

Anticorruption Regulation and Firm Value: Evidence from a Shock of Mandated Resignation of Directors in China

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Introduction

What the Paper Studies & Brief on Results

1. Use a particular event to test the effect of anticorruption regulation.

- China's broad anti-corruption campaign includes a regulation that requires bureaucrats to resign from director positions in listed companies.
- Find that this regulation costs firms on average **4%** (Market Value).

2. How can the cost be explained?

- Cannot be explained by **(1)** the typical cost of losing a director (<1%) **or** by **(2)** loss due to the punishment of companies by political enemies.
- Actually influence through two channels:
 - ▣ Losing political connection
 - ▣ Through anticorruption disincentive, the incentive to act passively for fear of being accused of corruption (Chilling Effect)

3. Other effects

- Affected firms reduce investments, hire more employees, and have poor performance afterwards.

Introduction

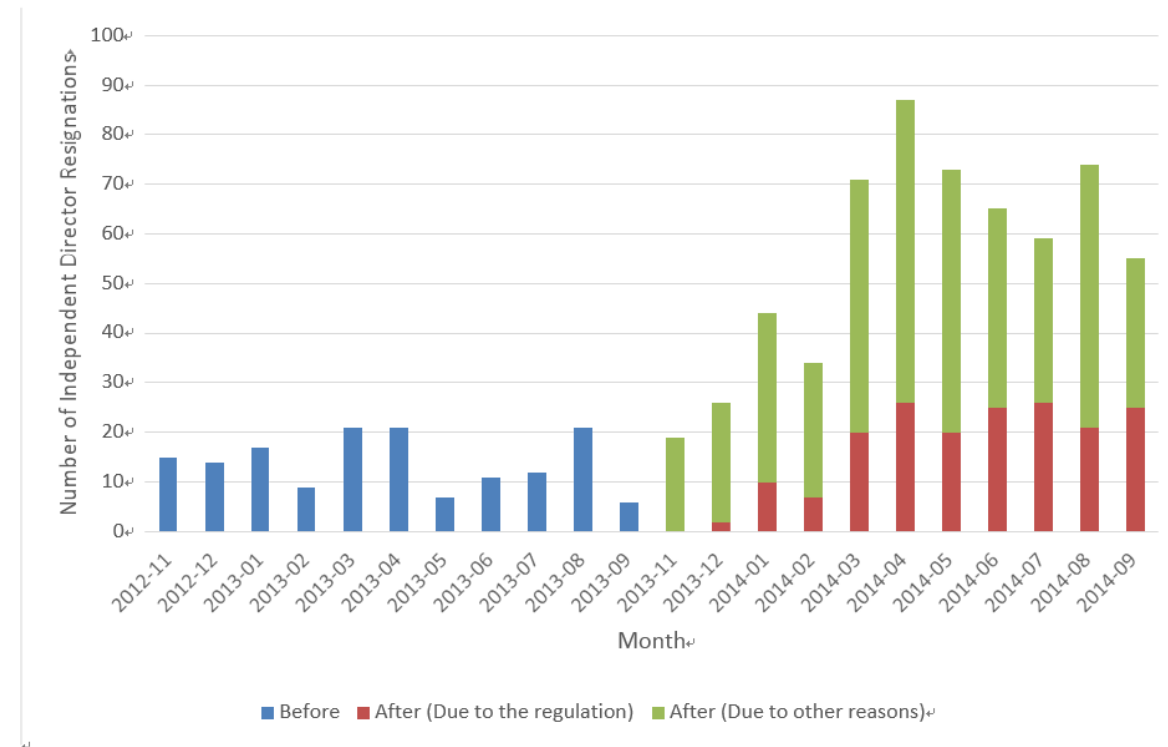
Brief about the Specific Regulation

1. The regulation:

- On October 19, 2013, the Organization Department of the Communist Party of China implemented a particular anticorruption regulation towards independent directors in listed companies. (As part of President Xi's Anticorruption Campaign) The regulation requires that former and current government officers can serve as directors, without compensations or perquisites, only if the Organization Department approves.
- Bureaucrat directors started to resign from listed companies (Figure).
- About one-quarter of resignation announcements after the regulation specifically claimed that the independent directors resigned due to the regulation.

2. Meaning of investigating the event:

- Provide clearly defined treatment firms, firms with bureaucrat independent directors before the regulation.
- Help draw a causal inference of anticorruption regulation on firm value (Exogenous shock to shareholders and firms).



Introduction

Sample Selection

1. Companies and time horizon

- Include all the A-share listed companies in China, except for companies in the financial industry.
- From 2009 to 2014, to avoid the influence of the 2008 financial crisis.

2. Database and processing

- The information on the ultimate controlling shareholder is obtained from the **CCER database**, while the research and development expenditure is from the **WIND database**. The independent director background information, as well as the accounting information, stock returns, and other information, is from the **CSMAR database**.
- The final sample contains a total of 780 (1,267) unique treatment (control) firms. All the continuous variables are winsorized at 1% and 99%.

Methodology & Results

Define Treatment Firms and Control Firms & Measurement of Firm Value

1. Define Treatment Firms and Control Firms

- Define firms with bureaucrat directors before October 19, 2013 as **treatment firms**, leaving the other firms as **control firms**.
- Bureaucrat directors are defined as **independent directors** who have working experience in a government agency with a rank higher than **Chu level**.

(Chu is the lowest level under the direct supervision of the Organization Department of the Central Committee of the Communist Party of China)

2. Measurement of firm value

- Here the paper uses **Tobin's Q** to measure firm value, which is defined as the market value of equity plus the book value of liability, divided by the total assets.

Methodology & Results

All the Variables Used in the Paper

Table 1: Variable definitions and summary statistics

Panel A: Variable definitions

Variable Name	Variable Definition		
<i>Tobin's Q</i>	The market value of the equity plus the book value of liability, divided by the total assets. Tradable shares are priced at the year-end stock price. Non-tradable shares are priced at the book value of equity per share.		
<i>Treat</i>	An indicator variable that equals one if a firm has at least one independent director with a bureaucratic background before the announcement of anticorruption regulation.		
<i>Post</i>	An indicator variable that equals one for observations since 2013.		
<i>SIZE</i>	The natural logarithm of total sales.		
<i>LEV</i>	Total liability divided by total assets.		
<i>CAPEX</i>	Capital expenditure divided by total assets.		
<i>R&D</i>	Research and development expenditure divided by total assets.		
<i>PPE</i>	Property, plant and equipment divided by total assets.		
<i>ROE</i>	Net income divided by the book value of equity.		
<i>M2B</i>	Ratio of market value to the book value of equity.		
<i>AGE</i>	The number of years since the firm was listed on the exchange.		
<i>SOE</i>	A dummy variable that equals one if the ultimate controlling shareholder is a government agency.		
<i>StateHoldings</i>	The number of shares held by government agencies, divided by the total shares outstanding.		
<i>TOP1</i>	The number of shares held by the largest shareholder, divided by the total shares outstanding.		
<i>Intangibility</i>	Intangible assets divided by total assets.		
<i>BankLoan</i>	Bank loans divided by total assets.		
<i>Subsidies</i>	Subsidies from the government divided by total assets.		
<i>DeficitGrowth</i>	The local deficit growth rate in the region where listed firms' headquarters are located.		
<i>MgmHoldings</i>	The number of shares held by the management team, divided by total shares outstanding.		
<i>Marketization</i>	The index from China's National Economic Research Institute. The higher the index is,		the more developed a region is.
		<i>DirAge</i>	The average age of independent directors.
		<i>Male</i>	The number of male independent directors divided by the number of all independent directors.
		<i>Education</i>	The number of independent directors with graduate degrees divided by the number of all independent directors.
		<i>Busyness</i>	The number of independent directors with multiple positions divided by the number of all independent directors.
		<i>Absence</i>	The number of board meetings from which any independent director is absent divided by the number of board meetings.
		<i>Dissent</i>	An indicator variable that equals one if an independent director dissents from a management proposal.
		<i>BdSize</i>	The number of all board members.
		<i>IndBd</i>	The number of independent directors divided by the number of all board members.
		<i>IndBdPay</i>	The average pay of independent directors.
		<i>CurrentRatio</i>	Current assets divided by current liability.
		<i>Cash</i>	Cash divided by total assets.
		<i># of Employees</i>	The number of employees.
		<i>Ln(ProfitPerEmployee)</i>	The natural logarithm of net profit per employee.
		<i>ROA</i>	Earnings before interest and taxes divided by total assets.
		<i>AssetTurnover</i>	Sales divided by total assets.

Methodology & Results

Match the Firm (Nearest-Neighbor Propensity Score Matching Method)

1. Reason for matching

- Firms with bureaucrat directors may not be comparable to other firms, in the sense that firms could hire bureaucrat directors for strategic reasons.
- So the paper matches firms using the propensity score matching method based on a series of variables, including year, industry and location fixed effects.

2. Matching & Test

- For each treatment firm, select a matched control firm based on a propensity score, after a logit model is estimated (Prior to the regulation).
 - ▣ Logit Model:

$$\text{Logit}[P(\text{Treat Dummy}=1)] = \beta_1 * X(\text{firm characteristics}) + \beta_2 * \text{Year Dummy} + \beta_3 * \text{Industry Dummy} + \beta_4 * \text{Location Dummy} + e$$

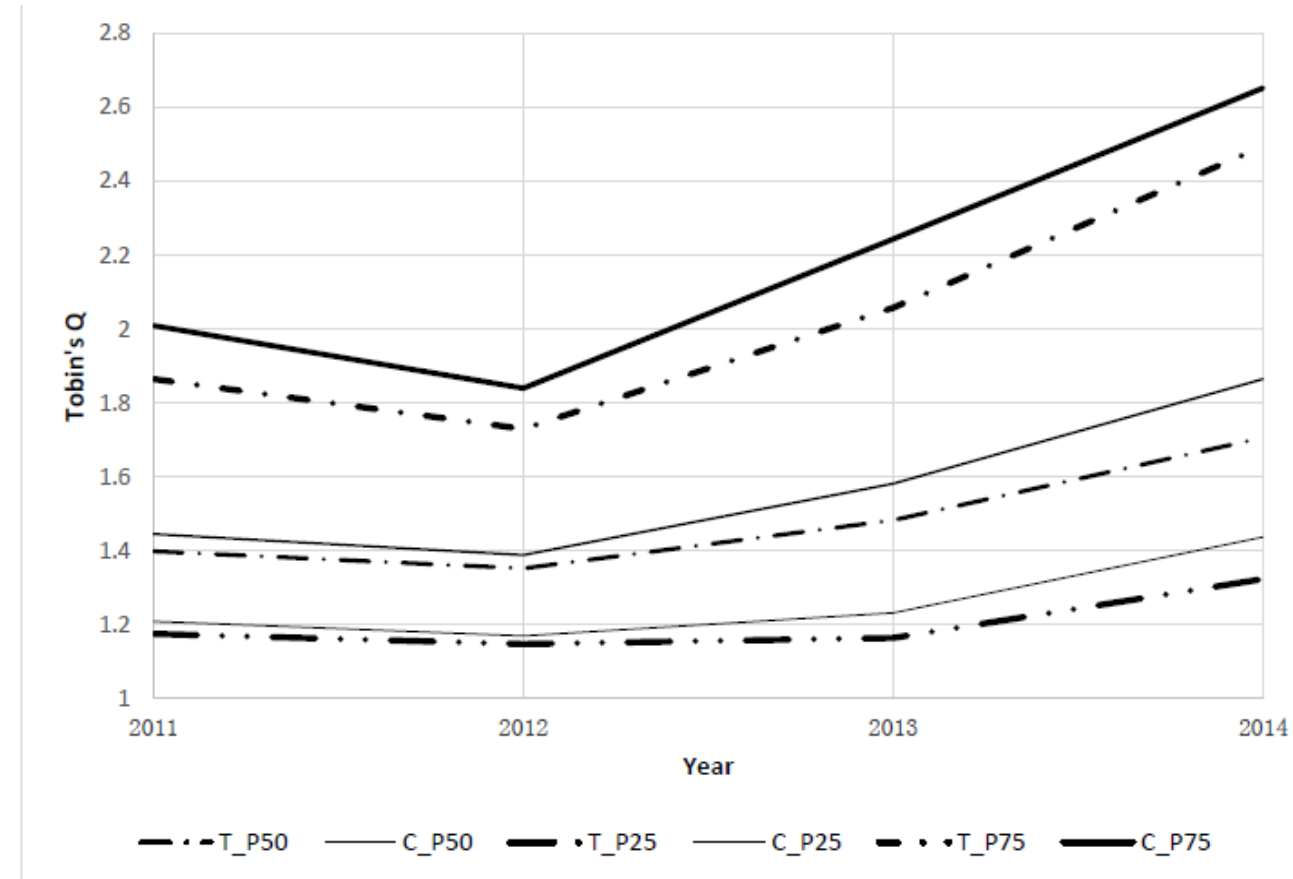
- ▣ Based on the matching results, the paper conducts two tests to evaluate whether the treatment firms are comparable to control firms:
 - Diagnostic Regression & Balance Test
 - The diagnostic analyses implies that propensity score matching procedure makes treatment firms and matched control firms comparable.

Methodology & Results

Main Regression (DID)

1. Whether DID can be used?

- One of the underlying assumptions in Difference-in-Difference analysis is the **parallel trend assumption** (Same trend before regulation).
- Two inferences:
 - ▣ The firm values of treatment firms and control firms follow similar trends before the regulation.
 - ▣ The difference in trends between treatment firms and control firms persists in both 2013 and 2014, implying that the anticorruption regulation **may have a long-lasting effect on firm value**.



Methodology & Results

Main Regression (DID)

2. Regression Function

- $Tobin's\ Q_{it} = \alpha_t + \alpha_i + \beta_1 * Treat_i * Post_t + \beta_2 * X_{it} + e_{it}$
- If the anticorruption regulation enhances (impedes) firm value, a positive (negative) β_1 is expected in the empirical results.

3. DID Results

- Column 1 (with only fixed effect):
 - ▣ The economic magnitude of the effect is nontrivial: -0.105 represents a 5.1% (=0.105/2.068) reduction relative to the sample average in the pre-regulation period.
- Column 2:
 - ▣ The economic magnitude is reduced to 3.7% (=0.077/2.068).
- Collective, the anticorruption regulation reduces firm value by about **4%**.

Table 3: The impact of anticorruption regulation on firm value

	(1)	(2)
<i>Treat*Post</i>	-0.105** [2.16]	-0.077* [1.77]
<i>SIZE</i>		-0.679*** [9.99]
<i>LEV</i>		0.990*** [4.84]
<i>CAPEX</i>		0.090 [0.70]
<i>R&D</i>		6.125*** [3.11]
<i>PPE</i>		0.677*** [3.02]
<i>ROE</i>		0.949*** [7.26]
Firm	YES	<u>YES</u>
Year	YES	<u>YES</u>
<i>N</i>	11300	11295
Adj. <i>R</i> ²	0.119	0.230

Methodology & Results

Robustness Checks: Placebo Tests

1. Purpose

- Address the concern that the results may be driven by chance.

2. Approach

- Perform a **placebo test** with randomly assigned treatment firms and control firms 5,000 times. (Randomly select 780 firms as treatment firms, leaving the rest as control firms)

3. Results

- For Column 1 (Column 2) of Table 3, the mean value of the coefficient for *Treat*Post* is 0.0008 (0.0005), with the mean value of the t-statistic equal to 0.0164 (0.0073) (Table 4).
- Based on **falsified** treatment firms and control firms, the placebo test does not generate a significant effect of anticorruption regulation on firm value.

Table 3: The impact of anticorruption regulation on firm value

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<i>Treat*Post</i>	-0.105** [2.16]	-0.077* [1.77]
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Table 4: Placebo tests

	Mean	P5	P25	Median	P75	P95	S.D.
Table 3 Column 1							
Coefficient for <i>Treat*Post</i>	0.0008	-0.0790	-0.0314	0.0004	0.0334	0.0816	0.0488
T-stat for <i>Treat*Post</i>	0.0164	-1.6350	-0.6444	0.0092	0.6839	1.6718	1.0016
Table 3 Column 2							
Coefficient for <i>Treat*Post</i>	0.0005	-0.0718	-0.0296	0.0005	0.0303	0.0736	0.0443
T-stat for <i>Treat*Post</i>	0.0073	-1.6372	-0.6662	0.0110	0.6818	1.6436	1.0017

Methodology & Results

Robustness Checks: Event Study Technique (Market's Reaction)

1. Approach

- For each trading day, the paper computes abnormal returns relative to the value-weighted market return (Index).
- Calculate the cumulative **market-adjusted stock return (CAR)** for both treatment firms and control firms.

2. Results

- During the two-day event window, the difference in CARs between treatment firms and control firms is -0.2% (t-statistic=0.94).
- The tests for the 5, 30, 50, 100, 150, 200 and 250-day event windows show that treatment firms experience significantly lower stock returns, with the **difference in CARs decreasing from -0.6% to -4.3%. (Without time reversal)**
- The results using the event study technique support the assumption that the anticorruption regulation represents an exogenous shock to shareholders.

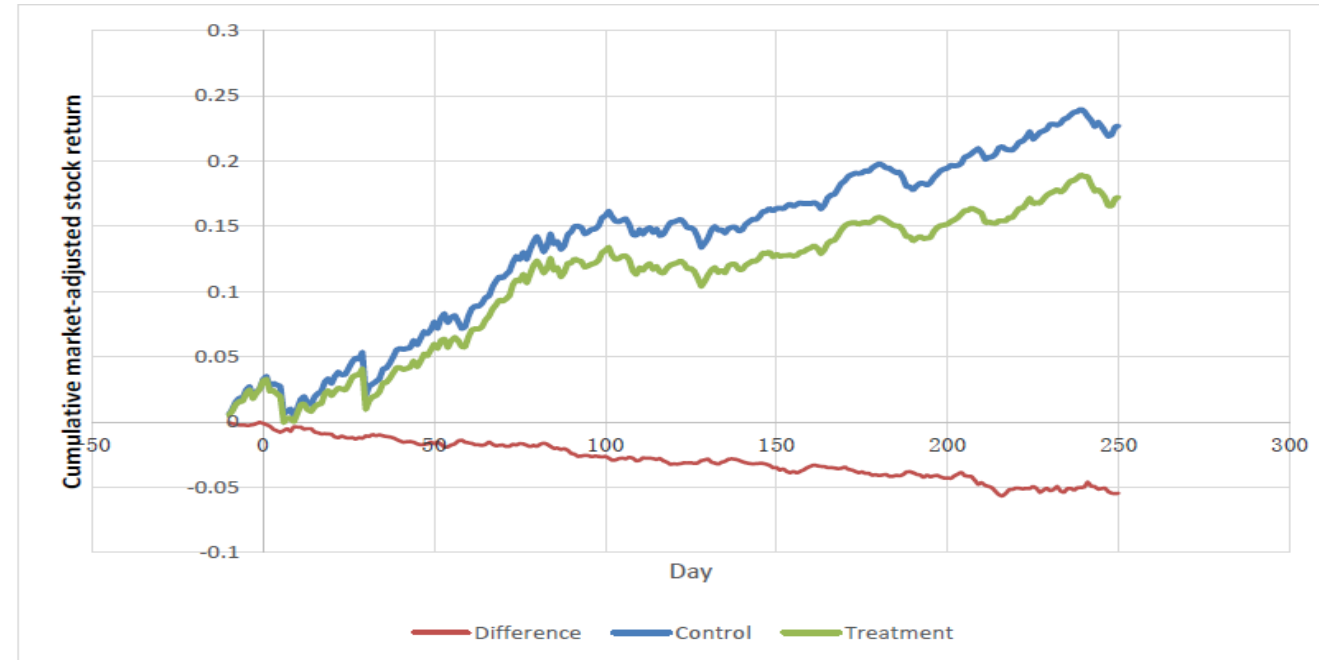


Table 5: Market reaction to the commencement of anticorruption regulation

	Number of Firms	Cumulative market-adjusted abnormal returns within different event windows							
		(0,+2)	(0,+5)	(0,+30)	(0,+50)	(0,+100)	(0,+150)	(0,+200)	(0,+250)
Treatment firms	780	-0.001 [-0.69]	-0.006*** [-2.70]	-0.018*** [3.85]	0.034*** [6.20]	0.107*** [12.56]	0.105*** [11.14]	0.136*** [13.23]	0.152*** [13.99]
Control firms	1267	0.001 [0.67]	-0.000 [0.19]	-0.007** [2.04]	0.050*** [11.09]	0.131*** [20.35]	0.137*** [19.03]	0.172*** [21.14]	0.195*** [22.51]
Difference	2047	-0.002 [0.94]	-0.006* [1.89]	-0.010* [1.72]	-0.016** [2.20]	-0.024** [2.28]	-0.032*** [2.73]	-0.036*** [2.73]	-0.043*** [3.06]

Methodology & Results

Test Two Alternative Explanations: Repress Political Opponents

1. Alternative Explanation I

- Anticorruption regulation is just a cover-up, with the real intension being political fight — the anticorruption regulation is merely used to fight against firms affiliated with President Xi's rivals.

2. Test

- President Xi's alleged rivals: *Xilai Bo* and *Yongkang Zhou* (Chongqing City, Liaoning Province and Sichuan Province)
- Partition Analysis:
 - ▣ If true: firms located in these provinces may be more likely to be affected.
 - ▣ **Rival: statistically insignificant vs Others: main results still hold** — anticorruption regulation instead of political repression is a plausible explanation for the reduction.

Table 6: Tests for alternative explanations
Panel A: Anticorruption vs. political repression

	(1) Rivals	(2) Others
<i>Treat*Post</i>	-0.064 [0.42]	-0.077* [1.71]
<i>SIZE</i>	-0.720*** [3.55]	-0.674*** [9.47]
<i>LEV</i>	0.820 [1.53]	1.008*** [4.60]
<i>CAPEX</i>	0.025 [0.06]	0.086 [0.64]
<i>R&D</i>	14.510* [1.81]	5.565*** [2.74]
<i>PPE</i>	1.153 [1.63]	0.638*** [2.69]
<i>ROE</i>	0.770*** [2.82]	0.960*** [6.73]
Firm	YES	YES
Year	YES	YES
<i>N</i>	916	10379
Adj. <i>R</i> ²	0.337	0.221

Methodology & Results

Test Two Alternative Explanations: Simply Loss of Independent Directors

1. Alternative Explanation II

- The decrease in firm value after the regulation is simply driven by the loss of independent directors.

2. Test

- Presumably, firms with a lower ratio of independent directors or a smaller board may be more sensitive to the loss of independent directors.
- Panel B shows that the results are not driven by these firms.
- A prior study shows that the sudden death of an independent director is associated with a less than 1% loss of firm value (Nguyen and Nielsen, 2010).

Panel B: Loss of independent directors

	(1) More Independent Directors	(2) Fewer Independent Directors	(3) Large Board	(4) Small Board
<i>Treat*Post</i>	-0.135** [2.16]	-0.013 [0.21]	-0.109** [2.28]	-0.022 [0.26]
<i>SIZE</i>	-0.812*** [8.89]	-0.494*** [6.03]	-0.552*** [6.44]	-0.816*** [7.99]
<i>LEV</i>	1.211*** [3.94]	0.617*** [3.12]	0.865*** [3.62]	1.016*** [3.14]
<i>CAPEX</i>	0.003 [0.02]	0.246 [1.49]	0.303* [1.76]	-0.150 [0.78]
<i>R&D</i>	9.048*** [3.43]	2.455 [0.92]	5.792** [2.26]	6.691** [2.17]
<i>PPE</i>	0.311 [1.03]	1.207*** [4.19]	0.981*** [3.70]	0.414 [1.13]
<i>ROE</i>	0.917*** [5.35]	1.015*** [5.07]	0.894*** [5.03]	0.987*** [5.18]
<i>Firm</i>	YES	YES 374	YES	YES
<i>Year</i>	YES	YES	YES	YES
<i>N</i>	5738	5557	6997	4298
<i>Adj. R²</i>	0.258	0.211	0.217	0.255

Methodology & Results

Two Possible Channels (Mechanisms): Political Connection (Three Subsample Tests)

Test One:

1. Approach

- Use **Subsidies** to measure political connections.

(*Subsidies* is defined as the subsidies from the government divided by total asset)

- Intuitively, anticorruption regulation is not a serious issue for a well-connected firm.

(Expect more reduction in firm value for firms with low *Subsidies*)

2. Results

- Column 1 (Column 2) is estimated on firms whose *Subsidies* in the year before anticorruption regulation are higher (lower) than the sample median.
- **The magnitude of the effect for firms with low *Subsidies* is not negligible: -0.101 represents a 4.9% (=0.101/2.046) reduction relative to the average pre-regulation firm value for the low *Subsidies* sample.**

	(1) High <i>Subsidies</i>	(2) Low <i>Subsidies</i>
<i>Treat*Post</i>	-0.0552 [0.89]	-0.101* [1.72]
<i>SIZE</i>	-0.637*** [5.45]	-0.697*** [8.60]
<i>LEV</i>	1.157*** [4.22]	0.811*** [2.75]
<i>CAPEX</i>	0.318 [1.49]	-0.135 [0.92]
<i>R&D</i>	8.507*** [3.34]	1.220 [0.39]
<i>PPE</i>	0.808** [2.40]	0.582* [1.93]
<i>ROE</i>	1.183*** [6.00]	0.724*** [4.28]
Firm FE	Yes	Yes
Year FE	Yes	Yes
<i>N</i>	5539	5756
Adj. <i>R</i> ²	0.248	0.226

Methodology & Results

Two Possible Channels (Mechanisms): Political Connection (Three Subsample Tests)

Test Two:

1. Approach

- Previous studies show that political connection may help firms to gain better access to finance, especially from state-owned banks.
- The value of treatment firms that are more financially constrained before the regulation should drop more due to regulation.
- Use *Intangibility*, to proxy the Level of financial constraints.

(Defined as intangible assets divided by total assets)

2. Results

- Column 3(Column 4) is estimated for firms with higher (lower) *Intangibility* than the sample median.
- The magnitude of the effect for firms with high *Intangibility* is economically significant: -0.170 represents a 7.9% ($=0.170/2.150$) reduction compared with the average pre-regulation firm value for the high *Intangibility* sample.

	(3) [↔]	(4) [↔]
	High [↔]	Low [↔]
	<i>Intangibility</i> [↔]	<i>Intangibility</i> [↔]
<i>Treat*Post</i> [↔]	-0.170*** [↔]	0.0298 [↔]
	[2.81] [↔]	[0.48] [↔]
<i>SIZE</i> [↔]	-0.811*** [↔]	-0.548*** [↔]
	[9.04] [↔]	[5.37] [↔]
<i>LEV</i> [↔]	0.848*** [↔]	1.048*** [↔]
	[3.11] [↔]	[3.32] [↔]
<i>CAPEX</i> [↔]	0.0518 [↔]	0.0933 [↔]
	[0.24] [↔]	[0.65] [↔]
<i>R&D</i> [↔]	5.438* [↔]	6.377** [↔]
	[1.83] [↔]	[2.47] [↔]
<i>PPE</i> [↔]	0.613** [↔]	0.688** [↔]
	[1.98] [↔]	[2.24] [↔]
<i>ROE</i> [↔]	0.977*** [↔]	0.844*** [↔]
	[6.29] [↔]	[3.86] [↔]
Firm FE [↔]	Yes [↔]	Yes [↔]
Year FE [↔]	Yes [↔]	Yes [↔]
<i>N</i> [↔]	5691 [↔]	5604 [↔]
Adj. <i>R</i> ² [↔]	0.262 [↔]	0.206 [↔]

Methodology & Results

Two Possible Channels (Mechanisms): Political Connection (Three Subsample Tests)

Test Three:

1. Approach

- Previous study documents that the government may expropriate private property.

(Listed companies may utilize the political connections of bureaucrat directors to help prevent government expropriation)

- The value of treatment firms that are vulnerable to government expropriation should drop more.
- The paper uses **DeficitGrowth** to proxy the vulnerability.

(Defined as the local government deficit growth rate in the region where listed firms' headquarters are located)

2. Results

- Column 5 (Column 6) is estimated for firms in which the *DeficitGrowth* before 2013 is higher (lower) than the sample median.
- **The magnitude of the effect for firms with high *DeficitGrowth* is economically significant: -0.122 implies that firm value decreases by 5.9% (=0.122/2.068) in high *DeficitGrowth* Sample.**

	(5) High <i>DeficitGrowth</i>	(6) Low <i>DeficitGrowth</i>
<i>Treat*Post</i>	-0.122**	-0.0239
	[2.01]	[0.37]
<i>SIZE</i>	-0.768***	-0.577***
	[8.72]	[5.43]
<i>LEV</i>	1.167***	0.737**
	[4.41]	[2.31]
<i>CAPEX</i>	-0.249	0.416**
	[1.40]	[2.21]
<i>R&D</i>	7.481***	3.701
	[2.78]	[1.36]
<i>PPE</i>	0.313	1.090***
	[1.10]	[3.10]
<i>ROE</i>	0.833***	1.149***
	[5.24]	[5.24]
Firm FE	Yes	Yes
Year FE	Yes	Yes
<i>N</i>	5609	5449
Adj. <i>R</i> ²	0.263	0.212

Methodology & Results

Two Possible Channels (Mechanisms): Disincentive for Managers & Officers

For Managers:

1. Idea

- They are potentially subject to anticorruption investigation, which is very costly.
- If possible, managers would rather choose to do nothing to lower the probability of being involved in anticorruption investigation.
- Intuitively, managers who have low ownership and managers in firms under the control of government do not have strong incentive.

2. Results

- Column 1 (Column 2) is estimated on firms whose *MgmHoldings* in the year before anticorruption regulation are higher (lower) than the sample median. Column 3 (Column 4) is estimated on firms controlled by **government (non-government) agents**.
- **The coefficients for Treat*Post in Column 2 and Column 3 represent 4.8% (=0.104/2.150) and 5.3% (=0.105/1.973) reduction of firm value, respectively. (Driven Factors)**

Panel A: Disincentive for managers

	(1) High <i>MgmHoldings</i>	(2) Low <i>MgmHoldings</i>	(3) SOE	(4) Non-SOE
<i>Treat*Post</i>	-0.029 [0.50]	-0.104* [1.66]	-0.105** [1.99]	-0.014 [0.22]
<i>SIZE</i>	-0.467*** [4.07]	-0.806*** [10.10]	-0.704*** [7.01]	-0.710*** [8.06]
<i>LEV</i>	1.303*** [4.40]	0.553** [2.13]	0.888*** [2.95]	0.884*** [3.33]
<i>CAPEX</i>	0.615** [1.98]	-0.508 [0.99]	-0.083 [0.20]	0.115 [0.29]
<i>R&D</i>	7.719*** [3.51]	2.782 [0.87]	-0.529 [0.18]	10.470*** [3.84]
<i>PPE</i>	1.062*** [4.04]	0.341 [1.02]	0.586** [2.11]	0.454 [1.25]
<i>ROE</i>	1.960*** [6.78]	0.620*** [4.36]	0.892*** [5.69]	1.109*** [5.15]
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
<i>N</i>	5327	5968	5306	5788
Adj. <i>R</i> ²	0.224	0.271	0.270	0.230

Methodology & Results

Two Possible Channels (Mechanisms): Disincentive for Managers & Officers

For Government Officers:

1. Idea

- After the regulation, strictly following protocols is much more preferred by government officers.
- Firms in the industries that rely more on government officers' involvement and firms located in regions with lower level of market development are very sensitive to government officers' cooperation.

2. Results

- Column 1 is estimated on firms in **more government related industries**, while Column 2 is estimated on the rest of firms; Column 3 (Column 4) is estimated on firms located in regions with **Marketization Index** higher (lower) than the 33 percentile of the sample.
- **The coefficients for Treat*Post in Column 1 and Column 4 represent 12.1% (=0.215/1.770) and 7.2% (=0.157/2.176) reduction in firm value, respectively.**

Panel B: Disincentive for government officers

	(1) More Government Related Industry	(2) Less Government Related Industry	(3) High Marketization	(4) Low Marketization
<i>Treat*Post</i>	-0.215** [2.14]	-0.049 [1.02]	-0.0346 [0.67]	-0.157** [2.01]
<i>SIZE</i>	-0.640*** [5.80]	-0.678*** [8.28]	-0.614*** [6.81]	-0.761*** [7.54]
<i>LEV</i>	-0.379 [0.73]	1.235*** [5.71]	1.156*** [4.74]	0.627* [1.79]
<i>CAPEX</i>	-1.769 [1.45]	0.418 [1.43]	0.257 [0.72]	-0.088 [0.17]
<i>R&D</i>	-3.166 [0.37]	7.197*** [3.72]	7.433*** [2.96]	3.362 [1.06]
<i>PPE</i>	0.164 [0.36]	0.716*** [2.76]	0.724** [2.47]	0.596 [1.64]
<i>ROE</i>	0.567* [1.79]	1.013*** [6.86]	0.916*** [5.30]	0.925*** [4.94]
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
<i>N</i>	1683	9612	7403	3892
Adj. <i>R</i> ²	0.276	0.234	0.211	0.269

Methodology & Results

Other Impacts on Firms (Briefly)

DID regression techniques are used in this section. To avoid potential “bad controls” in the sense of *Angrist and Pischke (2009)*, only control for size in these regressions.

1. Board Characteristics

- The average age and education level of independent directors increase, while the busyness of independent directors decreases.
- The absence rate of independent directors in board meetings also increases.

2. Investment & Financial Policies

- While firms do not change their leverage significantly, they do invest less.

3. Operation Policies

- Firms hire more employees and have a lower level of net profit per capita, ROA, and asset turnover.
- Operational efficiency could be reduced by redundant employees.

The paper has at least two limitations:

1. Limitation I: One implicit assumption is that the Chinese stock market is at least **semi-strong efficient** in the long run. Although it is believed this assumption to be valid by and large (Carpenter et al., 2015), the results inevitably rely on the Efficient Market Hypothesis to some extent.

2. Limitation II: It must be noticed that the regulation studied by the paper is part of President Xi's anticorruption campaign. Although this regulation helps pin down the effect of anticorruption regulation, it is hard to infer the overall effect of anticorruption campaign. So the findings should be generalized to other settings with caution.



Appendix

Reasons for the Study & Event

1. Reasons for this study:

- Although anticorruption regulations are prevalent little is known about the influence of anticorruption regulation.
- The study adds to the understanding of Chinese political reform by examining how anticorruption regulation in President Xi's anticorruption campaign influences firm value.

2. Reasons for investigating the particular regulation: A prohibition of service by government bureaucrats on the boards of publicly-listed firms (2013):

- Help to solve following two problems:
 - ▣ Some events affecting all firms are not qualified to differentiate the effect of anticorruption regulation from natural trends.
 - ▣ Some events (e.g. anticorruption investigations) including a combination of different anticorruption tools could not help understand the specific influence of anticorruption regulation.

Appendix

- Column 1 (2) presents the estimations using sample firms before (after) matching. Before matching, logit model explains the choice variable well, with a p-value from the χ^2 test below 0.001.
- After the paper performs nearest-neighbor propensity score matching, using the predicted probabilities from the estimation in Column 1, the χ^2 test for the logit model in Column 2 becomes insignificant statistically.
- Panel B presents the comparisons in firm characteristics between treatment and control firms. All the differences shown in Panel B are not significant at the conventional level.
- The diagnostic analysis in Panel A and Panel B implies that the propensity score matching procedure makes treatment firms and matched control firms comparable.

Panel B: Balance tests

	Treatment	Control	Difference	T-test	P-value
<i>SIZE</i>	21.270	21.249	0.021	0.52	0.601
<i>LEV</i>	0.458	0.459	0.000	0.00	0.998
<i>M2B</i>	3.788	3.756	0.031	0.31	0.755
<i>AGE</i>	9.689	9.658	0.032	0.19	0.848
<i>ROE</i>	0.079	0.079	0.000	0.05	0.963
<i>SOE</i>	0.527	0.532	-0.005	-0.36	0.718
<i>StateHoldings</i>	0.085	0.090	-0.005	-1.05	0.294
<i>TOP1</i>	0.372	0.372	0.000	0.02	0.986

Panel A: Propensity score regression and diagnostic regression

	(1) Pre-match	(2) Post-match
<i>SIZE</i>	0.242*** [6.00]	0.013 [0.31]
<i>LEV</i>	-0.213 [0.87]	-0.031 [0.12]
<i>M2B</i>	0.0131 [1.09]	0.003 [0.27]
<i>AGE</i>	0.000 [0.05]	0.002 [0.15]
<i>ROE</i>	0.169 [0.67]	-0.026 [0.09]
<i>SOE</i>	0.130 [1.06]	0.013 [0.10]
<i>StateHoldings</i>	0.244 [0.96]	-0.178 [0.65]
<i>TOP1</i>	-0.101 [0.31]	0.050 [0.15]
Year FE	YES	YES
Industry FE	YES	YES
Location FE	YES	YES
<i>N</i>	8080	5184
Pseudo R^2	0.048	0.002
P-value of χ^2	<0.001	1.000