


Expropriation Risk and Investment: A Natural Experiment

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Abstract

This article uses the enactment of China's 2007 Property Law (the Law), which reduces the risk of expropriation by local governments, as the setting to investigate the importance of property rights protection for private firm investment. Using propensity score matching and a difference-in-differences design, we find that firms facing weaker property rights protection prior to the Law significantly increase their investment and investment efficiency after the Law. Cross-sectional analyses document evidence consistent with a decrease in firms' perceived expropriation risk as the main mechanism underlying the Law's effect. Finally, we show that the Law improves local economic outcomes and employment.

I. Introduction

Property rights institutions govern the ownership and usage of economic resources. Strong property rights institutions help enforce contracts between the government and private entities and constrain a government's arbitrary behavior and expropriation activities. As the threat of expropriation reduces firms' expected returns from investments, lowering expropriation risk by strengthening property

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rights protection should increase firms' willingness to invest. Prior studies have used cross-country settings to document higher levels of investment, financial development, and economic growth in countries with stronger property rights (La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998), Johnson, McMillan, and Woodruff (2002)). However, the conclusions from these studies are subject to two caveats. First, a country's property rights are deeply intertwined with other important factors that influence economic outcomes, such as contracting institutions and political economy, rendering it challenging to identify the effect of property rights (Acemoglu and Johnson (2005)). Second, property rights institutions are largely shaped by pre-determined factors, such as natural endowments and colonial origins (Gallup, Sachs, and Mellinger (1999), Acemoglu, Johnson, and Robinson (2001), (2002), and Levine (2005)), so it is unclear whether attempts to strengthen property rights can sufficiently alleviate expropriation risk and lead to economically meaningful differences in real outcomes.¹

In this article, we use the enactment of China's 2007 Property Law (hereafter, the Law) to study the effects of a property rights reform on corporate investment. We choose this setting because the Law effectively reduces firms' perceived government expropriation risk by formally granting legal protection to private property rights (Zhang (2008), Berkowitz, Lin, and Ma (2015)). Prior to the Law, private property owners were entitled to an "administrative review" in response to local government expropriation. This administrative review, which entailed assessments of the owners' and local government's claims and the compensation provided by the local government, was conducted by the local government itself. The Law allows owners to challenge expropriations in a court, thereby creating a check on the local government (Lu, Pan, and Zhang (2015)).

Our study focuses on the Law's effect on private (i.e., unlisted) firms for three reasons. First, private firms account for most of the employment, industrial output, and investments in China, contributing significantly to its economic growth (Allen, Qian, and Qian (2005)). Second, compared to publicly traded firms, private firms are susceptible to higher expropriation risk, which facilitates our identification of the effects of expropriation risk. In particular, local governments in China are less likely to expropriate from publicly listed firms due to their greater visibility and deeper connections to the State (Chen, Li, Su, and Sun (2011), Berkowitz et al. (2015), and Liu, Liu, and Wei (2022)). Third, Chinese banks are heavily influenced by the government and prioritize financing state-owned enterprises and other large public firms, which receive implicit government guarantees, over small and private firms (Brandt and Li (2003), Allen et al. (2005), Cull and Xu (2005), and Ru (2018)). In addition, creditors may have more difficulty in recovering debts from public firms than from private firms, because the former face greater pressure to maintain social stability and need to prioritize stakeholders such as employees during financial distress (Fan, Huang, and Zhu (2013), Li and Ponticelli (2022)). Thus, although the Law improves creditors' rights to collateral during bankruptcy, its effect on private firms is more likely driven by expropriation risk.

¹Prior studies highlight that property rights reforms may not have their intended effects if powerful groups alter or exploit reforms to maintain their economic dominance (North (1993), Rapaczynski (1996), and Goldstein and Udry (2008)).

Prior to the Law, property rights protection varied by geographic regions (i.e., provinces) in China.² As the Law formalizes property rights protection for all provinces, we expect firms in provinces with weaker pre-Law property rights protection (i.e., those facing higher expropriation risk) will experience greater improvement than firms in provinces with stronger pre-Law protection. Empirically, we follow Berkowitz et al. (2015) and use the provincial-level marketization score from the National Economic Research Institute (NERI) Index of Marketization of China's Provinces 2011 Report (Fan, Wang, and Zhu (2011)) to measure each province's pre-Law level of property rights protection. We label the 5 provinces with the highest marketization score and thus strongest property rights protection as the control provinces and firms headquartered in them as control firms. We label the remaining provinces as treatment provinces and firms headquartered in them as treatment firms.

To control for differences in characteristics between treatment and control firms that may influence investment, we conduct a propensity score matching procedure and match each treatment firm with a control firm based on their economic fundamentals (i.e., size, profitability, leverage, growth, cash levels, fixed assets, cash flows, investment levels, and R&D expenses) in the year prior to the Law's enactment in 2007. Our sample includes 25,817 pairs of covariate-balanced treatment and control firms from 2005 to 2008 (i.e., the 4 years surrounding enactment of the Law). Using this sample and a difference-in-differences design, we find that treatment firms significantly increase their investment after the Law, compared to control firms, consistent with treatment firms becoming less concerned about expropriation risk post-Law. The effect is economically significant: the average treatment firm increases its investment by 1.41% of total assets (22% of the average level pre-Law investment of 6.38% of total assets) or 1.5 million RMB (or USD 188,000). We conduct a battery of sensitivity tests to ascertain that our results are not sensitive to alternative definitions of treatment and control firms, using entropy-balancing or unmatched samples, different sample windows, additional control variables, alternative fixed effects, or first-difference regressions.

Next, we explore the Law's effect on different types of investments. Investments can produce either tangible or intangible assets, with tangible assets subject to higher expropriation risk because they are easier to be repurposed for other uses and require lower expertise (Shleifer and Vishny (1992), Fabbri and Menichini (2010), and Opp (2012)). Thus, we separate investments into capital expenditures and R&D expenses and expect the effect of the Law to be stronger on the former as they primarily involve tangible assets. We indeed find that treatment firms' increased investments are driven by capital investments, lending further support to the notion that treatment firms' perceiving lower expropriation risk is the mechanism driving their investment.

To further mitigate the concern that regional differences other than pre-Law expropriation risk drive our results, we limit our sample to firms in contiguous counties in treatment and control provinces. Because these firms are subject to similar economic, geographic, and demographic forces, their differences are more

²For simplicity and parsimony, we refer to the 5 Autonomous Administrative Regions and 4 Municipalities in mainland China as provinces.

likely to be driven by expropriation risk related to the local government rather than other factors. Using this sample, we find similar treatment effects as in our main sample.

We then conduct cross-sectional analyses to provide evidence regarding the mechanism of the Law's effect on investment. Intuitively, if treatment firms increase investment post-Law due to lower perceived expropriation risk, the Law's effects should be stronger among treatment firms experiencing a larger reduction in expropriation risk. We measure the magnitude of reduction in expropriation risk using a firm's level of tangible assets; the local government's spending level where the firm is headquartered; and whether the firm has access to a high-quality court, such as those in provincial capitals. First, as discussed earlier, tangible assets are easier to expropriate than intangible assets. Second, higher spending incentivizes local governments to expropriate (Stroebel and Van Benthem (2013), Xu, Chen, Xu, and Chan (2016)). Third, as the Law allows owners to challenge expropriations in a court, having access to a high-quality court reduces expropriation risk (He (2009)). We find evidence consistent with these predictions.

Next, we investigate how treatment firms fund their additional investment post-Law. We begin by examining whether treatment firms obtain more capital from their three main sources of financing: internally generated profits, bank loans, and personal capital (equity). First, consistent with internally generated cash flows being the main source of funding for Chinese private firms (Allen et al. (2005)), we find that treatment firms reinvest a larger proportion of their profits after the Law, compared to control firms. Second, we find that, relative to control firms, treatment firms borrow more from banks and their owners invest more in the firms post-Law, suggesting that bank loans and personal equity also help finance treatment firms' additional investments.

Because property rights affect creditors' ability to repossess collateral when borrowers default, the Law can improve the pledgeability of real property and may increase lenders' willingness to offer credit to firms and owners. That is, the increase in treatment firms' investments could be due to both lower concern about expropriation risk *and* easier access to credit (Johnson et al. (2002)). Using treatment firms' levels of bank loans and personal invested equity prior to the Law to measure their ease of access to financing, we find the Law has similar effects on investment of treatment firms with and without easy access to finance, consistent with the notion that the effect of the Law on treatment firms' investment is primarily due to lowering expropriation risk rather than improving access to financing.

Lastly, we explore how the law affects firm efficiency and the local economy. We start with the optimality of investments. Expropriation risk distorts investments decisions. Thus, when treatment firms are less constrained by expropriation risk, their investments should become more optimal and efficient. Consistent with this prediction, we indeed find that treatment firms' investments become more sensitive to growth opportunities post-Law, compared to control firms. Our result echoes Berkowitz et al.'s (2015) finding that stronger property rights protection can enhance firm value. We further examine how the Law influences local economic outcomes. First, consistent with firm-level evidence, cities in treatment provinces exhibit higher total fixed-asset investments, higher foreign direct investment, and higher GDP per capita post-Law, compared to cities in control provinces. Second, in

cities in treatment provinces, we also document higher employment levels and higher proportions of workers employed by private firms. In sum, the evidence suggests that strengthening property rights protection improves local economy outcomes.

Our article primarily contributes to the literature on property rights institutions. In particular, we add to the law and finance literature by documenting the effect of a *change* in property rights institutions. Most studies on the economic implications of property rights use cross-sectional differences in property rights institutions (Acemoglu et al. (2001), Johnson et al. (2002), and Cull and Xu (2005)), which makes it difficult to disentangle the effect of other important factors, such as contracting institutions and political economy. By taking advantage of an exogenous shock that reduces private firms' expropriation risk and a difference-in-differences research design, we answer the call in Acemoglu and Johnson (2005) to open the black box on how property rights institutions affect economic outcomes and provide a more definitive answer on the role of expropriation risk in investment decisions. Moreover, our evidence of the Law's positive effects on local economic outcomes highlights that strengthening property rights protection can promote economic growth. As such, our article has important implications for regulators and policymakers in developing countries.

We also add to the literature that uses the passage of the Law to examine how property rights protection influences firm decisions. Extant studies document how the Law affects firms' financing decisions by facilitating contracting between lenders and borrowers (e.g., Berkowitz et al. (2015), Qian and Fang (2017), Qian, Tang, and Fang (2019), and Liu et al. (2022)). Our study is the first to demonstrate the Law's effects on firms' investment decisions via constraints on governments' arbitrary behavior and expropriation activities. By focusing on private unlisted firms, which have little access to formal financing, our evidence also sheds light on how property rights reform may influence private and public firms differently.

II. Related Literature and Institutional Background

Legal institutions can have a profound influence on economic development and corporate policy. Acemoglu and Johnson (2005) dissect legal institutions into two deeply intertwined yet distinct clusters: contracting institutions and property rights institutions. The former oversees the rules and regulations that govern *transactions* among private and public entities. Stronger contracting institutions can mitigate uncertainty in the enactment and enforcement of contracts between parties (North (1990)). Property rights institutions, on the other hand, address the rules and regulations that protect private entities against *infringement* from other parties, such as individuals, private organizations, or the government.

Prior studies examining the effect of property rights institutions usually rely on regional differences in property rights. One stream of this literature uses historical events that shape a country's property rights as identification. For example, using European settlements as an instrumental variable, Acemoglu and Johnson (2005) show the importance of property rights institutions for financial development and economic growth. In a similar vein, Acemoglu, Johnson, and Robinson (2005) use the rise of merchant groups in Europe via the Atlantic trade, which acted as a

constraint on the monarchy and increased private property rights, as a setting to highlight the importance of private property protection for economic growth. However, there is little evidence on the effect of a *change* in property rights institutions, mainly because a country's property rights are shaped by natural endowments and colonial origins (Gallup et al. (1999), Acemoglu et al. (2001), (2002), and Levine (2005)) and because property rights reforms are rare.

Another stream of literature examines the effect of property rights institutions on firm decisions using survey evidence. For example, using firms in several eastern European countries in the post-Soviet era as their sample, Johnson et al. (2002) find that entrepreneurs in the manufacturing industry reinvest a higher share of their profits when they perceive more secure property rights. Using Chinese survey data, Cull and Xu (2005) show that government expropriation risk plays an important role in firms' investment decisions. Similar to the studies using archival data to measure property rights institutions, these studies rely on cross-sectional differences for identification and thus are subject to the same omitted variable problem and cannot speak to the effect of a *change* in property rights. Moreover, as survey questions focus on bribes and informal payments, their results could be due to firms reducing investment to retain liquid assets for making these payments.

In 2007, China enacted the Property Law to boost economic development by clarifying and better protecting private property rights. Widely hailed as a landmark law, it improved property rights and reduced government expropriation via a two-pronged approach. First, it enhanced the legality and formal codification of property registration documents, gave private property equal protection as that of public property, and laid out administrative, civil, and criminal responsibilities for embezzlement or misappropriation. Second, it required that local governments appropriately compensate owners for any private property that they seized.

While the law was formally passed in Mar. 2007 during the Fifth Session of the 10th Standing Committee of the National People's Congress (NPC) and went into effect in the same year, it was effectively approved on Dec. 29, 2006, when the NPC accepted a draft of the bill (Berkowitz et al. (2015)). This approval came as a surprise as a record-setting seven versions of the Law had been hotly debated in the NPC for 14 years due to concerns that it would undermine the socialist economic system and its foundation of public ownership of property (Zhang (2008)).³ It was unclear, even just 5 days prior to the approval, whether the Law would pass (Berkowitz et al. (2015)). The market reacted strongly to the Law's approval (+3.95% in the China Security Index 300, which includes the largest 300 firms in the Shanghai and Shenzhen stock exchanges by market cap), indicating that the business community did not anticipate its passage. Thus, it is unlikely that firms had adjusted their behavior prior to the event.

Several recent studies have used the passage of the Law to examine the effect of creditor rights protection. Most of these studies focus on the financing decision of firms, especially publicly listed ones. For example, Berkowitz et al. (2015) show that the Law increases the value of publicly listed firms through the collateral

³The Law received 11,543 responses during its public consultation (Zhang (2008)). The primary concern of the opponents of the Law is that "the law would undermine government authority and encourage social inequalities" (Batson (2006)).

channel (i.e., by improving these firms' access to secured loans). Qian and Fang (2017), Qian et al. (2019), and Liu et al. (2022) find that the Law decreases the cost of debt and increases the leverage of financially constrained firms. In a similar vein, Yang, Guariglia, Peng, and Shi (2022) find that after the Law, firms use more bank loans to finance their inventory. Finally, Qian, Dai, Chen, and Fang (2019) find that the Law lowers firms' cash holdings. In sum, these studies find results consistent with the notion that the Law facilitates contracting between lenders and borrowers.

III. Sample Construction and Summary Statistics

Although the Law applies to all provinces in China, its impact is not uniform. Prior to the Law, the strength of legal protections for private property owners varied across provinces (Chen (2010), Cai, Fang, and Xu (2011)). As a result, the Law's effect in lowering expropriation risk is stronger for firms in provinces that had weaker property rights protection before the Law than it is for firms in other provinces. We follow prior studies (e.g., Berkowitz et al. (2015)) and use the score (PROPERTY_RIGHTS_SCORE) in NERI Index of Marketization of China's Provinces 2011 Report (Fan et al. (2011)) to measure the perceived expropriation risk in each province.⁴ Survey evidence confirms that owners of firms located in provinces with a low PROPERTY_RIGHTS_SCORE have a much higher perception of expropriation risk than do owners of firms in other provinces (Du, Lu, and Tao (2015)). We tabulate the scores of all 31 provinces for 2006, the year prior to the Law, in Table 1. As shown, Zhejiang, Guangdong, Shanghai, Jiangsu, and Beijing have the 5 highest PROPERTY_RIGHTS_SCORE (average score of 9.53), consistent with the observation that they have the highest levels of private business activity and foreign investment. In contrast, the rural and western provinces of Xizang, Qinghai, Gansu, and Shanxi (X) have the lowest PROPERTY_RIGHTS_SCORE values (0.27, 3.29, 4.58, and 4.71, respectively).

We obtain financial data of private unlisted firms from the Chinese Industrial Enterprises Database (CIED), which is constructed by the National Bureau of Statistics of China using data from firms' annual reports submitted to their local Bureau of Statistics. CIED covers over 200,000 unique Chinese private firms with annual sales no less than RMB 5 million. It is the most complete and authoritative firm-level database for private firms in China (An (2012), Nie, Jiang, and Yang (2012)) and has been widely used in published studies (Hsieh and Klenow (2009), Song, Storesletten, and Zilibotti (2011), and Fang, Lerner, and Wu (2017)).

Table 2 reports our sample selection process. We start with 750,511 firm-year observations between 2005 and 2008 from CIED. We first remove firms with significant government ownership (i.e., national capital values greater than 10%) because state-owned firms are less concerned about government expropriation. Next, we drop firms with missing values of variables used in our analyses in any year during the sample period (i.e., we require a balanced sample) so that changes in firm composition during the sample period do not drive our results. After these

⁴In Section IV.G.1, we use the 2006 World Bank survey results (Mako (2006)) following Fan et al. (2013) as alternative measures of firms' perceived expropriation risk and find similar results as in the main tests.

TABLE 1
Province-Level Property Rights Measure

Table 1 presents PROPERTY_RIGHTS_SCORE values and the number of unique firms in the propensity-score-matched sample in each province. Variable definitions are provided in the Appendix.

Rank	Provinces	PROPERTY_RIGHTS_SCORE	Number of Unique Firms in the Propensity-Score-Matched Sample
<i>Control</i>			
1	Zhejiang	10.37	8,923
2	Guangdong	9.72	6,670
3	Shanghai	9.63	5,839
4	Jiangsu	9.39	3,292
5	Beijing	8.54	1,093
	Total	9.53	25,817
<i>Treatment</i>			
6	Fujian	8.42	3,443
7	Tianjin	8.28	1,062
8	Shandong	8.24	3,905
9	Liaoning	7.56	1,995
10	Chongqing	7.26	914
11	Anhui	7.15	1,254
12	Henan	7.11	1,126
13	Sichuan	6.95	1,840
14	Hubei	6.85	1,227
15	Hebei	6.84	1,776
16	Hunan	6.74	1,189
17	Jiangxi	6.64	583
18	Jilin	6.20	474
19	Neimenggu	5.89	330
20	Hainan	5.66	101
21	Heilongjiang	5.61	544
22	Yunnan	5.57	658
23	Shanxi (T)	5.56	783
24	Guangxi	5.17	756
25	Ningxia	5.10	123
26	Guizhou	4.94	434
27	Xinjiang	4.87	336
28	Shanxi (X)	4.71	662
29	Gansu	4.58	242
30	Qinghai	3.29	55
31	Xizang	0.27	5
	Total	6.21	25,817

TABLE 2
Sample Selection Procedure

Table 2 details the selection procedure of the sample used in our main analyses.

Selection Procedures	No. of Firm-Year Observations	No. of Unique Firms
All firm-year observations between 2005 and 2008 from the Chinese Industrial Enterprises Database	750,511	238,704
Exclude: firm-years with "national capital" greater than 10%, which indicates significant government ownership	648,842	186,378
Exclude: firms missing values of variables used in our analyses in any year between 2005 and 2008 (i.e., require a balanced sample)	263,252	65,813

steps, our sample includes 263,252 firm-year observations of 65,813 unique firms.⁵ To implement our difference-in-differences research design, we assign firms headquartered in the 5 provinces with the highest PROPERTY_RIGHTS_SCORE

⁵In a sensitivity test, we follow Nie et al. (2012) and exclude firms with fewer than 30 employees and sales less than RMB 20 million and find similar results as our main analyses (untabulated).

TABLE 3
Propensity-Score Matching and Summary Statistics

Table 3 presents summary statistics of treatment and control firms. ***, **, and * indicate significance at 0.01, 0.05, and 0.10 levels, respectively. Variable definitions are provided in the Appendix.

Panel A. Summary Statistics of Unmatched Firms in 2006

	Treatment		Control		Difference in Means
	Mean	No. of Obs.	Mean	No. of Obs.	
SIZE	10.60	30,379	10.43	35,434	0.17***
PROFITABILITY	0.08	30,379	0.06	35,434	0.02***
LEVERAGE	0.56	30,379	0.57	35,434	-0.01***
ΔSALES	0.27	30,379	0.21	35,434	0.06***
CASH	0.12	30,379	0.15	35,434	-0.03***
NET_FIXED_ASSETS	0.38	30,379	0.30	35,434	0.08***
CFO	0.11	30,379	0.09	35,434	0.02***
CAPEX	0.06	30,379	0.06	35,434	0.008***
R&D	0.00	30,379	0.00	35,434	-0.001***

Panel B. Summary Statistics of Propensity-Score Matched Firms in 2006

SIZE	10.54	25,817	10.53	25,817	0.01
PROFITABILITY	0.06	25,817	0.07	25,817	-0.00**
LEVERAGE	0.57	25,817	0.56	25,817	0.01
ΔSALES	0.23	25,817	0.23	25,817	0.00
CASH	0.13	25,817	0.13	25,817	0.00
NET_FIXED_ASSETS	0.33	25,817	0.34	25,817	-0.01
CFO	0.10	25,817	0.10	25,817	0.00
CAPEX	0.06	25,817	0.06	25,817	0.00
R&D	0.00	25,817	0.00	25,817	0.00

Panel C. Summary Statistics of the Propensity-Score Matched Sample in 2005–2008

	No. of Obs.	Mean	Std. Dev.	P10	P25	P50	P75	P90
INVESTMENT	206,536	0.063	0.130	-0.017	0.003	0.029	0.091	0.207
CAPEX	206,536	0.062	0.130	-0.018	0.003	0.027	0.089	0.205
R&D	206,536	0.001	0.007	0.000	0.000	0.000	0.000	0.001
SIZE	206,536	10.576	1.343	8.970	9.591	10.415	11.423	12.434
PROFITABILITY	206,536	0.071	0.127	-0.020	0.005	0.035	0.098	0.204
LEVERAGE	206,536	0.564	0.240	0.227	0.392	0.577	0.744	0.870
ΔSALES	206,536	0.235	0.635	-0.259	-0.037	0.115	0.390	0.869
ΔPROVINCIAL_GDP	206,536	0.211	0.024	0.179	0.195	0.205	0.239	0.245
PROFIT_REINVEST	206,536	0.063	0.257	-0.015	0.003	0.023	0.077	0.190
BANK_LOAN	206,536	0.046	0.105	0.000	0.000	0.000	0.027	0.171
PERSONAL_CAPITAL	206,536	0.095	0.157	0.000	0.000	0.000	0.137	0.312

(i.e., lowest pre-Law expropriation risk) as control firms (TREATED equals 0) and other firms as treatment firms (TREATED equals 1).⁶ We use 5 provinces as the cutoff to yield a similar number of unique treatment and control firms (30,379 and 35,434, respectively).⁷

We tabulate summary statistics of the treatment and control firms in Panel A of Table 3. As shown, treatment firms are significantly larger, more profitable, exhibit

⁶It is possible that some firms operate outside of their headquarters provinces and thus face different levels of expropriation risk. However, this phenomenon is unlikely to be prevalent among private, unlisted firms because they are small. Further, it should introduce noise to our classification of treatment and control firms and bias against finding significant differences between the two groups.

⁷In a robustness test, we exclude firms located in the provinces ranked sixth, seventh, and eighth (Fujian, Tianjin, and Shandong, respectively) to create a greater wedge in property rights between treatment and control firms. We find similar results (see column 1 in Table IA1 in the Supplementary Material). In another robustness test, we use four alternative assignments pairing control firms in the top 1, 2, 3, and 4 provinces by property rights with treatment firms in the bottom 10, 15, 20, and 25 provinces, respectively. We also find similar results as in our main tests (see columns 2–5 in Table IA1 in the Supplementary Material).

higher sales growth, and have lower liability and cash levels. Treatment firms also exhibit higher cash flows, more fixed assets and investments, and lower R&D expenses relative to control firms. These differences in firm characteristics are consistent with the evidence in McMillan and Woodruff (2002) that firms that overcome higher impediments to do business in less developed areas tend to produce and sell goods and services that are more profitable (see also the discussion in Johnson et al. (2002), p. 1336) and that it is easier for new firms to enter more developed areas, which results in competition driving down profits (see also Li (1997), Berkowitz and DeJong (2005)).⁸

To ensure that our results are not driven by differences in firm characteristics, we create a propensity-score-matched sample.⁹ Specifically, we match on firm size (SIZE), profitability (PROFITABILITY), leverage (LEVERAGE), sales growth (Δ SALES), cash holdings (CASH), fixed assets (NET_FIXED_ASSETS), cash flows (CFO), capital expenditure (CAPEX), and R&D expenses (R&D) in 2006 (i.e., the year prior to the Law), using a 0.01 caliber.^{10,11} Detailed variable definitions are in the Appendix. The matched sample comprises of 25,817 pairs of unique treatment and control firms for a total of 206,536 firm-year observations. Panel B of Table 3 shows that the matching procedure effectively eliminates significant differences between the two groups of firms.¹² We tabulate the full-sample descriptive statistics in Panel C of Table 3. Our sample firms have a mean (median) book value of assets of 112 (33) million RMB. The leverage for the average firm year is 56.4%, and the average operating profit is 7.1% of book assets. The average investment of firms is 6.3% of total assets. Untabulated statistics show that the average firm has 348 employees, with the median firm employing 165 people.

IV. Empirical Results and Discussion

A. Property Law and Corporate Investment: A Difference-in-Differences Analysis

We begin our empirical analyses by testing whether treatment firms exhibit greater changes in investment subsequent to the Law, as compared to control firms.

⁸Another potential explanation is that firms in underdeveloped provinces in China are more likely to be those in upstream and more profitable industries (Ju and Yu (2015)).

⁹In sensitivity tests, we repeat our main analysis using either an entropy-balancing sample (McMullin and Schonberger (2020)) or an unmatched sample and find similar results (tabulated in columns 6 and 7 in Table IA1 in the Supplementary Material, respectively).

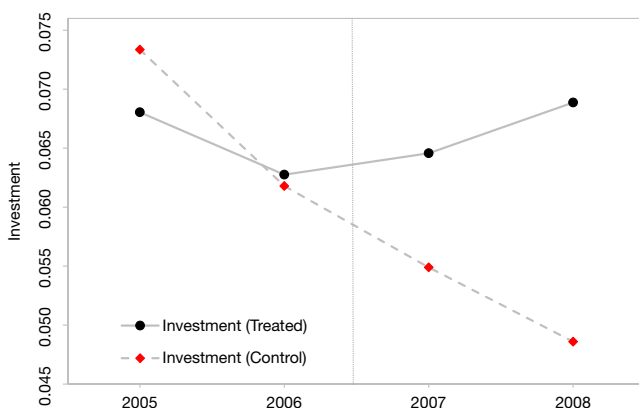
¹⁰Following the suggestion of Nie et al. (2012), we trim all variables at the 0.5% and 99.5% levels to mitigate the influence of outliers. In a sensitivity test, we remove firms below the 5th percentile and above the 95th percentile in investment values and find that our main results continue to hold (column 8 in Table IA1 in the Supplementary Material).

¹¹To account for the possibility that firms anticipated the Law's passage, we conduct a sensitivity test with matching based on firm characteristics in 2005 and use 2004–2005 as the pre-Law period. We find similar results (column 9 in Table IA1 in the Supplementary Material).

¹²Although the profitability of treatment and control firms is statistically different at the 5% level, we note that the difference is small in magnitude. Specifically, treatment and control firms' profitability are 0.064 and 0.067, respectively, a difference of only 0.003. We also calculate the standardized mean differences between the propensity-score-matched treatment and control firms following Kaiser, Lusardi, Menkhoff, and Urban (2022) and find similar results as in Panel B of Table 3.

FIGURE 1
Trend in Investment Over Time

Figure 1 plots the annual investment of treatment and control firms in the propensity-score matched sample between 2005 and 2008. See the Appendix for variable definitions and Table 2 for the sample selection procedure.



In Figure 1, we plot the annual levels of investment of treatment and control firms (solid and dashed lines, respectively) in our sample period. In line with the parallel trend assumption, both groups of firms decrease investment prior to the Law, consistent with Chinese government's policies to curb investment to address the overcapacity problem in the economy (Lin, Wu, and Xing (2010)). Importantly, treatment firms increase investment post-Law, whereas control firms continue the downward trend, providing initial evidence that treatment firms invest more post-Law.¹³

Next, we adopt a regression approach to control for determinants of investment:

$$(1) \quad \text{INVESTMENT} = \alpha + \beta \times \text{TREATED} \times \text{POST} + \gamma \times \text{CONTROLS} + \varepsilon,$$

where POST equals 1 for the post-Law years of 2007 and 2008, and 0 otherwise.¹⁴ Our coefficient of interest is β , which measures the difference in investment from the pre-Law to post-Law periods between treatment and control firms. We control for firm characteristics that may affect investment propensity, such as size (SIZE), profitability (PROFITABILITY), leverage (LEVERAGE), sales growth (Δ SALES), and provincial GDP growth (Δ PROVINCIAL_GDP). We also include

¹³Note that the post-Law downward trend in control firms' investment may also be driven by the Chinese stock market crash and global financial crisis. For instance, the Shanghai Stock Exchange Composite Index, which covers all stocks traded in the Shanghai Stock Exchange, slid more than 70% from its peak of 6,124 on Oct. 16, 2007, to 1,664 on Oct. 28, 2008. Using data from Chinese listed firms between 2006 and 2010, Bo, Driver, and Lin (2014) document that Chinese listed firms' investment decreased by 0.94% of total assets after the financial crisis (i.e., after the third quarter of 2007), due to the negative demand shock.

¹⁴In a sensitivity test, we exclude 2007 from the post-Law period to account for the possibility that firms need time to adjust their investments and find similar results (see column 1 in Table IA2 in the Supplementary Material).

TABLE 4
Property Law and Corporate Investment

Table 4 examines the effects of the Property Law on corporate investment. Columns 1–3, 4, and 5 use INVESTMENT, CAPEX, and R&D as the dependent variables, respectively. The *t*-statistics reported in parentheses are based on standard errors clustered by city. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. Variable definitions are provided in the Appendix.

Dependent Variables	INVESTMENT			CAPEX	R&D
	1	2	3	4	5
TREATED × POST	1.73*** (8.61)	1.58** (2.14)	1.41*** (7.26)	1.46*** (7.50)	−0.01 (−1.25)
TREATED	−0.15 (0.81)	−0.22 (−1.28)			
POST	−1.63*** (−11.64)	−1.91* (−1.80)			
SIZE		0.45*** (11.21)	0.46*** (10.81)	0.52*** (12.50)	0.07*** (20.53)
PROFITABILITY		−2.03*** (−3.17)	−2.19*** (−3.58)	−4.05*** (−6.35)	0.29*** (9.75)
LEVERAGE		−2.25*** (−8.77)	−2.18*** (−8.62)	−2.36*** (−9.79)	−0.05*** (−4.85)
ΔSALES		4.36*** (35.73)	4.39*** (36.06)	4.14*** (36.32)	0.00 (0.53)
APROVINCIAL_GDP		−7.32* (−1.80)	−7.40** (−2.02)	17.39 (0.44)	−0.20 (−0.46)
SIZE × POST		0.00 (0.02)	−0.03 (−0.70)	−0.07 (−1.46)	−0.02*** (−9.71)
PROFITABILITY × POST		7.06*** (9.01)	7.26*** (9.57)	7.49*** (9.74)	−0.17*** (−6.05)
LEVERAGE × POST		−0.29 (−1.00)	−0.41 (−1.40)	−0.16 (−0.58)	0.01 (1.52)
ΔSALES × POST		−4.75*** (−28.21)	−4.78*** (−28.59)	−4.68*** (−29.73)	0.01** (1.97)
APROVINCIAL_GDP × POST		1.23 (0.32)	0.53 (0.14)	0.34 (0.09)	−0.21 (−0.05)
Firm FEs	No	No	Yes	Yes	Yes
Industry-year FEs	No	No	Yes	Yes	Yes
City FEs	No	No	Yes	Yes	Yes
Adj. R^2	0.00	0.06	0.05	0.05	0.02
Within R^2			0.06	0.05	0.01
No. of obs.	206,536	206,536	206,536	206,536	206,536

firm, industry-year, and city fixed effects to account for the influence of time-invariant firm, industry, and local characteristics, along with macroeconomic trends that might affect investment.¹⁵ We cluster standard errors at the city level to avoid having too few clusters (Cameron, Gelbach, and Miller (2011)).

We present the regression results in Table 4. The first three columns report the effect of the Law on the change in firms' total investment. In column 1, we include only TREATED, POST, and their interaction term. We control for firm characteristics in column 2 and further include firm, industry-year, and city-fixed effects in column 3. We find consistent results across the three specifications showing that

¹⁵We conduct 3 robustness tests to gauge whether our results are sensitive to the empirical specification. First, we include investment in the previous year as an additional control variable. Second, we estimate the main regressions in first differences (i.e., using the change in all level variables). Third, we use match-firm-pair fixed effects instead of firm fixed effects. We find similar results in all 3 tests (see columns 1–3 in Table IA3 in the Supplementary Material).

treatment firms significantly increase their investment after the Law, compared with control firms. The effects are economically significant. Based on the results in column 3, the average treatment firm increases its investment by 1.41% of total assets (equivalent to 22% of their level of pre-Law investment of 6.38% of total assets), which translates into 1.5 million RMB (or USD 188,000), given that the average total assets of treatment firms in 2006 are 105 million RMB.

Next, we separately examine the Law's effect on capital expenditures and R&D expenses, which represent investment in tangible and intangible assets, respectively. Compared to intangible assets, tangible assets are subject to higher expropriation risk because they are easier to repurpose and require lower expertise (Shleifer and Vishny (1992), Fabbri and Menichini (2010), and Opp (2012)). We thus expect the documented increase in investment post-Law to be driven by capital expenditures. The results in columns 4 and 5 are consistent with this prediction: treatment firms significantly increase capital expenditures relative to control firms after the Law, without a corresponding result for R&D expenses. These results support the notion that treatment firms increase investment after the Law due to lower expropriation risk.¹⁶

B. Property Law and Corporate Investment: A Contiguous-County Test

In this section, we conduct a contiguous-county test using only firms headquartered in counties that share the same border between treatment and control provinces. Firms in counties that are geographically adjacent should face similar economic, geographic, and demographic forces (Dube, Lester, and Reich (2010), Fan, Lin, and Tang (2018)). Therefore, differences between these firms are more likely to be driven by expropriation risk, which is a provincial government factor, rather than by other factors. Though results based on this limited sample of firms may be less generalizable than those in our main tests (Armstrong, Kepler, Samuels, and Taylor (2022)), they further mitigate the concern that regional differences other than pre-Law expropriation risk explain our findings.

To ensure that treatment and control firms in contiguous counties are subject to meaningfully different levels of expropriation risk, we exclude the three treatment provinces (Fujian, Tianjin, and Shandong) with property rights levels that are similar to their neighboring control provinces.¹⁷ We then identify counties on the borders of the remaining treatment and control provinces. For example, areas in postal codes that begin with 3415, 3416, 3417, 3418, 3419, and 3422 in Jiangxi (a treatment province) border those in postal codes that begin with 5123, 5124,

¹⁶In Table IA4 in the Supplementary Material, we report regression results separately for the treatment and control firms. We find that, in line with the trend in Figure 1, treatment firms increase their investments, especially those for fixed assets, after the Law (positive coefficients on POST in columns 1 and 3), whereas control firms decrease their investments (negative coefficients on POST in columns 2 and 4). In addition, both groups of firms increase their R&D investments after the Law with no discernible differences between the two groups (positive coefficients on POST in columns 5 and 6), possibly due to the increasing importance of intangible assets over time.

¹⁷Specifically, Fujian (ranked 6th in PROPERTY_RIGHTS_SCORE) is next to Zhejiang and Guangdong. Tianjin (ranked 7th) neighbors Beijing. Shandong (ranked 8th) is a neighbor province to Jiangsu.

TABLE 5
Property Law and Corporate Investment: Contiguous-County Tests

Table 5 examines the effects of the Property Law on corporate investment using firms located in counties that share the same border along the treated and control provinces. The *t*-statistics reported in parentheses are based on standard errors clustered by city. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. Variable definitions are provided in the Appendix.

Dependent Variables	INVESTMENT	CAPEX	R&D
	1	2	3
TREATED × POST	1.95*** (3.24)	1.96*** (3.26)	-0.01 (-0.53)
SIZE	8.10*** (7.92)	8.15*** (7.97)	-0.05** (-2.37)
PROFITABILITY	-3.94 (-1.14)	-4.04 (-1.17)	0.10 (1.22)
LEVERAGE	-5.04** (-2.23)	-5.03** (-2.23)	-0.01 (-0.23)
ΔSALES	2.56*** (5.52)	2.56*** (5.51)	0.00 (0.22)
ΔPROVINCIAL_GDP	3.29 (0.36)	3.04 (0.29)	0.46 (1.00)
SIZE × POST	-0.25 (-1.10)	-0.23 (-1.02)	-0.02** (-2.36)
PROFITABILITY × POST	1.45 (0.48)	1.48 (0.49)	-0.03 (-0.36)
LEVERAGE × POST	-1.83 (-1.34)	-1.88 (-1.38)	0.05 (1.54)
ΔSALES × POST	-3.24*** (-7.15)	-3.23*** (-7.14)	-0.01 (-0.78)
ΔPROVINCIAL_GDP × POST	-1.72 (-0.10)	-1.15 (-0.07)	-0.57 (-1.38)
Firm FEs		Yes	
Industry-year FEs		Yes	
City FEs		Yes	
Adj. R^2	0.06	0.06	0.40
Within R^2	0.06	0.06	0.00
No. of obs.	11,104	11,104	11,104

5125, 5126, 5145, 5146, 5171, 5172, and 5173 in Guangdong (a control province). A total of 2,776 firms (11,104 firm-years) from our main matched sample reside in these counties, of which 1,059 are treatment firms and 1,717 are control firms. We re-estimate equation (1) using this sample and present the results in Table 5. The estimated coefficients of TREATED × POST in columns 1 and 2 remain positive (statistically significant at the 1% level), consistent with treatment firms increasing their investments post-Law, compared to control firms in neighboring counties. In sum, the results from the contiguous-county test corroborate those using the main sample and strengthen our confidence that treatment firms increase their investment due to lower expropriation risk.

C. Property Law and Corporate Investment: Cross-Sectional Tests

To provide further evidence on the underlying mechanism of the Law's effect on investment, we examine three conditions under which firms should perceive a larger magnitude of reduction in expropriation risk and as a result, the Law should have a greater influence on investments. The first two conditions use firms' pre-

TABLE 6
Property Law and Corporate Investment: Cross-Sectional Tests Based on
Reduced Expropriation Risk

Table 6 examines the effects of the Property Law on corporate investment in subsamples of firms with high and low reductions in expropriation risk. In columns 1 and 2, 3 and 4, 5 and 6, and 7 and 8, we classify firms into those with larger and smaller reductions in expropriation risk based on whether their NET_FIXED_ASSETS, cities' welfare spending (government social welfare spending divided by fiscal revenues), cities' total fiscal expenditure (fiscal expenditure divided by fiscal revenue) in 2006 are above or below the sample median and whether they reside inside or outside the provincial capital zone, respectively. In columns 3–6, we restrict the sample to firm-years in cities with city government spending data. For brevity, we do not report coefficients for controls. The *t*-statistics reported in parentheses are based on standard errors clustered by city. *F*-test presents the difference in coefficients of TREATED × POST in the respective cross-sectional tests. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. Variable definitions are provided in the Appendix.

Partition	Dependent Variable: INVESTMENT							
	NET_FIXED_ASSETS		City Welfare Spending		City Fiscal Expenditure		Provincial Capital Zone	
	High	Low	High	Low	High	Low	Inside	Outside
	1	2	3	4	5	6	7	8
TREATED × POST	2.21*** (7.52)	0.19 (1.37)	2.74*** (3.26)	0.97*** (4.48)	1.45*** (3.50)	1.32*** (4.49)	1.74*** (3.79)	1.29** (2.34)
<i>F</i> -Tests	2.02**		1.77**		0.13		0.45*	
Controls and interactions					Yes			
Firm FEs					Yes			
Industry-year FEs					Yes			
City FEs					Yes			
Adj. <i>R</i> ²	0.09	0.01	0.01	0.05	0.03	0.04	0.03	0.03
Within <i>R</i> ²	0.10	0.03	0.07	0.05	0.07	0.05	0.06	0.05
No. of obs.	103,268	103,268	41,611	135,089	58,338	118,362	56,504	150,032

Law expropriation risk and the last one is based on firms' ability to enforce the Law.

First, as discussed in Section IV.A, tangible assets are easier to expropriate than intangible assets. Therefore, firms with more tangible assets (NET_FIXED_ASSETS) should be more exposed to expropriation risk before the Law. Second, prior studies document that governments with larger welfare spending or fiscal deficit levels are more likely to expropriate local firms (Stroebel and Van Benthem (2013), Xu et al. (2016)). Thus, we expect firms that reside in cities with larger welfare spending or fiscal expenses as a proportion of their revenue to have higher expropriation risk before the Law. Third, we consider the quality of local courts. Prior to the Law, private property owners expropriated by the local government were entitled only to an "administrative review" conducted by the government itself. The Law entitles owners to challenge expropriation in a court, which creates a check on the local government (Lu et al. (2015)). Therefore, firms with access to higher-quality local courts should receive stronger protection by the Law and perceive a larger reduction in expropriation risk. As courts located farther from the provincial capitals generally operate with lower budgets and efficiency (He (2009)), we measure the quality of courts firms have access to based on whether their headquarters are inside the provincial capital zone.

Table 6 reports the results of cross-sectional analyses. Columns 1 and 2 show that the estimated coefficient of TREATED × POST is positive and significant in the subsample with a higher proportion of tangible assets and insignificant in the

subsample with a lower proportion of tangible assets. The difference between the two coefficients is statistically significant at the 5% level, suggesting that the Law's effect on investment is more pronounced among firms with more tangible assets. In columns 3–6, we separately examine the Law's effect in subsamples of firms facing high or low levels of local government incentives to expropriate. We find that although the estimated coefficients of $TREATED \times POST$ are positive and significant in all subsamples, the magnitudes of the coefficients are higher when city governments have more incentive to expropriate (the difference is statistically significant at the 5% level when we measure incentives using cities' welfare spending). Last, we find that the effect of the Law on investment is significantly stronger (at the 10% level) for firms headquartered in the provincial capital zone than for those outside the zone, consistent with access to higher-quality courts enhancing the Law's effect. Taken together, the results from these cross-sectional analyses further support our argument that the Law affects treatment firms' investment decisions by lowering expropriation risk.

D. Property Law and Corporate Investment: Funding Source of Additional Investments

In this section, we explore the funding sources of treatment firms' additional investments, along with the role of financing in the Law's effect on investment. We examine three sources of funding available to private firms: internally generated profits, bank loans, and personal investment (equity).

Prior studies document that Chinese private firms finance their investments primarily through self-fundraising, which includes internally generated profits and personal investment. For example, Allen et al. (2005) report that private firms obtain close to 60% of their funding for fixed asset investments from self-fundraising and less than 20% from bank loans. Therefore, we expect treatment firms to fund their additional investments using internally generated cash flows. To test this intuition, we examine whether treatment firms reinvest a larger proportion of their profits after the Law, compared to control firms. Following prior studies including Lin, Lin, and Song (2010) and Chen (2015), we measure profit reinvestment ($PROFIT_REINVEST$) using investment volume scaled by total sales in the previous year. We use the difference-in-differences design in equation (1) while controlling for firm characteristics and macroeconomic conditions (Johnson et al. (2002), Cull and Xu (2005)). The results in Table 7 show that the estimated coefficients on $TREATED \times POST$ are positive and significant at the 1% level in all specifications. Based on the results in column 3, treatment firms increase their profit re-investment rate by 1.12% after the Law, compared with control firms, equivalent to increasing their pre-Law re-investment rate by 15.8% (1.12%/7.10%).

We then turn to treatment firms' external capital using two sets of analyses to shed light on the role of credit supply in the Law's effect on investment. First, we examine whether treatment firms increase borrowing and equity financing after the Law. We measure borrowing and equity financing using firms' long-term liabilities

TABLE 7
Property Law and Profit Reinvestment

Table 7 examines the effects of the Property Law on firms' profit reinvestment. The *t*-statistics reported in parentheses are based on standard errors clustered by city. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. Variable definitions are provided in the Appendix.

Dependent Variable	PROFIT_REINVEST		
	1	2	3
TREATED × POST	1.27*** (5.03)	1.28*** (5.15)	1.12*** (4.32)
TREATED	0.79*** (3.56)	0.76*** (3.40)	
POST	-2.02*** (-13.56)	-0.83 (-0.54)	
SIZE		1.85*** (26.25)	1.72*** (23.19)
PROFITABILITY		-14.10*** (-20.97)	-12.41*** (-17.90)
LEVERAGE		-3.90*** (-10.15)	-3.32*** (-8.43)
ΔSALES		1.56*** (17.79)	1.77*** (19.79)
ΔPROVINCIAL_GDP		-0.43 (-0.08)	-22.60 (-0.72)
SIZE × POST		-0.26*** (-2.71)	-0.31*** (-2.76)
PROFITABILITY × POST		7.61*** (9.92)	6.97*** (8.88)
LEVERAGE × POST		1.96*** (3.58)	1.69*** (3.08)
ΔSALES × POST		-1.26*** (-15.00)	-1.40*** (-16.71)
ΔPROVINCIAL_GDP × POST		-0.78 (-0.14)	-1.33 (-0.23)
Firm FEs	No	No	Yes
Industry-year FEs	No	No	Yes
City FEs	No	No	Yes
Adj. <i>R</i> ²	0.00	0.01	0.05
Within <i>R</i> ²			0.01
No. of obs.	206,536	206,536	206,536

(BANK_LOAN) and personal capital (PERSONAL_CAPITAL), respectively. Specifically, we estimate the following regression:

$$(2) \quad \text{BANK_LOAN or PERSONAL_CAPITAL} \\ = \alpha + \beta \times \text{TREATED} \times \text{POST} + \gamma \times \text{CONTROLS_FINANCE} + \varepsilon.$$

Our coefficient of interest is β , which measures the difference in the change in bank loans and personal capital from the pre-Law to the post-Law period between treatment and control firms. We control for firm characteristics that affect capital structure, including size, profitability, and sales growth (Vig (2013)), along with provincial GDP growth. Similar to the investment test, we include firm, industry-year, and city fixed effects and cluster standard errors at the city level.

The results in Panel A of Table 8 show positive coefficients on TREATED × POST (0.38 and 0.40, significant at the 1% and 5% levels, respectively), consistent with the notion that post-Law, treatment firms receive more bank

TABLE 8
Property Law and Corporate Investment: The Role of Financing

Table 8 examines the role of financing in the Property Law's effect on investment. Panel A examines the effect of the Law on firms' external financing. Panel B examines its effect on corporate investment separately for firms with better and worse access to financing. In columns 1–2 and 3–4, we classify firms into those with better and worse access to financing based on whether their BANK_LOAN and PERSONAL_CAPITAL values in 2006 are above or below the sample medians, respectively. For brevity, we do not report coefficients for controls in Panel B. The *t*-statistics reported in parentheses are based on standard errors clustered by city. The *F*-test in Panel B presents the difference in coefficients of TREATED × POST in the respective cross-sectional tests. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. Variable definitions are provided in the Appendix.

Panel A. Sources of External Financing

	BANK_LOAN	PERSONAL_CAPITAL
	1	2
TREATED × POST	0.38*** (3.60)	0.40** (2.13)
SIZE	0.89*** (20.67)	−2.26*** (−30.52)
PROFITABILITY	−5.78*** (−12.50)	−0.56 (−0.77)
ΔSALES	−0.21*** (−4.56)	0.31*** (3.34)
ΔPROVINCIAL_GDP	−29.15 (−1.08)	−4.05 (−0.11)
SIZE × POST	−0.19*** (−5.89)	0.22*** (4.75)
PROFITABILITY × POST	1.47*** (3.49)	1.46** (2.18)
ΔSALES × POST	0.33*** (7.22)	0.28*** (3.16)
ΔPROVINCIAL_GDP × POST	−8.40*** (−4.92)	−7.39** (−2.08)
Firm FEs		Yes
Industry-year FEs		Yes
City FEs		Yes
Adj. R^2	0.16	0.18
Within R^2	0.01	0.03
No. of obs.	206,536	206,536

Panel B. Property Law and Investment: Access to Financing

Partition Variables	Dependent Variable: INVESTMENT			
	BANK_LOAN		PERSONAL_CAPITAL	
	Above Median	Below Median	Above Median	Below Median
	1	2	3	4
TREATED × POST	1.53*** (6.69)	1.45*** (6.15)	1.45*** (5.72)	1.43*** (5.79)
<i>F</i> -Tests	0.08		0.02	
Controls and interactions			Yes	
Firm FEs			Yes	
Industry-year FEs			Yes	
City FEs			Yes	
Adj. R^2	0.10	0.08	0.09	0.08
Within R^2	0.06	0.05	0.06	0.04
No. of obs.	68,804	137,732	100,128	106,408

loans and owners' equity than do control firms. A comparison of the magnitudes of these coefficients with that of TREATED × POST in Table 4 (1.41 in column 3) suggests that bank loans and personal capital finance roughly 27% and 28% of treatment firms' additional investments, respectively.

Because property rights affect creditors' ability to repossess collateral when borrowers default, the Law can improve the pledgeability of real property and may increase lenders' willingness to offer credit to firms and owners (Berkowitz et al. (2015)).¹⁸ That is, treatment firms' increase in investment post-Law could be due to both lower concern about expropriation risk *and* easier access to credit (Johnson et al. (2002)). In our second set of analyses, we attempt to disentangle the two explanations to shed light on how financing influences the Law's effect on investment. Specifically, we compare whether the Law's effect on investment varies with firms' financial constraints. If treatment firms increase investments primarily due to their improved access to financing, we expect the effect of the Law to be stronger for treatment firms with more difficult access to financing pre-Law (Duchin, Ozbas, and Sensoy (2010), Aretz, Campello, and Marchica (2020)).

Empirically, we classify firms into those with better (worse) access to financing based on whether their uses of bank financing and personal equity prior to the Law are above (below) the respective sample medians. We then re-estimate the investment regression (equation (1)) separately for the two groups. The results in Panel B of Table 8 show that, for both measures of access to financing, there are no statistically significant differences between the two groups of treatment firms' increases in investments post-Law. This evidence suggests it is unlikely that the Law's effect on investments is due to improving access to financing and is instead more consistent with lowering expropriation risk.¹⁹

In sum, the results in this section suggest that treatment firms finance additional investments from a variety of sources, including internally generated profits, bank loans, and personal equity, and that the Law's effect on investments is more likely due to lower perceived expropriation risk rather than improved access to financing. These findings echo the survey results in Johnson et al. (2002) showing that for private firms in developing countries, expropriation risk is a more important determinant of investment than is access to financing.

E. Property Law and Corporate Investment Efficiency

Next, we examine the optimality of investments to provide additional evidence on how property rights' protection affects firm decisions. Expropriation risk distorts firms' investment behavior and thus reduces their investment efficiency. Because the Law lowers treatment firms' expropriation risk, we expect treatment firms to improve their investment efficiency after the Law.

¹⁸It is common for entrepreneurs to use their personal real property as collateral to borrow from banks and invest the proceeds in their firms (Adelino, Schoar, and Severino (2015), Schmalz, Sraer, and Thesmar (2017), and Fan, Li, Li, and Zhang (2022)).

¹⁹Despite a few studies attributing the post-Law increase in long-term debt among publicly listed firms to creditors' willingness to lend (Berkowitz et al. (2015), Qian and Fang (2017)), we may not observe similar effects in private firms for two reasons. First, most Chinese banks are state-owned and thus prioritize lending to state-owned enterprises and large, publicly traded firms (Allen et al. (2005)). Indeed, Firth, Lin, Liu, and Wong (2009) report that although the private sector accounts for 50% of the economy, it accounts for just 7% of bank lending. Second, compared to banks in developed countries, Chinese banks pay less attention to economic fundamentals when granting loans to private firms (Cull and Xu (2005)). For example, Chen, Liu, and Su (2013) document that bribery, rather than performance, determines private firms' access to bank credit in China.

We measure investment efficiency using the sensitivity of firms' investments to growth opportunities. Following prior studies (Bekaert, Harvey, and Lundblad (2005), Bekaert, Harvey, Lundblad, and Siegel (2007), and Mortal and Reisel (2013)), we use the price to earnings ratio (PE) as a measure of growth opportunity. As private firms do not have readily available market prices, we estimate their PE using the relation between PE and firm fundamentals for similar publicly listed firms. Following Campello and Graham (2013), we include four measures of firm fundamentals (sales growth, return on assets, net income, and leverage) to account for different firms' marginal product of capital. We regress PE on firm fundamentals for listed manufacturing firms in each province-year.²⁰ We then use the estimated coefficients from the regressions and private firms' fundamentals to generate a predicted value of \widehat{PE} for each private firm-year observation. To test the Law's effect on treatment firms' investment efficiency, we estimate the following regression:

$$(3) \text{ INVESTMENT} = \alpha + \beta \times \text{TREATED} \times \text{POST} \times \widehat{PE} + \gamma \times \text{CONTROLS} + \varepsilon,$$

where β measures treatment firms' change in investment sensitivity to growth opportunities after the Law, relative to control firms. We control for firm characteristics and their interactions with \widehat{PE} (coefficients untabulated for brevity) and include firm, industry-year, and city fixed-effects.

Table 9 shows that, in line with the theory, firms' investments are positively associated with growth opportunities (the estimated coefficient on \widehat{PE} is positive and significant at the 1% level). More importantly, the sensitivity of treatment firms' investments to growth opportunities increases post-Law, compared to control firms (β is positive and significant at the 1% level in column 1). Results in columns 2 and 3 further show that the improvement in efficiency exists only for investments that lead to tangible assets, which are subject to higher expropriation risk than intangible assets. These findings suggest that a venue through which government can improve the efficiency of resource allocation is to strengthen property rights protection.

F. Property Law and Local Economic Outcomes

Lastly, we broaden the scope of our analysis to examine whether the Law's effect on firm-level investment decisions translates into discernible improvements in local economy. We focus on two key economic outcomes: economic growth and employment.

For economic growth, we first test whether the increases in investments documented in firm-level analyses correspond to economy-wide increases in investments. In addition to total investments, we separately examine foreign direct investment for two reasons. First, foreign direct investments have contributed significantly to China's exceptional economic growth (Tseng and Zebregs (2002)) and are an important source of funding for private firms during their growth period (Allen et al. (2005)). Second, foreigners may be more concerned about expropriation risk because they are less connected to local governments (Thomas

²⁰We use listed manufacturing firms because most private firms in the CIED sample are in manufacturing and related industries.

TABLE 9
Property Law and Corporate Investment Sensitivity

Table 9 examines the effects of the Property Law on the sensitivity of corporate investments to growth opportunities. For brevity, we do not report coefficients for interactions with the control variables. The *t*-statistics reported in parentheses are based on standard errors clustered by city. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. Variable definitions are provided in the Appendix.

	INVESTMENT	CAPEX	R&D
	1	2	3
TREATED × POST × \widehat{PE}	0.28*** (3.44)	0.27*** (3.38)	0.00 (0.99)
TREATED × \widehat{PE}	-0.32*** (-4.17)	-0.33*** (-4.16)	0.00 (0.57)
POST × \widehat{PE}	-0.25*** (-3.26)	-0.25*** (-3.18)	-0.01 (-1.35)
TREATED × POST	1.69*** (8.31)	1.72*** (8.43)	-0.02*** (-2.90)
\widehat{PE}	0.30*** (3.98)	0.31*** (3.97)	-0.00 (-0.59)
SIZE	0.59*** (14.03)	0.53*** (12.42)	0.07*** (20.31)
PROFITABILITY	-2.92*** (-4.22)	-3.20*** (-4.61)	0.28*** (8.01)
LEVERAGE	-2.34*** (-9.68)	-2.29*** (-9.49)	-0.05*** (-4.76)
ΔSALES	4.16*** (36.35)	4.16*** (36.40)	0.00 (0.44)
ΔPROVINCIAL_GDP	-29.70 (-1.10)	-29.10 (-1.08)	-0.60 (-1.14)
Controls and interactions			
Firm FEs		Yes	
Industry-year FEs		Yes	
City FEs		Yes	
Adj. R^2	0.09	0.09	0.11
Within R^2	0.05	0.05	0.01
No. of obs.	206,536	206,536	206,536

and Worrall (1994), Lin, Mihov, Sanz, and Stoyanova (2019)). Next, we use GDP per capita to measure the value of output per person, that is, local economic productivity (Acemoglu et al. (2001), (2002), (2005), Acemoglu and Johnson (2005)).

Empirically, we estimate the following regression:

$$(4) \quad \text{ECONOMIC_OUTCOME} = \alpha + \beta \times \text{TREATED} \times \text{POST} + \gamma \\ \times \text{CONTROLS_ECONOMY} + \varepsilon,$$

where ECONOMIC_OUTCOME includes LOCAL_INVESTMENT, FOREIGN_INV, and GDP/CAPITA, all at the city-year level. We predict that the Law would have a positive effect on the local economy of cities in the treatment provinces (hereafter, treatment cities), that is, a positive coefficient of β . Following prior studies (Kormendi and Meguire (1985)), we control for lagged city GDP (GDP_{t-1}), cities' revenue scaled by GDP (REVENUE/GDP), and provinces' exports (EXPORT) and human capital (HUMAN_CAPITAL). We obtain city-level data from the China City Statistical Yearbook and province-level data from the National Bureau of Statistics of China. We include year fixed effects to account

for macroeconomic trends that may affect economic outcomes.²¹ Table 10 presents the summary statistics in Panel A and regression results in Panel B.

Consistent with our predictions, we find significant increases in aggregate local investment and foreign investments in treatment cities after the Law, compared to control cities ($TREATED \times POST$ is positive and significant at the 1% level in columns 1 and 2). These results confirm earlier firm-level evidence and are consistent with the notion that the Law stimulates investment. We also find a positive result for treatment cities' GDP per capita (in column 3), which suggests that the Law improves productivity and echoes its effect on firms' investment efficiency. In sum, the results show that, consistent with Acemoglu and Johnson (2005), property rights institutions have significant effects on economic growth.

Finally, we examine the Law's effect on local employment.²² Documenting whether reducing expropriation risk for private firms improves local employment is important because the private sector accounts for most employment and employment growth in China (Allen et al. (2005)), and maintaining social stability is a Chinese government mandate (Bai, Lu, and Tao (2006)). In addition to employment level, we investigate the percentage of local employment by private firms. Compared to state-owned firms, private firms are more concerned with expropriation. Thus, the Law's effect on employment should be stronger among private firms, thereby translating to an increase in private firms' employment proportion.

To test these predictions, we re-estimate equation (3) using $\Delta EMPLOYMENT$ (the annual change in the log number of employees at the city-year level) and $PRIVATE_EMP$ (the proportion of workers employed by private entities at the province-year level) as the dependent variables. We control for local industrial mix using the proportion of workers in the primary and secondary sectors ($PRIMARY_SECTOR$ and $SECOND_SECTOR$, respectively) in both regressions, as well as the differential effect of private versus public employers on employment level using $PRIVATE_EMP$ in the employment-level regression. The results in Panel C of Table 10 show positive and significant coefficients on $TREATED \times POST$ in both columns, consistent with treatment cities experiencing increases in employment and the percentage of private firm employment.²³ Taken together, we conclude that the Law results in significant improvements in local economic outcomes.

G. Property Law and Corporate Investment: Additional Analyses

1. Alternative Measures of Government Expropriation

In our main analyses, we follow prior studies (e.g., Berkowitz et al. (2015)) and use NERI Index of Marketization of China's Provinces 2011 Report (Fan et al.

²¹In a sensitivity test, we replace year fixed effects with city fixed effects and find similar results (untabulated).

²²In an additional test, we investigate the Law's effect on firm-level employment. The results (tabulated in Table IA5 in the Supplementary Material) show that treatment firms hire significantly more workers post-Law, compared to control firms.

²³In an untabulated analysis, we find that treatment cities have higher wages post-Law, compared to control cities, consistent with stronger property rights creating a positive demand shock in local employment (Aragón (2015)).

TABLE 10
Property Law and Local Economic Outcomes

Table 10 examines the effects of the Property Law on local economic outcomes. Panel A presents summary statistics of the variables. Panel B presents the effect of the Property Law on local economic outcomes (i.e., LOCAL_INVESTMENT, FOREIGN_INV, and GDP/CAPITA). Panel C presents the effect of the Property Law on local employment outcomes (i.e., ΔEMPLOYMENT and PRIVATE_EMP). The *t*-statistics reported in parentheses are based on standard errors clustered by city (province) in Panel B and Panel C column 1 (Panel C column 2). ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. Variable definitions are provided in the Appendix.

Panel A. Summary Statistics at the City-Year and Province-Year Levels

	No. of Obs.	Means	Std. Dev.	P10	P25	P50	P75	P90
LOCAL_INVESTMENT	1,060	14.821	0.927	13.722	14.173	14.671	15.423	16.141
FOREIGN_INV	1,060	9.147	1.890	6.823	8.120	9.149	10.374	11.572
GDP/CAPITA	1,060	1.079	0.146	0.934	0.996	1.068	1.155	1.258
GDP _{<i>t</i>-1} (city level)	1,060	6.191	0.899	5.095	5.636	6.062	6.711	7.422
REVENUE/GDP (city level)	1,060	0.055	0.023	0.031	0.039	0.051	0.064	0.081
EXPORT	100	14.094	1.521	12.438	12.983	13.670	15.197	16.434
HUMAN_CAPITAL	100	0.077	0.057	0.039	0.045	0.059	0.076	0.153
ΔEMPLOYMENT	1,060	0.015	0.088	-0.029	-0.009	0.011	0.037	0.076
PRIVATE_EMP	100	0.389	0.132	0.219	0.281	0.373	0.470	0.607
GDP _{<i>t</i>-1} (provincial level)	100	26.854	15.108	3.766	18.151	28.902	36.755	45.176
REVENUE/GDP (provincial level)	100	0.073	0.026	0.047	0.051	0.065	0.079	0.112
PRIMARY_SECTOR	100	0.048	0.092	0.003	0.006	0.016	0.034	0.123
SECOND_SECTOR	100	0.404	0.143	0.241	0.282	0.409	0.502	0.583

Panel B. Property Law and Local Investment and GDP

Dependent Variables	LOCAL_INVESTMENT		FOREIGN_INV		GDP/CAPITAL	
	1		2		3	
TREATED × POST	0.18*** (5.42)		0.17** (2.28)		0.03*** (4.41)	
TREATED	-0.08 (-1.15)		-0.27 (-1.20)		0.01 (0.27)	
GDP _{<i>t</i>-1}	0.93*** (37.08)		1.43*** (17.01)		0.06*** (6.32)	
REVENUE/GDP	3.97*** (3.41)		8.15** (2.20)		1.45*** (3.70)	
EXPORT	-0.03 (-1.64)		0.17** (2.44)		0.02** (2.56)	
HUMAN_CAPITAL	-0.54 (-0.68)		-0.85 (-0.36)		0.49 (1.34)	
Year FEs			Yes			
Adj. <i>R</i> ²	0.88		0.65		0.40	
Within <i>R</i> ²	0.87		0.64		0.37	
No. of obs.	1,060		1,060		1,060	

Panel C. Property Law and Local Employment

Dependent Variables	ΔEMPLOYMENT		PRIVATE_EMP	
	1		2	
TREATED × POST	0.03* (1.97)		0.12*** (3.23)	
TREATED	-0.06*** (-4.46)		-0.14*** (-3.20)	
GDP _{<i>t</i>-1}	0.01*** (2.63)		0.00* (1.78)	
REVENUE/GDP	0.15 (1.18)		1.11 (1.64)	
HUMAN_CAPITAL	-0.65*** (-5.54)		0.05 (0.16)	
EXPORT	-0.00 (-1.28)		-0.05*** (-3.25)	
PRIMARY_SECTOR	0.07 (0.91)		-0.08 (-0.44)	
SECOND_SECTOR	0.07*** (3.59)		-0.02 (-0.11)	
PRIVATE_EMP	-0.11*** (-2.81)			
Year FEs			Yes	
Adj. <i>R</i> ²	0.06		0.63	
Within <i>R</i> ²	0.07		0.33	
No. of obs.	1,060		100	

(2011)) to assign provinces to treatment and control groups. To test the robustness of our results, we use three alternative measures of expropriation risk. The first two measures are based on city-level survey data from the World Bank (Mako (2006)): the Property Rights Protection Index (PPRI), which measures the likelihood that firms' property and contract rights would be protected and enforced, and the number of days in a year firms spend dealing with important government agencies (BUREAUCRACY), for which a higher value indicates a lower level of government effectiveness and thus higher likelihood of expropriation (Fan et al. (2013), Berkowitz et al. (2015)). For both measures, we follow Fan et al. (2013) and use the average values for all cities within a province to produce a province-level measure. The third measure, lawyers per capita (LAWYER), is a proxy for the quality of the local legal system (Hasan, Wachtel, and Zhou (2009), Kelly, Mokyr, and Gráda (2023)), with higher values indicative of lower expropriation risk.

All three measures are correlated with the PROPERTY_RIGHTS_SCORE we use in the main tests in the expected direction (the correlation coefficients at the province level are 0.48, -0.23 , and 0.49 for PPRI, BUREAUCRACY, and LAWYER, respectively). We define TREATED_ALT using the three measures and re-estimate equation (1), replacing TREATED with TREATED_ALT. The results (tabulated in Table IA6 in the Supplementary Material) show positive and significant coefficients of TREATED_ALT \times POST in all columns, suggesting that our main findings are not sensitive to using other measures of expropriation risk.

2. Effects on Listed Firms' Investment

As discussed in the introduction, the Law should have weaker, if any, results on investment of publicly listed firms because compared to private firms, public ones are more visible, have deeper connections to the State, and are thus less likely to be expropriated (Allen et al. (2005), Chen et al. (2011), and Liu et al. (2022)). To this end, we obtain listed firms' data from the China Stock Market & Accounting Research Database (CSMAR) and repeat our main tests using this sample (reported in Table IA7 in the Supplementary Material).²⁴ As shown, the coefficients of TREATED \times POST are insignificant in all 3 columns, consistent with the results in Berkowitz et al. (2015) showing that the Law does not materially change expropriation risk among listed firms. Taken together with the results for private firms, our evidence suggests that strengthening property rights protection may help level the playing field between private and public firms.

3. The Role of Lifecycle Stages

Next, we explore whether the Law's effect on firms varies with firms' life cycle stages. On the one hand, early-stage firms have more growth opportunities and fewer connections and resources to challenge expropriation, which suggests they should benefit more from the Law (Beck, Demirgüç-Kunt, and Makismovic (2005), Duchin, Gao, and Shu (2020)). On the other hand, they own fewer tangible assets and are financially less stable, and thus the government may be concerned that expropriating assets from these firms could lead to severe negative consequences

²⁴We use CAPEX only as the dependent variable because R&D expenses are not available for listed firms in CSMAR prior to 2007.

such as bankruptcy and fewer opportunities for future expropriation (Friedman, Johnson, and Mitton (2003), Allen et al. (2005)).²⁵ Following prior studies (Porter (1997), Grullon, Michaely and Swaminathan (2002), and Gao, Hsu and Li (2018)), we classify our sample firm-years into early-stage and mature, based on age (FIRM_AGE), size (SIZE), and sales growth rate (Δ SALES), and separately estimate equation (1) in each subsample (reported in Table IA8 in the Supplementary Material). We find that the estimated coefficients of TREATED \times POST are positive and significant in all subsamples, suggesting that the Law affects private firms in different life cycle stages. Furthermore, compared to low-growth firms, high-growth firms exhibit greater increases in investment post-Law (significant at the 10% level). This evidence is consistent with the notion that high-growth firms are especially sensitive to expropriation risk, likely due to their available growth opportunities and reliance on investment, and thus benefit more from the Law. As these firms are arguably the engine of economic development and job creation, this finding further accentuates the importance of property rights protection.

4. Alternative Sample Period

To investigate whether the effect of the Law is short-lived, we extend the post-Law period to 2010 (i.e., 4 years after the Law) or use 2009–2010 (i.e., the third and fourth years after the Law) as the post-Law period. The results (tabulated in columns 2 and 3 in Table IA2 in the Supplementary Material, respectively) show that compared to control firms, in both alternative post-Law sample periods, treatment firms' level of investments remains elevated. The result is consistent with a long-lasting effect of the Law.

An alternative explanation of our results is that treatment firms consistently increase their investment levels at a rate greater than that of control firms. To address this concern, we conduct two sets of analyses. First, we add 2003 and 2004 data to the sample to better control for differences in the pre-Law trends of treatment and control firms. We examine CAPEX only because CIED does not have R&D data prior to 2001 and for 2002–2004 (National Bureau of Statistics of China (2007); Nie et al. (2012)). Using this sample, we re-estimate the regression in Table 4 column 4, and also explicitly control for pre-Law trends by including the CAPEX growth rate and the change in CAPEX in the previous year, respectively. We find similar results as for the main test in all 3 regressions (tabulated in columns 4–6 in Table IA2 in the Supplementary Material). Second, we conduct a placebo test using a pseudo-treatment year. We choose 2002 as the pseudo-treatment year, that is, 2000–2001 (POST2002 equals 0) and 2002–2003 (POST2002 equals 1) as the pre- and post-pseudo-treatment periods, respectively, because this period does not overlap with our main sample period and the CIED data have low coverage prior to 1999. We perform propensity score matching based on firm characteristics in 2001 and re-estimate equation (1) using this placebo sample. Column 7 in Table IA2 in the Supplementary Material shows an insignificant coefficient on TREATED \times POST2002. Taken together, the

²⁵ Anecdotal evidence suggests that the government uses policy incentives such as tax exemptions, grants, and subsidies to encourage young firms (Hu (2007), Guo, Guo, and Jiang (2016)). In a similar vein, Jia and Mayer (2017) show a positive relation between government expropriation and firm age in China.

results of these additional analyses suggest that it is unlikely that our main results are driven by differences in general time trends of investment between the treatment and control firms.

V. Summary

Property rights institutions govern the ownership and usage of economic resources and constrain governments' arbitrary behavior and expropriation activities. In theory, strengthening property rights should lower firms' perceived expropriation risk and increase their willingness to invest. Prior studies rely on cross-sectional evidence to show that stronger property rights protection is associated with higher investment (La Porta et al. (1998), Johnson et al. (2002), Acemoglu and Johnson (2005), and Cull and Xu (2005)). However, as property rights are shaped by natural endowments and colonial origins and are deeply intertwined with contracting institutions and the political economy of the state, it remains unclear whether reforms aimed at strengthening property rights can sufficiently alleviate expropriation risk, stimulate investment, and improve economic outcomes.

We exploit the enactment of China's 2007 Property Law, which constrains the ability of local governments to expropriate assets, to investigate the effect of property rights protection. Using pre-Law variation in expropriation risk across provinces for identification, along with a difference-in-differences design, we find that treatment firms (i.e., those experiencing a larger reduction in expropriation risk) increase their levels of investment post-Law, compared to control firms. Cross-sectional analyses show that the Law's effects are stronger for firms with a higher proportion of easy-to-expropriate assets, for firms in cities where local governments have higher incentives to expropriate, and for firms with access to higher-quality courts, all of which suggests that lowering expropriation risk is the key mechanism behind the Law's effect. We further show that treatment firms fund their additional investments from a variety of sources, including internally generated profits, bank loans, and personal equity. Lastly, we document evidence consistent with the notion that the Law improves treatment firms' investment efficiency and has positive impacts on local economic outcomes, including investment, GDP per capita, and employment.

Our study contributes to the literature on property rights institutions by providing a more definitive answer on the role of expropriation risk in investment decisions. By documenting new evidence showing that strengthening property rights institutions can improve firms' investment decisions and promote economic growth, our article has important implications for regulators and policymakers.

Appendix. Variable Definitions

This appendix defines the variables used in the analyses. Firm-level, city-level, and provincial-level variables are from the Chinese Industrial Enterprises Database, China City Statistical Yearbook, and National Bureau of Statistics of China, respectively. The firm-level variables are trimmed at the 0.5 and 99.5% levels.

PROPERTY_RIGHTS_SCORE: A provincial-level score based on the National Economic Research Institute Index of Marketization of China's Provinces 2011

Report (Fan, Wang, and Zhu (2011)). Higher scores represent higher property rights protection levels.

Variables Used in Firm-Level Analyses

TREATED: Indicator variable that equals 0 for firms located in Zhejiang, Guangdong, Shanghai, Jiangsu, and Beijing, and 1 otherwise.

POST: Indicator variable that equals 1 if the fiscal year is 2007 or 2008 and 0 if the fiscal year is 2005 or 2006.

SIZE: Natural logarithm of total assets (in RMB 1,000) at fiscal year-end.

PROFITABILITY: Operating profit scaled by total assets at fiscal year-end.

LEVERAGE: Total liabilities scaled by total assets at fiscal year-end.

Δ SALES: Change in revenue minus change in receivables, scaled by average total assets.

CASH: Cash balance scaled by total assets at fiscal year-end.

NET_FIXED_ASSETS: Net PP&E scaled by total assets at fiscal year-end.

CFO: Cash flows from operations scaled by total assets at fiscal year-end.

CAPEX: Sum of change in net PP&E and depreciation expense scaled by total assets at fiscal year-end, multiplied by 100 in regression analyses for ease of interpreting coefficient estimates.

R&D: R&D expense scaled by total assets at year-end, multiplied by 100 in regression analyses for ease of interpreting coefficient estimates.

INVESTMENT: Sum of change in net PP&E, R&D expense, and depreciation expense scaled by total assets at fiscal year-end, multiplied by 100 in regression analyses for ease of interpreting coefficient estimates.

Δ PROVINCIAL_GDP: Change in the natural logarithm of provincial nominal GDP (in RMB 100 million) from previous year.

PROFIT_REINVEST: Investment scaled by sales of previous year.

BANK_LOAN: Long-term liabilities scaled by total assets at fiscal year-end.

PERSONAL_CAPITAL: Personal equity of owners scaled by total assets at fiscal year-end.

\widehat{PE} : $\widehat{\beta}_1 \times \Delta SALES + \widehat{\beta}_2 \times ROA + \widehat{\beta}_3 \times NET_INCOME + \widehat{\beta}_4 \times LEVERAGE$, with $\widehat{\beta}_1, \widehat{\beta}_2, \widehat{\beta}_3$, and $\widehat{\beta}_4$ obtained from estimating the regression of $PE = \beta_1 \times \Delta SALES + \beta_2 \times ROA + \beta_3 \times NET_INCOME + \beta_4 \times LEVERAGE$ in listed manufacturing firms in each province year. PE is year end closing price scaled by the ratio of net income in previous year's annual report over year-end paid-in-capital values. Listed firms' data are from the China Stock Market & Accounting Research Database.

Variables Used in City- and Province-Level Analyses

TREATED: Indicator variable that equals 0 for cities located in Zhejiang, Guangdong, Shanghai, Jiangsu, and Beijing, and 1 otherwise.

LOCAL_INVESTMENT: Natural logarithm of city's total fixed asset investment (in RMB 10,000s).

FOREIGN_INV: Natural logarithm of city's total foreign investment (in USD 10,000s).

GDP/CAPITA: Natural logarithm of city's GDP per capita (in RMB 10,000s).

GDP_{*t*-1}: Natural logarithm of GDP (in RMB 100 millions) at city or provincial level in previous year.

REVENUE/GDP: Fiscal revenue scaled by GDP at city or provincial level.

EXPORT: Natural log of exports (in USD 10,000s) at provincial level.

HUMAN_CAPITAL: Percentage of population in province that have junior college degree.

ΔEMPLOYMENT: Change in the natural logarithm of number of employees in the city (in 10,000s) from previous year.

PRIMARY_SECTOR: City's percentage of workers employed in primary sector (i.e., production of goods and services by exploiting natural resources). We take the average values for cities in each province to create a provincial-level measure.

SECOND_SECTOR: City's percentage of workers employed in secondary sector (i.e., transforming raw materials into finished goods). We take the average values for cities in each province to create a provincial-level measure.

PRIVATE_EMP: Percentage of workers employed by nonstate-owned entities at province-year level.

Supplementary Material

To view supplementary material for this article, please visit <http://doi.org/10.1017/S0022109023000972>.

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