What determines firms' access to credit in the absence of effective economic institutions: evidence from China

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Abstract

The existing literature suggests that economic institutions determine the allocation of resources for economic growth. As an important counterexample, although China has one of the world's fastest-growing economies, its legal and financial systems are underdeveloped. With evidence from China, the author confirms that government intervention positively and causally determines firms' access to credit. The author further provides evidence that government intervention enables firms' profit through facilitating access to credit. This evidence confirms that the mechanism of government intervention allows firms' access to credit and then enables the firms to obtain relatively large profits. Ultimately, this paper reveals that, in the absence of effective economic institutions, government intervention determines firms' access to credit.

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1   Introduction

The existing literature suggests that economic institutions determine the allocation of resources for economic growth (North 1990). The endogenous growth theory states that "the fundamental explanation of comparative growth is differences in [economic] institutions" (Lin et al. 2010: 49). As an important counterexample, although China has one of the fastest-growing economies in the world, its legal and financial systems are underdeveloped (Allen et al. 2005). Given that China has among the weakest protection of property rights (La Porta et al. 2004), what determines the allocation of credit by financial intermediaries in this rapid economic growth? In microeconomic terms, what determines firms' access to credit from financial intermediaries? This microeconomic question challenges the existing literature.

Recent literature on law, finance, and economic growth explains the impact of economic institutions on economic growth, but it offers no insight into our research question. Allen et al. (2005) explain China's growth puzzle by revealing the important contribution of the informal sector on that growth, while Ayyagari et al. (2010) and Linton (2006) analyze formal and informal financing. Other scholars investigate the impact of a firm's government connection (e.g., Cull et al. 2015) or bank relationships (e.g., Ongena et al. 2011) on its corporate finance.[1] However, these scholars do not discover what drives the formal financing mechanism when legal institutions are undeveloped. Even when scholars (e.g., Friedman et al. 2000) explain the underground economy or government intervention (e.g., Chen et al. 2011; Easterly and Levine 1997; La Porta et al. 1999; Shleifer 1997), they do not explore how financial resources (i.e., capital) are allocated when legal systems are ineffective.

Moreover, the existing institutional literature can explain the failure of institutional reforms, but it neglects financial development in the absence of effective legal institutions. In fact, economic institutions have attracted economic scholars only since Coase (1937). The follow-up economics of contract (e.g., Cheung 1970, 1974, 1983, 1998) and transaction cost economics (e.g., Williamson 1976, 1979, 1985, 2000) explain the effect of formal institutions and relational contracts, respectively. The endogenous growth theory (e.g., Acemoglu et al. 2002, 2005; Barro 1990; Beck et al. 2005; Claessens and Laeven 2003) emphasizes the impact of economic institutions on economic growth. Recently, legal origin theory (e.g., La Porta et al. 1997, 1998, 2008) and moral economics (e.g., Alesina and Giuliano 2015; Tabellini 2008) enrich the impact of economic institutions with a consideration of legal origin and culture, respectively. These institutional theories all neglect the topic of resource allocation in the absence of an effective legal system.

This paper posits that government intervention replaces legal institutions in allocating capital (La Porta et al. 1998). Legal institutions in developing countries have been underdeveloped for a long time, but local governments control the financial system and tend to facilitate investment in economic growth. For example, China's local governments construct strategic

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[1] Government or political connections are only one type of government intervention. Endogenous connections are those that a firm deliberately constructs with governments or politicians while exogenous connections are represented by the state share. These two connections represent the institutional property of a firm in the short or long run, respectively. This paper aims to explore how government intervention functions in place of a market system. Thus, we need to capture the general government intervention issue (rather than government connections), which is commonly measured by the interaction of the surveyed firm with government (see Section 3).

alliances with financial intermediaries (e.g., banks) and firms in making investment decisions. The strategic alliance guarantees the promotional effect of government intervention on firms' access to finance (Wang 2007).

To reveal the effect of government intervention, we first confirm that government intervention enables firms' access to credit in China. We then show that government intervention enables firms to obtain relatively large profits. We further confirm that government intervention has a promotional effect on profit through access to credit. Ultimately, we reveal a mechanism of government intervention that facilitates firms' access to credit and then profit. Our findings are robust to the potential endogeneity issue, different estimation methods, and different types of standard errors.

This paper contributes to the institutional economics literature on the micro government intervention issue. Because the public choice school exposes the impact of corruption (e.g., Alesina et al. 1992; Becker 1983; Tanzi and Schuknecht 2000), the academic world consistently views government intervention as a "grabbing hand" (e.g., Gamberger and Smuc 2013).With reference to the "Washington consensus," government intervention is considered almost equivalent to corruption (see International Monetary Fund 2002; World Bank 1997, 2004). The Washington consensus has been objectively challenged by Hopkin and Rodriguez-Pose (2007). Specifically, governments act as a grabbing hand only within a particular institutional structure (Di Tella and Schargrodsky 2003; Goel and Nelson 1998; Mauro 1998; Tanzi and Davoodi 1997) or in particular arenas (see the reviews in Kaufman 2003; Lambsdorff 2005; Svensson 2005). This paper presents an alternate view in which government intervention in China determines firms' access to credit in the absence of effective legal institutions.

This paper also contributes to the literature on corporate finance. To the best of our knowledge, we offer the first attempt to explore the micro effect of government intervention on a firm's formal financing, not to mention firms' access to credit. Many scholars of development economics or institutional economics study government structure (e.g., DiTella and Schargrodsky 2003; Van Rijckeghem and Weder 2001), but they overlook government intervention in formal economies. In particular, the effect of government intervention discussed in this paper can be generalized to all developing countries. For example, it helps explain the failure of the Russian government's economic reforms. The Russian government adopted radical reform policies in property rights protection but also lost control over its economic system. Accordingly, the new economic institutions and government fail to properly allocate Russian economic resources.

Section 2 designs a theoretical framework to explain government intervention as a helping hand in firms' financing. Section 3 explains our data and variables. Section 4 presents the model, and Section 5 reports our empirical results on the promotional effect of government intervention on firms' access to credit. Section 6 concludes.

2 Theoretical framework

2.1 Background: Financial intermediaries and firms

China's financial system consists of financial intermediaries,[2] stocks, bonds, and venture capital, but Chinese firms rely heavily on loans for financing. First, since its inception in 1992, China's stock market has grown rapidly, but the scale is still small relative to that of the banking sector (Allen et al. 2005). Second, the bond market has a much smaller scale than the banking sector. For example, the bond market raised $184.46 billion in 2005 (People's Bank of China 2006), whereas banking sector assets that year totaled $3.4 trillion. So, the value of bonds was only about 5% that of bank loans. If other financial intermediaries are included, the amount invested in the bond market would be much smaller than 5% of bank loans. Third, venture capital is negligible. That year, less than $2 billion in venture capital was invested in 233 Chinese mainland or mainland-related enterprises (Zero2ipo 2005); put differently, the value of venture capital is less than 0.1% of bank loans. In sum, equity, venture capital, and bonds are negligible sources of financing for firms in China, so their financing hinges on access to lending.

Moreover, all of China's financial intermediaries are controlled by the government in whole or in part. The government partially owns and fully manages the banking sector and other financial intermediaries (Ayyagari et al. 2010). The country has only "two nominally private banks, both [of which] are dominated by state shareholders and management" (Linton 2006: 4). Thus, government intervention can affect financial intermediaries' credit supply.

These two facts drive China's local governments to construct strategic alliances with financial intermediaries and firms (Wang 2007), which has two consequences. First, local governments have the power to affect firms' financing. Local governments have been empowered through three phases of administrative decentralization, one of which delegated to them administration over financial intermediaries and other organizations. Moreover, local governments have an incentive to facilitate firms' access to credit. Before 2012, every chief official in local government must achieve an economic growth target determined by the government department above it. Hence, investment facilitation is the most important goal of local government. One illustrative clue is that banks are under so much pressure from local governments to support investments that 30–40% of bank loans were nonperforming (Economist Intelligence Unit 2006).

Second, financial intermediaries are willing to support investments that involve government intervention because in case of difficulties they are assured of being bailed out by the local government. In the entire history of the People Republic of China, only one bank has been permitted to go bankrupt. Thus, financial intermediaries undertake no business risk due to government intervention. For these reasons, local governments, firms, and financial intermediaries have mutual incentives with respect to the extension of loans; in effect, a

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[2] Financial intermediaries are also called financial institutions. Note that "institutions" as in "financial institutions" differ from "institutions" as in "economic institutions." The former mean intermediaries as organizations; the latter involve an abstract structure for property rights protection and contract enforcement. To avoid expository confusion, we use "financial intermediaries" instead of "financial institutions"; we only use "institutions" to mean "economic institutions."

strategic alliance among these three parties is generated through the mechanism of government intervention.

2.2 Theoretical effects and hypotheses

Through this alliance, government intervention promotes firms' access to credit in the following way. First, local governments contribute "critical inputs" (Byrd 1990; Chang and Wang 1994; Naughton 1992, 1994) such that government intervention reduces the financial cost of firms, thus firms will seek government intervention to gain access to credit.

Second, government intervention can also effectively limit the financial cost in a broad sense because it reduces ex ante and ex post uncertainty. As Cai et al. (2011) point out, government intervention functions as not only "protection money" but also "grease money." Some components of grease money can have substantial returns on firms' productivity (Cai et al. 2011) because it is paid for with the firms' financing. The "protection money" also provides a helping hand because government intervention limits predatory behaviors by the state (Che and Qian 1998). If government intervention did not offer a helping hand, firms would not seek rent via the government (e.g., Congleton et al. 2008; Tollison 2012).

Third, government intervention can directly allocate resources when legal institutions are underdeveloped. Because government intervention can correct and prevent market imperfections (e.g., Che 2005; Pigou 1938), it functions powerfully as a visible hand in economic actions. As a clear sign, the size of state-owned enterprises rapidly and continuously expanded after the fiscal decentralization empowering local governments to control financial intermediaries (Oi 1992, 1999; Qian and Weingast 1996; Wong 1992). Based on the foregoing, we posit the following hypothesis.

Hypothesis 1: Government intervention enables firms' access to credit.

We distinguish between real access to credit and the ability of a firm to obtain access to credit. Real access is indicated by the existence of loans to a firm from financial intermediaries, whereas the ability to access is inversely reflected by the ratio of collateral required for loans. A higher collateral ratio is required when a firm has a lower ability (or potential) to obtain access to loans.

Hypothesis 1.1: Government intervention increases the probability of real access to loans.

Hypothesis 1.2: Government intervention reduces the ratio of collateral for potential loans.

To further reveal the mechanism of government intervention, we need to investigate the effect of government intervention on a firm's performance. Given the importance to firms of access to credit (Allen et al. 2005; Ayyagari et al. 2010), we expect to find a positive relationship between government intervention and firm profit.

Hypothesis 2: Government intervention facilitates profit for firms.

Moreover, considering that government intervention reduces firms' financial cost, whether narrowly or broadly, it should help firms to access credit and then to generate better performance than other similar firms without that access.

Hypothesis 3: Government intervention enables profit for firms through facilitating their access to credit.

Hypotheses 1 predicts a causal effect of government intervention on firms' access to credit. We also propose Hypotheses 2–3, and these three hypotheses together provide a coherent theory of the government intervention mechanism. In other words, Hypotheses 1–3 examine whether access to credit is a significant mediating variable for the promotional effect of government intervention on firm profit. Thus, we posit aggregate hypotheses as follows.

Aggregate Hypothesis 1: Firms' access to credit positively mediates the promotional effect of government intervention on firms' profit.

Aggregate Hypothesis 1.1: The existence of loans positively mediates the promotional effect of government intervention on firms' profit.

Aggregate Hypothesis 1.2: The collateral ratio for potential loans negatively mediates the promotional effect of government intervention on firms' profit.

3   Data and variables

The data on Chinese firms come from the World Bank Investment Climate Survey, undertaken in 2005.[3] The survey samples come from the universe of registered businesses and follow a stratified random sampling methodology. The survey comprises 12,400 firms located across 120 cities in 30 provinces. The firms surveyed are in 30 types of manufacturing industries. All variables are updated to 2004. The descriptive statistics and the correlation matrix for the main variables are reported in Tables 1–2, respectively.

Tibet, Hong Kong, Macao, and Taiwan are excluded from the survey, which is desirable because the institutional backgrounds in those areas are clearly different from those in the provinces surveyed. Moreover, the survey undertaken by the World Bank comprises the non-agricultural economy of firms with at least five employees and positive levels of private ownership. Thus, the survey is conducted to cover all firms of different sizes (small, medium-size, and large). Furthermore, the survey data cover all of China's manufacturing industries and large cities. In particular, the large cities are selected on the basis of the number of establishments, contribution to employment, and value added.

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[3] The World Bank also provides other similar surveys, but we use the survey dataset in 2005 because it provides information on the standard measure of government intervention. For example, the survey provides information on government intervention for public security instead of business affairs, so, we can use it as an instrument. Moreover, China's investment climate behind the survey can be clearly identified. As Section 2.1 describes, we show that all capital sources except financial loans are negligible for firm samples in the survey.

Table 1: Descriptive statistics

	Observations	Mean	Std. Dec.	Min	Max
Financial loans (dummy)	12,398	0.6	0.49	0	1
Collateral ratio	12,400	5.494	4.507	0	10
Government intervention	12,265	2.567	1.272	1	8
Firm age	12,400	2.128	0.88	0.693	4.934
Firm size	12,395	5.553	1.491	0	11.7
Export dummy	12,400	0.377	0.485	0	1
State shares	12,400	0.134	0.316	0	1
Foreign shares	12,400	0.146	0.317	0	1
Government-appointed CEO	12,400	0.118	0.322	0	1
CEO's education	12,386	5.578	0.998	1	7
CEO's tenure	12,384	1.591	0.754	0	4.025

Table 2: Correlation matrix

	Financial loans (dummy)	Collateral ratio	Government intervention	Firm age	Firm size	Export dummy	State shares	Foreign shares	Gov.-appointed CEO	CEO education	CEO's tenure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	1										
(2)	-0.744	1									
(3)	0.046	-0.036	1								
(4)	0.080	-0.042	0.043	1							
(5)	0.284	-0.185	0.077	0.301	1						
(6)	0.163	-0.099	0.003	0.050	0.358	1					
(7)	-0.007	0.026	0.053	0.334	0.235	-0.029	1				
(8)	-0.046	0.095	-0.029	-0.066	0.114	0.343	-0.146	1			
(9)	-0.020	0.022	0.054	0.297	0.160	-0.045	0.437	-0.132	1		
(10)	0.102	-0.049	0.050	0.082	0.348	0.181	0.159	0.170	0.058	1	
(11)	0.049	-0.050	-0.004	0.167	-0.079	0.016	-0.110	-0.064	0.017	-0.166	1

We admit that the specific year of the data does not precisely represent the most recent period, but it should demonstrate the same trends. The Chinese government has strongly resisted American pressure not to deregulate its financial system, which it still controls. Hence, the findings from the data used are still applicable to the most recent period. Given that governments in most countries have an important role to play in promoting well-functioning financial systems (Demirgüç-Kunt, 2010), this paper should be able to offer some general insights on the potential promotion effect of government intervention on firms' access to credit. At least, the findings can be used as a yardstick for future empirical studies to compare the experience of China in the 2000s with that of other countries.

3.1 Access to credit (dependent variable)

We construct a dummy variable to measure whether a firm has access to credit. The dummy variable is based on the manager's response to the question: "Does your company have loans from banks or other financial institutions [i.e., intermediaries]?" This dummy directly measures a firm's real access to credit (e.g., Ayyagari et al. 2010; Cull et al. 2015).

Alternatively, we use the ratio of collateral value (relative to a potential loan) to measure the ability of a firm to obtain access to credit. Specifically, the survey inquires about the percentage of the total loan that represents the collateral value. Hence, we can directly obtain the ratio of collateral to a loan. The collateral ratio inversely reflects the trustworthiness of the firm according to financial intermediaries. As Hypothesis 1.2 suggests, the collateral ratio should negatively relate to government intervention.

In a comparison between these two variables, the dummy of loans objectively reflects real access to finance, whereas the collateral ratio inversely indicates the ability of the surveyed firm to obtain access to credit.

3.2 Government intervention (variable of interest)

The variable of interest is government intervention. It is captured by the manager's response to the question: "How many days per month does the GM (general manager) or deputy GM spend on government assignments and communications [related to business affairs]?" The respondent can select one of eight responses: (1) 1 day, (2) 2–3 days, (3) 4–5 days, (4) 6–8 days, (5) 9–12 days, (6) 13–16 days, (7) 17–20 days, or (8) $\geq$ 21 days. In particular, the standard approach in the microeconomic literature is to use the interaction days of general manager to measure government intervention (see Du et al., 2008).

The question may be designed to measure the regulatory and administrative burden, but regulatory and administrative assignments are part of government intervention. According to recent property rights economics, government intervention weakens incentives and entrepreneurship in the firm's operation and growth (Hart et al., 1997). The interaction due to regulatory and administrative assignments theoretically reduces entrepreneurial effort and rights per se; thus, it is in principle government intervention. This paper shows that this seemingly negative interaction can create opportunities for firms to seek government support.

We use a general measure of government intervention. If we measure specific government interventions in access to finance, it will significantly reduce the importance of the research. In my view, it is not necessary to study the effect of a specific government intervention in access to finance. Additionally, general government intervention can reduce the endogeneity bias.

To save space, we report only the top ten and bottom ten cities with government intervention and access to credit, respectively. As Table 3 shows, in the top ten cities, government intervention reaches around rank 3, whereas the dummy for loans equals almost 1 and the collateral ratio is at least 7.387. However, in the bottom ten cities, government intervention reaches only rank 1 or 2. Similarly, the dummy for loans is available for less than 40% of firms and the collateral ratio is only 2 or 3. Simply put, Table 3 demonstrates that government intervention and access to credit vary greatly across cities in China.

Table 3: Top/bottom ten cities for government intervention or access to credit

Top 10 cities								
Government intervention			Financial loans			Collateral ratio		
City	Mean	Std.	City	Mean	Std.	City	Mean	Std.
Nanyang	3.160	0.140	Zibo	0.92	0.027	Daqing	8.780	0.306
Lanzhou	3.060	0.159	Jinhua	0.89	0.031	Zhuhai	8.366	0.351
Datong	3.020	0.150	Linyi	0.87	0.034	Haikou	8.120	0.367
Harbin	2.980	0.166	Ningbo	0.87	0.034	Benxi	81	0.374
Wenzhou	2.980	0.139	Jiaxing	0.85	0.036	Huhehot	7.975	0.384
Xining	2.980	0.144	Huzhou	0.84	0.037	Shenzhen	7.864	0.393
Tianshui	2.970	0.154	Hangzhou	0.82	0.039	Datong	7.690	0.382
Jiangmen	2.949	0.176	Shaoxing	0.82	0.039	Dongguan	7.587	0.401
Hengyang	2.940	0.125	Leshan	0.81	0.039	Changchun	7.555	0.395
Xi'an	2.940	0.143	Taizhou	0.81	0.039	Fushun	7.394	0.410
Bottom 10 Cities								
Government intervention			Financial loans			Collateral ratio		
City	Mean	Std.	City	Mean	Std.	City	Mean	Std.
Hangzhou	1.133	0.034	Daqing	0.190	0.039	Linyi	2.155	0.321
Shangrao	1.370	0.051	Zhuhai	0.293	0.046	Zibo	2.401	0.334
Jiujiang	1.760	0.074	Benxi	0.306	0.047	Shaoxing	2.925	0.383
Changzhou	1.949	0.100	Datong	0.330	0.047	Jinhua	2.951	0.355
Wuhu	2.020	0.079	Urumqi	0.337	0.048	Leshan	3.034	0.355
Changchun	2.050	0.076	Jilin	0.340	0.048	Taizhou	3.042	0.385
Shantou	2.051	0.103	Dongguan	0.343	0.048	Jiaxing	3.076	0.404
Langfang	2.071	0.103	Haikou	0.365	0.049	Huzhou	3.204	0.376
Shangqiu	2.100	0.092	Huhehot	0.365	0.049	Yantai	3.583	0.413
Yangzhou	2.141	0.096	Shenzhen	0.368	0.050	Nantong	3.656	0.420

Comparing Table 3 with Table 1, we find little firm heterogeneity at the city level. Table 1 shows that the largest value of government intervention is 8, but the largest value of government intervention at the city level (in Table 3) is only 3.16. Similarly, the maximum value of the dummy for loans (or collateral ratio) is 1 (or 10) across firms, but the variable of access to credit at the city level is at most 0.92 (or 8.771). Therefore, individual firm properties are not negligible, which also motivates us to including the following control variables.

3.3   Control variables

We include two types of control variables, firm characteristics and CEO characteristics.[4] With respect to firm characteristics, we first control for firm age. The survey provides the

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[4] We do not control for other relevant variables, such as firm leverage with consideration of the endogeneity issue. Including firm leverage tends to enlarge R2, but it will also enlarge the potential endogeneity bias. For one thing, we select to undertake the variable-omitting issue that tends to be mitigated by the city- and industry-fixed effects. For another, IV (instrumental variable) estimation can effectively reduce the endogeneity bias. Hence, we mainly control for relatively exogenous and relevant variables to avoid inducing the bad-control issue (see Angrist and Pischke, 2008).

establishment year of the firm, so we can obtain the firm age in 2004. Second, we use the log of total income to control for firm size, as other scholars (e.g., Cai et al. 2011; Lin et al. 2010) have done. In particular, we select the total income value in 2003 to reduce potential reverse causality. Third, we also control for whether the firm has export sales and the ratio of the state share to the foreign share in the ownership structure. Export firms tend to benefit from preferential policies and then have better access to credit. The state share represents the firm's relationship with the government in terms of receiving benefits (Cull et al. 2015), whereas the foreign share can indicate benefiting from a preferential government policy (Lemoine 2000). However, these two ratio variables can also be negatively related to access to credit because a firm with a state share or a foreign share can rely more on informal financing, such as trade credit, because of government support (Ayyagari et al. 2010).

With respect to CEO characteristics, we design three variables. First, we control for whether the CEO is appointed by the government. A firm with a government-appointed CEO can also strategically use informal financing to rely less on access to credit thanks to its close government ties. Moreover, we control for the education and tenure of the CEO, respectively. These three characteristics should be beneficial to firm access to credit and to firm performance because they create social capital for firms and thus aid them in gaining support (Narayan et al. 2000; World Bank 1998).

4   The model

We test the relationship between government intervention and a firm's access to credit by estimating the following equation:

$$Pr(AC_i = 1) = aGI_i + bZ_i + city_i + industry_i + e_i \tag{1}$$

where AC refers to access to credit, specifically the dummy for loans or the collateral ratio, GI is government intervention, and Z_i represents the matrix of control variables. We use the probit method to regress the dummy for loans and the Tobit method to regress the collateral ratio, which has no negative values. To reduce the potential for omitted variables, we also control for city- and industry-fixed effects. We estimate Equation (1) using two types of standard errors. First, we use robust standard errors to avoid the heterogeneity issue. Second, we use cluster standard errors to reduce the heterogeneity issue across different firm groups. Considering that we have controlled for the city-fixed effect, we control for cluster standard errors at the county level.

Despite the issue of omitted variables, we admit the coefficient of interest may be biased by potential reverse causality. We use the IV (instrumental variable) probit method (Rivers and Vuong 1988) or IV Tobit method to estimate the following equations.

$$Pr(FA_i = 1) = a\widehat{GI_i} + bX_i + city_i + industry_i + e_i \tag{2}$$

$$\widehat{GI_i} = cGIPS_i + dX_i + city_i + industry_i + e_i \tag{3}$$

$\widehat{GI}_i$ in Equation (2) is the fitted value of GI_i, which is estimated from Equation (3). $GIPS$ in Equation (3) is government intervention in public security matters.[5] For expository convenience, we call it "public security intervention." The investment climate survey asks the firm manager how many days the firm needs to spend on interaction with the government regarding public security matters. We use the response to measure public security intervention. According to our definition, $GIPS$ is positively related to government intervention (GI). The former reflects government intervention in public security matters while the latter indicates general government intervention. Moreover, $GIPS$ is irrelevant for loans between firms and financial intermediaries. Thus, $GIPS$ can be a suitable IV for GI. In IV estimations, we also use robust standard errors or cluster standard errors.

Our data show that only 5% of the firms in our sample (11,718 observations) were not inspected in 2004. Hence, it is normal for a firm to be inspected for public security reasons. Given the pervasive public security intervention, it is impractical for banks to take it into account in supplying credit. Put differently, public security intervention should be irrelevant to financial intermediaries' decisions on supplying credit.

Moreover, even when our IV is imperfectly exogenous, we can refer to our reduced-form estimates and IV estimates to justify that our IV estimates are robust. Assuming that our IV (public security intervention) has a direct effect on access to credit with the coefficient ϑ. Conley et al. (2012) show how one can obtain consistent estimates of the effect of interest (a in Equation (2)) if ϑ is known. Applying Conley et al. (2012), the first finding is that when a in Equation (2) and ϑ are both positive or negative, the bounds on the strength of a in Equation (2) are actually further from zero (i.e., a stronger effect) than the IV estimate of a (see Nunn and Wantchekon, 2011). Put differently, if both the coefficient of our IV in our reduced-form estimations and the coefficient of interest in our IV estimations are significantly positive (or negative), the IV coefficient provides an underestimate of the true effect (in absolute value) of government intervention on access to credit. Therefore, our IV estimates are robust to the potentially endogeneity bias even when our IV is endogenous to generate a direct effect on the dependent variable as our variable of interest does, which we will show.

To test Hypothesis 2, we first estimate the following equation.

$$Pr(Mprofit_i = 1) = \alpha GI_i + \beta X_i + city_i + industry_i + e_i. \tag{4}$$

Considering the clear reverse causality between firm profit and government intervention, we then estimate the following equation with an IV.

$$Pr(Mprofit_i = 1) = \alpha \widehat{GI}_i + \beta X_i + city_i + industry_i + e_i \tag{4'}$$

where $\widehat{GI}_i$ is fitted with the variable $GIPS_i$ according to Equation (3); $Mprofit$ is an indicator reflecting that the firm's per capita profit is larger than the median value of a firm's per capita profits in the same city and industry. As a reference, we also use the indicator that firm profit is not smaller than the median value. Specifically, $Mprofit$ is defined as follows.

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[5] The Chinese government asserts that stability is a principle of overriding importance, so local governments need to visit or contact firm managers regarding public security matters. The survey investigates how many days governments intervened in 2004 on public security matters.

$$Mprofit_i = \begin{cases} 1, iff \ per \ capita \ profit_{i,j,k} \geq median(per \ capita \ profit_{j,k}) \\ 0, otherwise; \end{cases},$$

or

$$Mprofit_i = \begin{cases} 1, iff \ per \ capita \ profit_{i,j,k} > median(per \ capita \ profit_{j,k}) \\ 0, otherwise; \end{cases}.$$

where i, j, k represents a firm, city, and industry, respectively. For later regressions, our dependent variable is the profit dummy, $Mprofit$. Considering that the mean value may be biased by data skewness, we select the median value instead of the mean value as a benchmark in the definition of $Mprofit$. In these estimations, we also use robust standard errors or cluster standard errors.

To test Hypothesis 3, this section examines whether government intervention has an indirect promotional effect on a firm's profit through the firm's access to credit. Considering that Equations (1) and (4) have tested the effect of government intervention on access to credit and profit, we only need to examine whether access to credit significantly explains profit with government intervention included in the regression. Specifically, we use a probit (or Tobit) estimator[6] to estimate Equation (5).

$$Pr(Mprofit_i = 1) = \gamma GI_i + \delta AC_i + \theta X_i + city_i + industry_i + e_i \tag{5}$$

where AC_i is the variable of access to credit (the dummy for loans or the collateral ratio) and GI_i is government intervention. We use robust standard errors or cluster standard errors as before. The significance of the mediator variable requires that, first, despite a in Equation (1) and α in Equation (4), δ in Equation (5) is significant; second, a in Equation (2) and γ in Equation (5) are different.

To objectively measure the significance of the difference between a in Equation (2) and γ in Equation (5), we refer to z-tests in the frameworks of Baron and Kenny (1986), Goodman (1960), and Sobel (1982), respectively.

$$z_1 = \frac{me_a * me_\delta}{\sqrt{(me_\delta)^2 * (S_a)^2 + (me_a)^2 * (S_\delta)^2 + (S_a)^2 * (S_\delta)^2}} \tag{6}$$

$$z_2 = \frac{me_a * me_\delta}{\sqrt{(me_\delta)^2 * (S_a)^2 + (me_a)^2 * (S_\delta)^2 - (S_a)^2 * (S_\delta)^2}} \tag{7}$$

$$z_3 = \frac{me_a * me_\delta}{\sqrt{(me_\delta)^2 * (S_a)^2 + (me_a)^2 * (S_\delta)^2}} \tag{8}$$

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[6] Because IV estimates cannot ensure the precise size of coefficients, the endogeneity issue is of no less importance in the mediation model. Above all, the significance of the mediation effect depends on the coefficient change that emerges after the mediator is included. Thus, it is not necessary or meaningful to deal with the endogeneity issue in the mediation effect model. However, the IV estimates also support the significance of access to credit in this paper and are available from the authors upon request.

where me_a is the marginal effect of government intervention at its average value and me_δ is the marginal effect of access to credit at its average value (i.e., average partial effect; see Wooldridge 2002). S_a and S_δ are the standard deviation of government intervention and access to credit, respectively.

Because the probit (or Tobit) method used in Equations (2), (4), and (5) follows the maximum likelihood estimator, the inclusion of the mediator variable AC will alter the coefficient of GI. The change in GI coefficients includes differences in effects and differences in scale parameters. To exclude the difference due to the rescaling problem, we adopt average partial effects to calculate the z-test score as Woodridge (2002) suggests.

5   Results and implications

5.1   Government intervention and access to credit

We report baseline estimates for Equation (1) in Table 4. As Table 4 shows, the coefficient of government intervention is positively (or negatively) related to the dummy for loans (or the collateral ratio). In particular, the coefficient is highly significant at the 1% level. This finding confirms Hypotheses 1.1 and 1.2, thereby supporting Hypothesis 1.

Moreover, all coefficients of control variables are significant except firm age. Among the significant control variables, the state share, the foreign share, and government appointment of the CEO are negatively (or positively) related to the dummy of loans (or collateral ratio); the others are positively (or negatively) associated with the dummy for loans (or collateral ratio). The corresponding signs associated with the dummy or loans are the opposite of the one for the collateral ratio. The opposite signs are also expected. The negative (or positive) coefficients of the state share, the foreign share, and having a government-appointed CEO reflect that these three variables raise the probability that firms will have real loans and reduce the collateral ratio for potential loans, respectively. Generally speaking, these three variables constrain firms' access to credit.

To deal with the endogeneity issue, we conduct IV estimations according to Equations (2)–(3). We report first-stage estimates in Columns 1–2 in Table 5; to offer additional insight, we also report reduced-form estimates in Columns 3–4 in Table 5.

As Columns 1-2 in Table 5 show, the coefficient of public security intervention is positively and significantly related to government intervention. The *p*-value of the chi-square test is zero, which indicates that data for the first-stage estimates have a good fit. Reduced-form estimates (Columns 3-6 in Table 5) show that public security intervention has a strong positive (negative) relationship with the dummy for loans (or the collateral ratio). Both the first-stage and reduced-form estimates are stable across the various specifications.

We reports second-stage estimates in Table 6. As Table 6 shows, the coefficient of government intervention is significant in an IV framework. As found earlier, government intervention is positively related to the dummy for loans and negatively associated with the collateral ratio, respectively. Moreover, all coefficients obtain the same signs as in Table 4. Simply speaking, our IV estimates have the same findings as the basic estimates in Table 4.

Furthermore, our IV estimations report a positive (or negative) coefficient for government intervention (see Table 6) as our reduced-form estimations do for the coefficient of our IV (see Columns 3–6 of Table 5). Thus, applying Conley et al. (2012)'s plausible exogeneity theory, we can find that our IV estimates tend to underestimate the true effect of government intervention on access to credit in the absolute value. Hence, our IV estimates should be robust to potentially endogenous bias even when our IV is not perfectly exogenous.

Table 4: Basic estimates for Hypothesis 1 (government intervention and access to credit)

Hypothesis (sign):	Hypothesis 1.1 (+)		Hypothesis 1.2 (−)	
Access to credit	Financial loans		Collateral ratio	
Method	Probit		Tobit	
Column	(1)	(2)	(3)	(4)
Government intervention	0.039***	0.039***	-0.100***	-0.100***
	(0.010)	(0.010)	(0.031)	(0.032)
Firm age	0.026	0.026	-0.007	-0.007
	(0.016)	(0.016)	(0.051)	(0.052)
Firm size	0.275***	0.275***	-0.559***	-0.559***
	(0.011)	(0.013)	(0.032)	(0.036)
Export	0.246***	0.246***	-0.516***	-0.516***
	(0.031)	(0.032)	(0.095)	(0.098)
State shares	-0.241***	-0.241***	0.646***	0.646***
	(0.047)	(0.049)	(0.147)	(0.154)
Foreign shares	-0.418***	-0.418***	1.616***	1.616***
	(0.048)	(0.055)	(0.151)	(0.175)
Gov.-appointed CEO	-0.203***	-0.203***	0.484***	0.484***
	(0.044)	(0.043)	(0.136)	(0.134)
CEO education	0.074***	0.074***	-0.213***	-0.213***
	(0.014)	(0.015)	(0.044)	(0.046)
CEO tenure	0.096***	0.096***	-0.199***	-0.199***
	(0.017)	(0.017)	(0.054)	(0.054)
Constant	-1.383***	-1.383***	8.618***	8.618***
	(0.163)	(0.182)	(0.537)	(0.679)
City	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Std. Err.	Robust	Clustered[#]	Robust	Clustered[#]
R^2	0.146	0.146	0.025	0.025
N	12,244	12,244	12,246	12,246

We capture access to credit with financial loans or collateral ratio, which are the dependent variables. The former (Columns 1–2) is measured by whether the surveyed firm has loans from banks or other financial intermediaries. The latter (Columns 3–4) is measured by the ratio of the potential collateral relative to the loans obtained from financial intermediaries. The variable of interest is government intervention (in business affairs), reflected by days the general manager or the deputy general manager spends on government assignments and communications per month. Despite control variables, we also control for city and industry fixed effects. With each estimation method, we use robust standard errors or clustered standard errors. Standard errors of estimate are given in parentheses. *, **, and *** significant at the 10%, 5%, and 1% level, respectively. # Considering that we have controlled for city-fixed effects, we control for the cluster standard errors at the level of county.

Table 5: First-stage and reduced-form estimates for Hypothesis 1
(with public security intervention as the IV)

Dependent var.	First-stage estimates		Reduced-form estimates			
	Government intervention		Financial loans		Collateral ratio	
Method	Ordered logit		Probit		Tobit	
	(1)	(2)	(3)	(4)	(5)	(6)
Public security intervention	0.007***	0.007***	0.003***	0.003***	-0.183***	-0.183***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.042)	(0.042)
Firm age	0.007	0.007	0.021	0.021	0.007	0.007
	(0.023)	(0.024)	(0.017)	(0.017)	(0.052)	(0.054)
Firm size	0.083***	0.083***	0.269***	0.269***	-0.530***	-0.530***
	(0.015)	(0.016)	(0.012)	(0.013)	(0.034)	(0.038)
Export	-0.021	-0.021	0.239***	0.239***	-0.463***	-0.463***
	(0.042)	(0.042)	(0.031)	(0.033)	(0.096)	(0.101)
State share	-0.021	-0.021	-0.241***	-0.241***	0.658***	0.658***
	(0.067)	(0.071)	(0.048)	(0.050)	(0.150)	(0.158)
Foreign share	-0.128*	-0.128*	-0.435***	-0.435***	1.670***	1.670***
	(0.070)	(0.074)	(0.050)	(0.055)	(0.155)	(0.172)
Gov.-appointed CEO	0.063	0.063	-0.210***	-0.210***	0.505***	0.505***
	(0.062)	(0.064)	(0.044)	(0.044)	(0.138)	(0.137)
CEO education	0.048**	0.048**	0.072***	0.072***	-0.216***	-0.216***
	(0.020)	(0.021)	(0.015)	(0.016)	(0.045)	(0.048)
CEO tenure	0.026	0.026	0.099***	0.099***	-0.207***	-0.207***
	(0.024)	(0.025)	(0.018)	(0.018)	(0.055)	(0.055)
Constant	Yes	Yes	-1.271***	-1.271***	8.640***	8.640***
			(0.167)	(0.190)	(0.544)	(0.674)
City	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Std. Err.	Robust	Clustered#	Robust	Clustered#	Robust	Clustered#
Prob>chi2	0.000	0.000				
R^2	0.031	0.031	0.143	0.143	0.025	0. 025
N	11,594	11,594	11,697	11,697	11,699	11,699

The instrumental variable used in this regression is public security intervention. It is measured by days the firm needs to spend on the interaction with the government on public security matters (e.g., public security intervention). Government intervention (in business affairs) reflected by days the general manager or deputy general manager spends on government assignments and communications per month. Loans are measured by whether the surveyed firm has loans from banks or other financial intermediaries. Collateral ratio is measured by the ratio of the potential collateral relative to the loans obtained from financial intermediaries. For each estimation method, we use robust standard errors or cluster standard errors. Standard errors of estimate are given in parentheses. *, **, *** significant at the 10%, 5%, and 1% level, respectively. # Considering that we have controlled for city-fixed effects, we control the cluster standard errors at the level of county.

Table 6: Second-stage estimates for Hypothesis 1
(government intervention and access to credit)

Hypothesis (sign):	Hypothesis 1.1 (+)		Hypothesis 1.2 (−)	
Access to credit	Financial loans		Collateral ratio	
Method	Probit		Tobit	
Column	(1)	(2)	(3)	(4)
Government intervention	0.428***	0.428***	-1.223***	-1.223***
	(0.113)	(0.115)	(0.308)	(0.316)
Firm age	0.016	0.016	0.009	0.009
	(0.016)	(0.016)	(0.055)	(0.057)
Firm size	0.216***	0.216***	-0.490***	-0.490***
	(0.030)	(0.033)	(0.040)	(0.044)
Export	0.210***	0.210***	-0.482***	-0.482***
	(0.035)	(0.036)	(0.102)	(0.103)
State share	-0.213***	-0.213***	0.650***	0.650***
	(0.050)	(0.054)	(0.162)	(0.174)
Foreign share	-0.345***	-0.345***	1.552***	1.552***
	(0.063)	(0.068)	(0.166)	(0.188)
Gov.-appointed CEO	-0.202***	-0.202***	0.573***	0.573***
	(0.044)	(0.044)	(0.150)	(0.149)
CEO education	0.051***	0.051***	-0.176***	-0.176***
	(0.017)	(0.018)	(0.049)	(0.050)
CEO tenure	0.081***	0.081***	-0.184***	-0.184***
	(0.019)	(0.019)	(0.059)	(0.059)
Constant	-1.975***	-1.975***	10.917***	10.917***
	(0.200)	(0.218)	(0.836)	(0.943)
City	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Std. Err.	Robust	Clustered[#]	Robust	Clustered[#]
N	11,592	11,592	11,594	11,594

The instrumental variable used in this regression is public security intervention. It is measured by days the firm needs to spend on the interaction with the government for the public security matters (e.g., public security intervention). Government intervention (in business affairs) reflected by the number of days the general manager or deputy general manager spends on government assignments and communications per month. Loans are measured by whether the surveyed firm has loans from banks or other financial intermediaries. Collateral ratio is measured by the ratio of the potential collateral relative to loans obtained from financial intermediaries. For each estimation method, we use robust standard errors or clustered standard errors. Standard errors of estimate are given in parentheses. *, **, *** significant at the 10%, 5%, and 1% level, respectively. # Considering that we have controlled for city-fixed effects, we control the cluster standard errors at the level of county.

5.2   Government intervention and profit

To test Hypothesis 2, we conduct estimations according to Equation (4)' and report IV estimates[7] in Table 7. As Table 7 shows, the variable GI_i is positively and significantly related to the variable Mprofit across different specifications. This indicates that government intervention enables firms to obtain a sizable profit, which supports Hypothesis 2.

Moreover, all control variables are significant. Among these control variables, firm age, state share, and having a government-appointed CEO are negatively related to the profit probability (Mprofit), whereas the others are positively associated with the profit probability. In comparison to regressions in Table 6, all control variables have the same signs for profit and access to credit except firm age and the foreign share. These consistent signs indicate that these control variables have the same effects on profit and access to credit.

The difference in sign for firm age (or the foreign share) between Tables 6 and 7 is actually logical. First, an older firm has more social capital that it can use for access to external resources, but it has a weaker response to the external environment (e.g., Argyres and Silverman 2004) and tolerates poorer performance. Thus, an older firm has good access to credit even though it has low profit. Second, the foreign share allows some managerial advantages (e.g., Organization for Economic Cooperation and Development 2002; Shleifer and Vishny 1986) but creates disadvantages in terms of access to external finance (e.g., Linton 2006). That is why having a foreign share enlarges firms' profit but tends to constrain a firm's access to credit.

5.3   Government intervention, access to credit, and profit

To test Hypothesis 3, we conduct estimations according to Equation (5) and report the results in Table 8. As Table 8 shows, the coefficient of access to credit is highly significant. Moreover, the government intervention coefficient is still significant but changed after access to credit is controlled for. Furthermore, all control variables used in Table 7 are significant and obtain the same signs as in Table 8. This suggests that our estimates are highly robust.

To objectively identify the significance of the mediation effect of access to credit, we conduct z-tests using the frameworks of Baron and Kenny (1986), Goodman (1960), and Sobel (1982). We report the z-tests in Table 9. Panel A reports z-test results for the regressions under the Probit method, whereas Panel B presents z-test results for those under the Tobit method. As Table 9 shows, with each type of standard errors (robust or clustered), estimation method (Probit or Tobit), and z-test version, the z-test result is 1.960 or greater. Namely, all z-test results confirm that the mediator variable of access to credit is significant at least at the 5% level. Specifically, when access to credit is captured by the dummy for loans, significance reaches the 1% level, whereas significance still reaches 5% when access to credit is captured by the collateral ratio.

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[7] The estimation results based on Equation (4) are also available from the authors upon request. In particular, the estimates based on Equation (4) have the same findings as those based on Equation (4)'.

Table 7: Second-stage estimates (for government intervention and the profit dummy,
i.e., $Mprofit$; Hypothesis 2)

Definition of $Mprofit_i$	$Mprofit_i = 1, iff\ profit_{i,j,k}$ $\geq median(profit_{j,k})$		$Mprofit_i = 1, iff\ profit_{i,j,k}$ $> median(profit_{j,k})$	
Method	IVprobit			
Column	(1)	(2)	(3)	(4)
Government intervention	0.310***	0.310***	0.270**	0.270**
	(0.120)	(0.119)	(0.120)	(0.120)
Firm age	-0.063***	-0.063***	-0.069***	-0.069***
	(0.016)	(0.016)	(0.016)	(0.016)
Firm size	0.048***	0.048***	0.053***	0.053***
	(0.015)	(0.017)	(0.015)	(0.016)
Export	0.102***	0.102***	0.101***	0.101***
	(0.029)	(0.029)	(0.029)	(0.031)
State share	-0.249***	-0.249***	-0.298***	-0.298***
	(0.047)	(0.049)	(0.047)	(0.051)
Foreign share	0.265***	0.265***	0.302***	0.302***
	(0.047)	(0.052)	(0.047)	(0.051)
Gov.-appointed CEO	-0.221***	-0.221***	-0.228***	-0.228***
	(0.042)	(0.044)	(0.042)	(0.043)
CEO education	0.092***	0.092***	0.096***	0.096***
	(0.017)	(0.017)	(0.017)	(0.016)
CEO tenure	0.118***	0.118***	0.106***	0.106***
	(0.019)	(0.018)	(0.018)	(0.018)
Constant	-1.460***	-1.460***	-1.735***	-1.735***
	(0.293)	(0.286)	(0.283)	(0.267)
City	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Std. Err.	Robust	Clustered[#]	Robust	Clustered[#]
N	11,591	11,591	11,591	11,591

The dependent variable is the probability that a firm obtains a large profit, $Pr(Mprofit_i = 1)$. Put differently, the dependent variable reflects whether the firm's profit is larger (or not smaller) than the median one in the same district and city. The variable of interest is the variable of government intervention in general affairs. Considering that there is clear reverse causality between government intervention and firm profit, we adopt the IVProbit method. In particular, the instrumental variable is government intervention in public security matters (i.e., public security intervention). For these estimations, we use robust standard errors or clustered standard errors. Standard errors of estimate are given in parentheses. *, **, *** significant at the 10%, 5%, and 1% level, respectively. # Considering that we have controlled for city-fixed effects, we control the cluster standard errors at the level of county.

The findings in Tables 8 and 9 confirm that government intervention enables a firm's profit through the firm's access to credit (including the dummy for loans or the collateral ratio). Put differently, Hypothesis 3 is not rejected.

As mentioned earlier, our results confirm that government intervention causally and significantly facilitates a firm's access to credit and profit, respectively. We also document that government intervention has an indirect promotional effect on a firm's profit through the firm's

access to credit. In sum, our empirical findings jointly confirm that government intervention enables a firm's access to credit and then the firm's profit. Therefore, our results jointly support Aggregate Hypothesis 1.

Table 8: Estimates for mediation effects (for government intervention, access to credit and profit, i.e., $Mprofit$; Hypothesis 3)

Definition of $Mprofit_i$	$Mprofit_i = 1, iff\ profit_{i,j,k} \geq median(profit_{j,k})$				$Mprofit_i = 1, iff\ profit_{i,j,k} > median(profit_{j,k})$			
Access to credit	The dummy of financial loans		Collateral ratio		The dummy of financial loans		Collateral ratio	
Hypothesis (sign):	Hypothesis 3.1 (+)		Hypothesis 3.2 (−)		Hypothesis 3.1 (+)		Hypothesis 3.2 (−)	
Method	Probit		Tobit		Probit		Tobit	
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Access to credit	0.136***	0.136***	-0.009***	-0.009***	0.125***	0.125***	-0.010***	-0.010***
	(0.026)	(0.027)	(0.003)	(0.003)	(0.026)	(0.027)	(0.003)	(0.003)
Government intervention	-0.005	-0.005	-0.004	-0.004	-0.008	-0.008	-0.008	-0.008
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)	(0.009)	(0.010)
Firm age	-0.067***	-0.067***	-0.066***	-0.066***	-0.077***	-0.077***	-0.076***	-0.076***
	(0.015)	(0.016)	(0.015)	(0.016)	(0.015)	(0.016)	(0.015)	(0.016)
Firm size	0.057***	0.057***	0.063***	0.063***	0.057***	0.057***	0.063***	0.063***
	(0.010)	(0.011)	(0.010)	(0.011)	(0.010)	(0.011)	(0.010)	(0.011)
Export	0.105***	0.105***	0.111***	0.111***	0.106***	0.106***	0.110***	0.110***
	(0.029)	(0.030)	(0.029)	(0.029)	(0.029)	(0.031)	(0.029)	(0.031)
State share	-0.234***	-0.234***	-0.236***	-0.236***	-0.278***	-0.278***	-0.280***	-0.280***
	(0.044)	(0.045)	(0.044)	(0.045)	(0.044)	(0.045)	(0.044)	(0.045)
Foreign share	0.269***	0.269***	0.267***	0.267***	0.306***	0.306***	0.307***	0.307***
	(0.046)	(0.052)	(0.046)	(0.052)	(0.046)	(0.051)	(0.046)	(0.051)
Gov.-appointed CEO	-0.216***	-0.216***	-0.220***	-0.220***	-0.223***	-0.223***	-0.227***	-0.227***
	(0.041)	(0.044)	(0.041)	(0.044)	(0.042)	(0.043)	(0.042)	(0.043)
CEO education	0.111***	0.111***	0.112***	0.112***	0.111***	0.111***	0.111***	0.111***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
CEO tenure	0.131***	0.131***	0.132***	0.132***	0.114***	0.114***	0.116***	0.116***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Constant	-0.902***	-0.902***	-0.809***	-0.809***	-1.217***	-1.217***	-1.119***	-1.119***
	(0.200)	(0.186)	(0.201)	(0.189)	(0.200)	(0.166)	(0.202)	(0.169)
City	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Std. Err.	Robust	Clustered#	Robust	Clustered#	Robust	Clustered#	Robust	Clustered#
N	12,241	12,241	12, 243	12,243	12,241	12,241	12,243	12,243

The dependent variable is the probability that the firm obtains a large profit, $Pr(Mprofit_i = 1)$. Put differently, the dependent variable reflects whether the firm's profit is larger (or not smaller) than the median one in the same district and city. The variable of interest is government intervention. For these estimations, we use robust standard errors or clustered standard errors. Standard errors of estimate are given in parentheses. +, *, **, *** significance at the 15%, 10%, 5%, and 1% level, respectively. # Considering that we have controlled for city-fixed effects, we control for the cluster standard errors at the level of county.

Table 9: Z-test results for the mechanism from government intervention to profit through access to credit

Panel A: financial loans				
Definition of profit ($Mprofit$)	Standard errors	z-test results		
		z_1	z_2	z_3
$Mprofit_i = 1, if\, profit_{i,j,k}$ $\geq median(profit_{j,k})$	Robust standard errors	3.083***	3.120***	3.047***
	Cluster standard errors[#]	3.058***	3.097***	3.020***
$Mprofit_i = 1, if\, profit_{i,j,k}$ $> median(profit_{j,k})$	Robust standard errors	2.995***	3.035***	2.956***
	Cluster standard errors[#]	2.963***	3.005***	2.923***
Panel B：collateral ratio				
$Mprofit_i = 1, if\, profit_{i,j,k}$ $\geq median(profit_{j,k})$	Robust standard errors	2.327**	2.383**	2.276**
	Cluster standard errors[#]	2.307**	2.363**	2.255**
$Mprofit_i = 1, if\, profit_{i,j,k}$ $> median(profit_{j,k})$	Robust standard errors	2.387**	2.440**	2.337**
	Cluster standard errors[#]	2.377**	2.430**	2.327**

In the definition of $Mprofit$, i, j, k represents firm, city and industry, respectively. Z-tests for mediator effects are in the framework of Baron and Kenny (1986), Goodman (1960) and Sobel (1982). Considering that our estimation is of Probit (or Tobit) method that follows the maximum likelihood estimator, we use marginal effect of the variables at their average values in calculating the z-test results. Our previous estimations use different definitions of firm profit dummy and different types of standard errors and different estimation methods; we report z-tests for all estimation specifications. The significance at the 5% and 1% level requires z-test results to be larger than 1.960 and 2.576, respectively. # Considering that we have controlled for city-fixed effects, we control for cluster standard errors at the level of county.

6   Conclusions

The existing literature suggests that economic institutions determine the allocation of resources in economic growth. As an important counterexample, China has the largest and one of the world's most rapidly growing economies, but its legal and financial systems are underdeveloped. This paper explored what determines firms' access to credit in countries whose legal and financial systems are underdeveloped.

Using evidence from China, we first confirm the causality between government intervention and firms' access to credit. The correlation between government intervention and access to credit may be affected by the endogeneity bias, but our results are still robust after using an exogenous IV to remove this potential bias. Specifically, our IV estimates confirm that government intervention increases the probability that a firm will obtain high profit per capita relative to other firms in the same industry and city. Third, our estimates show that government intervention has an indirect effect on firms' profit through their access to credit. In particular, all these results are also robust to different types of standard errors and different estimation methods. Ultimately, our evidence confirms that government intervention enables firms' access to credit and then further enables the firms to obtain large profits.

Given that the Chinese government controls the country's financial system and that this paper finds a causal effect of government intervention on access to credit, this paper identifies what determines firms' access to credit in the absence of effective institutions. Although government intervention has a more or less positive effect on firms' operation or growth, it is theoretically meaningful to investigate the effect of government intervention on firms' access to

credit. In principle, the government does not need to act as a helping hand; it only has to refrain from fully expropriating a firm's economic profit. Whether government intervention helps firms to access credit (as a financial resource) is institutionally important. The traditional institutional economics posits that government intervention weakens entrepreneurship (e.g., Hart et al., 1997), but this paper confirms that, in some cases, as in the case of China, it promotes firms' access to credit and then enlarges the firms' profits.

Moreover, this paper offers significant insights for developing countries. In the spirit of pecking-order theory (Leary and Robert 2005), access to credit is critical for firms in developing countries. Hence, this paper suggests that governments in developing countries can design incentive programs to improve firms' access to credit when their economic institutions are underdeveloped. In particular, this paper does not provide direct evidence of the effect of government intervention on efficiency. Specifically, it only confirms that government intervention promotes a firm's access to credit and then boosts profits. However, this finding does not prevent us from explaining real conditions. In most developing countries, if economic institutions are ineffective and government intervention is also absent, then firms obtain less credit and undertake higher transaction costs. In that situation, it is not evident how credit will be allocated, but a larger ratio of rent related to the accessed finance must be dissipated (Cheung, 1974). In fact, China and Russia are cases of contrast. Whereas China has developed a profitable investment climate with government intervention, as this paper suggests, Russia experienced economic chaos in the absence of an effective government-intervention regime. Therefore, this paper suggests that developing countries consider the option of government intervention to help expand access to credit.

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