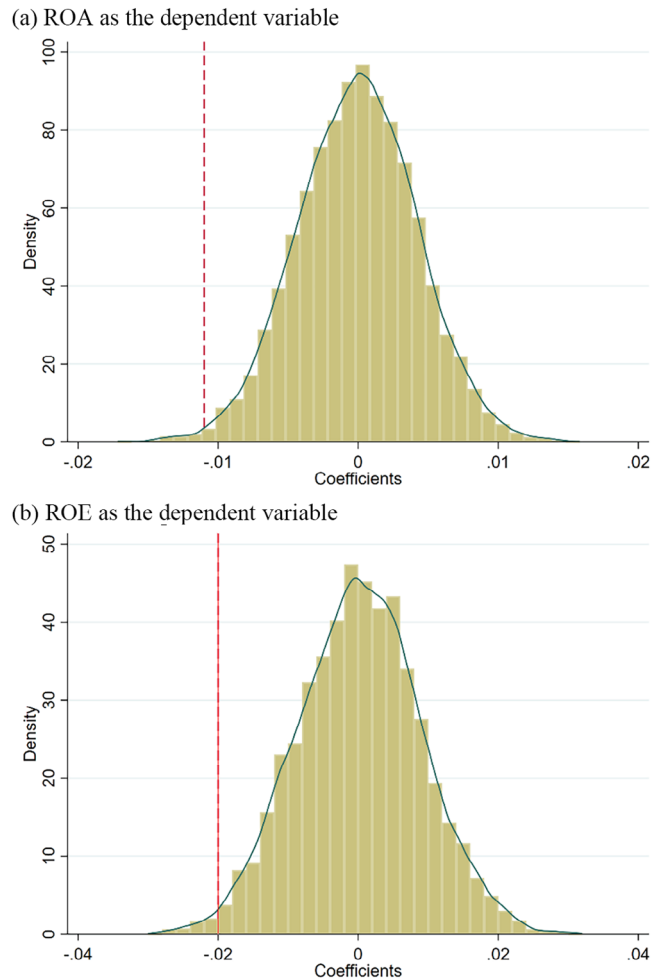
The findings collectively suggest that minority state ownership affects firm performance more adversely when the national team has stronger incentives to act aggressively in more risky firms during the market crash.

A firm's ownership structure can also influence the national team's ability to intervene in corporate activities. Specifically, the impact of the national team's minority state ownership can be restrained by the existence of large shareholders that are strong enough to bargain with the national team and act against the intervention. Therefore, we expect the negative impact of the national team's minority state ownership on firm performance to be more severe in firms with lower large shareholder ownership. We compute top one ownership to examine this issue. We divide the sample into two subgroups according to whether a firm's top one ownership is above or below the sample median. Panel A of Table 9 reports the results of Model (1) separately for the subgroups. Consistent with our expectation, we find that the coefficient on *Treatment × Post* is negative and significant at the 1% level for the subgroup of firms with lower top one ownership in both columns (2) and (4) where ROA and ROE are dependent variables, respectively. In contrast, we find that such coefficients are insignificant for the subgroup of firms with higher top one ownership. For robustness, we also compute top 10 ownership and report the results in the subgroups based on firms' top 10 ownership in Panel B of Table 9. The results are similar to those in Panel A of Table 9 using top one ownership as the measure of large shareholders' power. These results collectively suggest that the national team acts more aggressively in firms whose existing large shareholders are not strong enough and leads to a stronger impact of minority state ownership on firm performance.

TABLE 9 Cross-sectional heterogeneity analyses according to firms' ownership structure.

Panel A: Subsample analyses according to firms' top one ownership

Independent variable	ROA		ROE	
	Subsample of firms with high top one ownership	Subsample of firms with low top one ownership	Subsample of firms with high top one ownership	Subsample of firms with low top one ownership
	(1)	(2)	(3)	(4)
Treatment × Post	−0.009	−0.019***	−0.008	−0.041***
	(−1.602)	(−3.175)	(−0.740)	(−3.248)
Test for coefficient difference (p-value)	0.182	0.033		
Control variables	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.466	0.350	0.343	0.249
Observation	2915	2915	2915	2915

(Continues)

TABLE 9 (Continued)

Panel B: Subsample analyses according to firms' top 10 ownership

Independent variable	ROA		ROE	
	Subsample of firms with high top 10 ownership	Subsample of firms with low top 10 ownership	Subsample of firms with high top 10 ownership	Subsample of firms with low top 10 ownership
	(1)	(2)	(3)	(4)
$Treatment \times Post$	−0.007	−0.019***	−0.002	−0.043***
	(−1.242)	(−3.326)	(−0.219)	(−3.521)
Test for coefficient difference (p-value)	0.143	0.013		
Control variables	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.430	0.364	0.330	0.253
Observation	2915	2915	2915	2915

Note: This table presents estimates of difference-in-differences regressions in which the dependent variables are ROA in columns (1) and (2) and ROE in columns (3) and (4) in subsamples. The full sample consists of 5830 firm-year observations from 308 treatment firms and 795 controls. In Panel A, the full sample is divided into two subsamples according to whether a firm's top one ownership is above or below the sample median. In Panel B, the full sample is divided into two subsamples according to whether a firm's top 10 ownership is above or below the sample median. *Treatment* is an indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. *T*-statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.5 | The government's motives to influence corporate polices

In this section, we investigate the motives for the national team on behalf of the government to influence corporate policies. Specifically, we examine two motives based on the misalignment of interests between bureaucrats and other shareholders: (1) the motive of reducing firm-level risk to mitigate the market crash risk, and (2) the motive of preventing mass layoffs to maintain social stability. We estimate the following model:

$$Riskiness/Employment_{i,t+1} = \beta \times Treatment_{it} \times Post_{it} + Controls_{it} + Firm_i + Year_t + \varepsilon_{it} \qquad (2)$$

We measure firm-level *Riskiness* by stock return volatility (computed as the standard deviation of stock daily returns over a year) and earnings volatility (computed as the standard deviation of annual earnings in 5 years). We measure firm-level *Employment* by total employment and excessive employment, where total employment is calculated as number of employees scaled by total assets (in million RMBs) and excessive employment is the residual estimated from regressing total employment on total assets, leverage, ROA, sales growth, and asset tangibility (the ratio of gross property, plant, and equipment over total assets) for each industry and year. *Treatment*, *Post*, and *Controls* are defined the same way as in our Model (1). We also control firm and year fixed effects in the model.

Table 10 presents the results. In columns (1) and (2) where stock return volatility and earnings volatility are dependent variables, we find that the coefficients on the interaction term between *Treatment* and *Post* are negative and significant at least at the 5% level. Such negative coefficients suggest significant reductions in firm-level riskiness for treatment firms after the national team steps in. In contrast, we find that such coefficients are significantly positive in columns (3) and (4) where total employment and excessive employment are dependent variables. These results suggest that treatment firms experience an increase in employment under the presence of minority state ownership despite the fact that such high employment could be suboptimal.

Collectively, these results support our conjecture that government interventions in their holding firms are driven by their motives of reducing firm risk and preventing mass layoffs.

4.6 | Potential channels

In this section, we investigate the potential channels through which the national team's minority state ownership affects firm performance. Agency theory predicts that firms with state ownership are more likely to face larger costs arising from governance interventions and misalignment of political and business objectives. A large body of prior studies has shown that state owners tend to pursue social and political objectives over profitability (e.g., Bruton et al., 2015; Jensen, 2002; Musacchio et al., 2014; Porta et al., 1998; Tirole, 2001). In the setting of the 2015 stock market crash in China, the national team aims to reduce the systematic risk and attenuate the crash. It may use its minority ownership to force firms to withhold risky investments to decrease firm risk.

To test the predictions, we focus on firms' investment efficiency. Specifically, we compute investment inefficiency as the residuals estimated from the regressions of total investments scaled by lagged total assets on lagged revenue growth, an indicator variable that takes the value of 1 for negative lagged revenue growth and 0 otherwise, and an interaction term between them, for each industry-year based on the CSRC industry classification (Chen et al., 2011). We then run Model (1) by replacing firm performance measures with the investment inefficiency measure as the dependent variable. Column (1) of Table 11 presents the results. We find that the coefficient on the interaction term between *Treatment* and *Post* is positive and significant at the 5% level, suggesting a significant increase in investment inefficiency for treatment firms after the joining of the national team.

To better understand how investment behavior changes in treatment firms, we further split the sample into two subsamples of underinvestment and overinvestment and re-estimate Model (1) in two subsamples separately.

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TABLE 10 Tests of the government's motives to influence corporate policies.

Independent variable	Stock return volatility (1)	Earnings volatility (2)	Total employment (3)	Excessive employment (4)
Treatment × Post	−0.004***	−0.006**	0.075**	0.074**
	(−4.952)	(−1.989)	(2.154)	(2.147)
Log (total assets)	−0.005***	0.017***	−0.293***	−0.120***
	(−7.040)	(4.798)	(−8.143)	(−3.202)
Leverage	0.004*	−0.002	0.076	−0.334**
	(1.670)	(−0.206)	(0.461)	(−2.108)
Sales growth	0.000	−0.001	0.019	0.036
	(1.532)	(−1.361)	(0.420)	(0.817)
Log (firm age)	−0.008	−0.018	0.402**	0.376**
	(−1.513)	(−1.049)	(2.108)	(2.042)
Intangibility	−0.009	−0.010	1.079**	0.974**
	(−0.910)	(−0.253)	(2.233)	(2.087)
Capital expenditure	−0.001	−0.007	−1.019**	−0.894**
	(−0.160)	(−0.332)	(−2.448)	(−2.184)
Top one ownership	−0.007	0.007	0.005	−0.037
	(−1.329)	(0.309)	(0.024)	(−0.198)
Institutional ownership	0.016***	0.037***	−0.263**	−0.275**
	(5.961)	(2.857)	(−2.093)	(−2.189)
Board independence	−0.003	0.022	0.056	0.103
	(−0.407)	(0.965)	(0.260)	(0.514)
CEO–Chair duality	−0.000	0.003	−0.019	−0.009
	(−0.072)	(1.232)	(−0.710)	(−0.336)
Constant	0.165***	−0.305***	6.058***	1.738*
	(8.756)	(−3.668)	(5.973)	(1.710)
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.318	0.466	0.581	0.533
Observation	5830	5830	5830	5830

Note: This table presents estimates of difference-in-differences regressions in which the dependent variables are firm-level riskiness and employment. The sample consists of 5830 firm-year observations from 308 treatment firms and 795 control firms. *Stock return volatility* is calculated as the standard deviation of stock daily returns over a year. *Earnings volatility* is calculated as the standard deviation of annual earnings in 5 years. *Total employment* is calculated as the number of employees scaled by total assets (in million RMBs). *Excessive employment* is the residual estimated from regressing total employment on total assets, leverage, ROA, sales growth, and asset tangibility (the ratio of gross property, plant, and equipment over total assets) for each industry and year. *Treatment* is an indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. The *p*-values reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 11 Effects of minority state ownership on investment efficiency.

Independent variable	Investment inefficiency (1)	Underinvestment (2)	Overinvestment (3)
Treatment × Post	0.009**	0.007***	0.002
	(2.379)	(2.719)	(0.296)
Log (total assets)	−0.040***	−0.005*	−0.031***
	(−7.875)	(−1.933)	(−5.007)
Leverage	−0.011	0.014	−0.000
	(−0.772)	(1.592)	(−0.020)
Sales growth	0.001	−0.000	0.000
	(0.441)	(−0.220)	(0.169)
Log (firm age)	0.044**	0.009	0.015
	(2.092)	(0.534)	(0.377)
Intangibility	−0.023	0.010	−0.049
	(−0.411)	(0.326)	(−0.598)
Capital expenditure	−0.052	−0.009	−0.139***
	(−1.503)	(−0.409)	(−2.689)
Top one ownership	0.050*	0.016	0.024
	(1.796)	(0.952)	(0.572)
Institutional ownership	0.002	−0.012	0.051**
	(0.125)	(−1.358)	(2.383)
Board independence	−0.011	0.013	−0.045
	(−0.315)	(0.586)	(−0.709)
CEO–Chair duality	−0.001	0.000	−0.006
	(−0.256)	(0.179)	(−1.003)
Constant	0.788***	0.116*	0.682***
	(6.786)	(1.728)	(4.075)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Adjusted R^2	0.159	0.200	0.303
Observation	5476	3770	1706

Note: This table presents estimates of difference-in-differences regressions in which the dependent variables are firm benefits from the government. The sample consists of 5830 firm-year observations from 308 treatment firms and 795 control firms. *Investment inefficiency* is computed as the residuals estimated from the regressions of total investments scaled by lagged total assets on lagged revenue growth, an indicator variable that takes the value of 1 for negative lagged revenue growth and 0 otherwise, and an interaction term between them, for each industry-year based on the CSRC industry classification (Chen et al., 2011). *Underinvestment (Overinvestment)* takes the value of *Investment inefficiency* when it is negative (positive). *Treatment* is an indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. The *p*-values reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Columns (2) and (3) in Table 11 present the estimation results in the two subsamples. We find that the coefficient on *Treatment × Post* in column (2) for the subsample of underinvestment is 0.007, significant at the 1% level, whereas such coefficient is not significant in column (3) for the subsample of overinvestment. These results are consistent with the view that the presence of the national team's minority state ownership suppresses firms' risky investments.

We next investigate whether minority state ownership impedes firm productivity and innovation. We compute total factor productivity following the semiparametric method proposed by Olley and Pakes (1996).[12] For innovation, we take the natural logarithm of the number of patents as the quantity measure and take the natural logarithm of the number of citations as the quality measure. We then replace the dependent variable in Model (1) with these measures. Table 12 reports the results. In column (1) where the dependent variable is total factor productivity, the coefficient on the interaction term between *Treatment* and *Post* is negative and significant at the 1% level, suggesting that treatment firms experience significant decreases in firm productivity under the presence of minority state ownership. We use innovation quantity as the dependent variable in column (2) and find that the coefficient on *Treatment × Post* is also negative and significant at the 1% level. We also find a negative impact on innovation quality in column (3). This result is consistent with more underinvestment in treatment firms shown in Table 11. Innovation requires more input in research and development that is likely to be risky, and the presence of the national team suppresses risky investments and thus reduces innovation input and output.

We also examine the potential benefits of minority state ownership. Prior studies show that the political connections with governments arising from state ownership are more likely to help firms decrease the cost of debts, receive more government subsidies, and enjoy better tax treatments (e.g., Faccio, 2006; Fisman, 2001; Hillman, 2005; Hillman & Hitt, 1999; Oliver & Holzinger, 2008; Peng & Luo, 2000; Sun et al., 2012). In Table 13, we replace the dependent variable in Model (1) with measures of cost of debts, government subsidy, and tax benefit and re-estimation the regressions, where cost of debts is measured as the ratio of interest expenses to total bank debts, government subsidy is measured as the total amount of subsidies from government institutions scaled by total assets, and tax benefit is measured as an indicator for whether the enterprise receives an income tax credit in which the firm's applicable tax rate is lower than the statutory income tax rate. We find that the coefficients on *Treatment × Post* are insignificant for all the above measures as dependent variables, suggesting that the national team's minority state ownership does not benefit the firms through the political connection.

4.7 | The government's timely divestment of shares

If the presence of the national team's minority state ownership indeed impedes firms' investment efficiency, productivity, and innovation and thus hurts firm performance in the long run, we would expect that a timely divestment of shares by the national team may affect firm performance in a different manner.

To test this prediction, we define semi-treated firms as those whose minority state ownership of the national team is higher than 1% at the end of 2015 but lower than 1% in the years after 2015. We then compare semi-treated firms and treatment firms that are continuously held by the national team with more than 1% ownership from 2015 to 2018 using a difference-in-differences approach. Specifically, we construct an indicator variable *Semi-treated* that takes the value of 1 for semi-treated firms and 0 for treatment firms and interact it with *Post*. Panel A of Table 14 reports the results. We find that the coefficients on *Semi-treated × Post* are positive and significant at the 1% level for both columns where ROA and ROE are dependent variables. We also compare semi-treated firms with control firms that are not held by the national team from 2015 to 2018 by defining *Semi-treated* as an indicator variable that takes the value of 1 for semi-treated firms and 0 for control firms and again interacting it with *Post*. Panel B of Table 14 shows that none of the coefficients on *Semi-treated × Post* is significantly different from 0. Collectively, these results echo the negative

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[12] We use the Stata package provided by Yasar et al. (2008) to implement the calculation.

TABLE 12 Effects of minority state ownership on firm productivity and innovation.

Independent variable	Total factor productivity (1)	Innovation (2)	Citation (3)
Treatment × Post	−0.101***	−0.538***	−0.172**
	(−2.874)	(−6.422)	(−2.243)
Log (total assets)	0.306***	−0.089*	−0.076*
	(6.855)	(−1.887)	(−1.761)
Leverage	0.617***	−0.423***	−0.136
	(4.316)	(−2.605)	(−0.915)
Sales growth	0.019	−0.021	−0.025*
	(1.037)	(−1.484)	(−1.800)
Log (firm age)	0.171	−0.692*	−0.347
	(0.861)	(−1.785)	(−0.932)
Intangibility	−0.302	−0.390	−0.542
	(−0.547)	(−0.621)	(−0.976)
Capital expenditure	−0.492*	0.603	0.091
	(−1.716)	(1.455)	(0.192)
Top one ownership	−0.359*	0.211	0.342
	(−1.672)	(0.646)	(1.125)
Institutional ownership	0.497***	0.066	0.206
	(4.412)	(0.352)	(1.118)
Board independence	−0.207	0.401	−0.047
	(−0.746)	(0.842)	(−0.095)
CEO–Chair duality	0.016	0.042	0.042
	(0.455)	(0.846)	(0.854)
Constant	8.556***	5.436***	3.728***
	(8.124)	(3.842)	(2.704)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Adjusted R^2	0.780	0.581	0.324
Observation	5830	5830	5830

Note: This table presents estimates of difference-in-differences regressions in which the dependent variables are firm efficiency measures. The sample consists of 5830 firm-year observations from 308 treatment firms and 795 control firms. *Total factor productivity* is estimated using consistent semiparametric estimators for the labor and capital coefficients from Olley and Pakes (1996). *Innovation* is measured by the natural logarithm of the number of patents. *Citation* is measured by the natural logarithm of the number of citations. We obtain the data of firm patents and citations from the patent search website of the China National Intellectual Property Administration. *Treatment* is an indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. *T*-statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 13 Effects of minority state ownership on firms' benefit.

Independent variable	Cost of debts (1)	Government subsidy (2)	Tax benefit (3)
Treatment × Post	0.055	0.008	0.014
	(0.093)	(0.400)	(0.943)
Log (total assets)	0.034	−0.063***	−0.019*
	(0.111)	(−3.286)	(−1.685)
Leverage	−6.292***	−0.019	0.052
	(−4.349)	(−0.305)	(1.222)
Sales growth	−0.039	0.001	−0.004
	(−0.594)	(0.200)	(−1.489)
Log (firm age)	−4.222	−0.053	−0.140
	(−1.208)	(−0.404)	(−1.472)
Intangibility	3.979	0.847***	0.110
	(0.908)	(2.956)	(1.078)
Capital expenditure	4.152	0.255	0.162*
	(1.459)	(1.623)	(1.720)
Top one ownership	0.844	−0.013	0.081
	(0.324)	(−0.110)	(0.768)
Institutional ownership	0.062	0.103	−0.052
	(0.040)	(1.207)	(−0.866)
Board independence	4.101	0.015	−0.267**
	(1.303)	(0.059)	(−2.518)
CEO–Chair duality	−0.346	0.002	−0.007
	(−0.883)	(0.081)	(−0.532)
Constant	13.337	1.797***	1.434***
	(1.305)	(3.298)	(3.775)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Adjusted R^2	0.464	0.577	0.896
Observation	5830	5830	5830

Note: This table presents estimates of difference-in-differences regressions in which the dependent variables are firm benefits from the government. The sample consists of 5830 firm-year observations from 308 treatment firms and 795 control firms. *Government subsidy* is measured by the total amount of subsidies from government institutions scaled by total assets. *Tax benefit* is an indicator variable that takes the value of 1 if the firm's applicable tax rate is lower than the statutory income tax rate of 25%, and 0 otherwise. *Treatment* is an indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. The *p*-values reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 14 Effects of the government's timely divestment of shares.

Panel A: Effects of the government's timely divestment of shares in comparison with treatment firms		
	ROA	ROE
Independent variable	(1)	(2)
Semi-treated × Post	0.026***	0.054***
	(2.709)	(3.521)
Control variables	Yes	Yes
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Adjusted R^2	0.481	0.357
Observation	2456	2456
Panel B: Effects of the government's timely divestment of shares in comparison with control firms		
	ROA	ROE
Independent variable	(1)	(2)
Semi-treated × Post	−0.008	−0.011
	(−1.203)	(−0.907)
Control variables	Yes	Yes
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Adjusted R^2	0.325	0.218
Observation	4693	4693

Note: This table presents estimates of difference-in-differences regressions in which the dependent variables are ROA in column (1) and ROE in column (2). In Panel A, the sample consists of 2456 firm-year observations from 134 semi-treated firms and 308 treatment firms. In Panel B, the sample consists of 4693 firm-year observations from 134 semi-treated firms and 795 control firms. Semi-treated firms are firms whose minority state ownership of the national team is higher than 1% at the end of 2015 but lower than 1% in years after 2015. Treatment firms are firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018. Control firms are firms with zero ownership by the national team in the same period. *Semi-treated* is an indicator that takes the value of 1 for semi-treated firms and 0 for treatment firms in Panel A and control firms in Panel B. *Post* is an indicator variable that takes the value of 1 for firm-years in the postcrash period (i.e., the years of 2016–2018) and 0 for firm-years in the precrash period (i.e., the years of 2012–2014). Appendix B provides a detailed description of the variables. All continuous variables are winsorized at the 1st and 99th percentiles. *T*-statistics reported in parentheses are based on standard errors adjusted for heteroskedasticity and clustered at the firm level, and ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

impact of the national team's minority state ownership on firm performance and provide a useful verification of a way to alleviate such an impact.

5 | CONCLUSION

Minority state ownership becomes more and more pervasive over the world due to privatization waves of SOEs and governmental rescue packages in market crises. How minority state ownership affects firm performance beyond the aim of rescuing the market, however, remains unclear. We use the Chinese stock market crash in 2015 when the Chinese government directly purchases stock shares as the setting to investigate this issue. We provide evidence that

minority state ownership arising from the government stock purchase jeopardizes firm performance, which depicts the downside of governmental rescue strategies in the crisis period.

Our cross-sectional heterogeneity tests show that the negative impact of minority state ownership is more pronounced in more risky firms and firms with less powerful large shareholders, in which the national team has stronger incentives and better abilities to act aggressively in intervening in corporate decisions.

We test two motives of the national team to influence firm policies (i.e., the motive of reducing firm-level risk to mitigate market crash risk and the motive of preventing mass layoffs to maintain social stability) and find supportive evidence. We further examine the potential channels through which the national team's minority state ownership plays a role in influencing firm performance. We find that the presence of minority state ownership significantly reduces firms' investment efficiency, particularly in underinvestment. We also find that firms with minority state ownership have lower total factor productivity, innovation quantity, and innovation quality. These results are consistent with the agency problem view that there is a misalignment of interests between state ownership and value-maximizing shareholders. Finally, we examine whether the negative impact of minority state ownership still exists after the national team timely exits from holding the firms. We find that firms whose stock shares are purchased by the national team in 2015 but not held in later years have significantly higher operating performance compared to treatment firms that are continuously held by the national team, whereas these firms have no significant difference in operating performance compared to control firms that are never held by the national team. These results echo our main findings and verify the impact of the national team's minority state ownership.

Overall, our study provides new evidence on how minority state ownership affects firm performance during the crisis period, shedding new light on the downside of governmental rescue strategies that directly purchase stocks in the market.

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APPENDIX A: INTERVIEW ON THE IMPACT OF MINORITY STATE OWNERSHIP ON CORPORATE POLICIES

Questionnaire	Interview 1 on managers of treatment firms (N = 4) Responses	Interview 2 on EMBA students (N = 26) Responses
Q1: What is the amount of state ownership in the firm?	Larger than 1% but smaller than 5%: 4 respondents (100%)	Larger than 0% but smaller than 1%: 4 respondents (15.385%) Larger than 1% but smaller than 5%: 8 respondents (30.769%) Larger than 5% but smaller than 10%: 14 respondents (53.846%)
Q2: How often do minority state shareholders participate in the decision-making process of corporate policies?	Occasionally: 1 respondent (25%) Very often: 3 respondents (75%)	Occasionally: 7 respondents (26.923%) Very often: 17 respondents (65.385%) Always: 2 respondents (7.692%)
Q3: What are the methods, other than voting, through which minority state shareholders influence corporate policies?	Expressing opinions in formal meetings: 4 respondents (100%) Corporate site visits: 1 respondent (25%)	Expressing opinions in formal meetings: 23 respondents (88.462%) Corporate site visits: 7 respondents (26.923%)
Q4: Do managers value more about the opinions from minority state shareholders than those from other minority shareholders?	Yes: 4 respondents (100%)	Yes: 23 respondents (88.462%) No: 3 respondents (11.538%)

Note: This appendix presents the description of the questions in the interview and the summary of responses on the impact of minority state ownership on corporate policies. Our first interview is conducted with managers of treatment firms from our baseline sample, and the second is with students enrolled in the Executive Master of Business Administration (EMBA) program in our affiliated universities. We succeed in interviewing four executives from our treatment sample and 26 EMBA students who work as executives for firms with minority state ownership.

APPENDIX B: VARIABLE DEFINITIONS

Variable	Definition	Data source
Board independence	The proportion of independent directors on the board	CSMAR
Capital expenditure	The capital expenses scaled by total assets	CSMAR
CEO–Chair duality	An indicator variable that takes the value of 1 if the CEO also serves as the chairman of the board and 0 otherwise	CSMAR
Institutional ownership	The percentage of shares held by all institutional shareholders	CSMAR
Intangibility	The ratio of intangible assets to total assets	CSMAR
Leverage	The ratio of total liabilities to total assets	CSMAR
Log (firm age)	The natural logarithm of the company's listing years plus 1	CSMAR
Log (total assets)	The natural logarithm of total assets	CSMAR
Post	An indicator that takes the value of 1 for a firm-year in the postcrash period (i.e., the years of 2016–2018) and 0 for a firm-year in the precrash period (i.e., the years of 2012–2014)	
ROA	Return to assets, defined as the net income divided by the average total assets in a given year	CSMAR
ROE	Return on equity, defined as the net income divided by the average total equity in a given year	CSMAR
Sales growth	The annual growth rate of operating income	CSMAR
Top one ownership	The percentage of shares held by the top one largest shareholder	CSMAR
Top 10 ownership	The percentage of shares held by the top 10 largest shareholder	CSMAR
Treatment	An indicator variable that takes the value of 1 for treatment firms whose stock shares are directly purchased by the national team in the year 2015 and continuously held with more than 1% ownership up to the end of 2018, and 0 for control firms with zero ownership by the national team in the same period	Wind

Note: This appendix provides detailed descriptions of all variables used in the tables.