Government Intervention in the Credit Allocation Process and Leverage Dynamics: Evidence from China

Qiong Wang
Southeast University
qiongwang@seu.edu.cn

Hanwen Sun*
University of Bath
h.sun@bath.ac.uk

Guochao Yang
Zhongnan University of Economics and Law
yangguochao@zuel.edu.cn

ABSTRACT

We study how government intervention in the bank loan granting process affects firms' leverage dynamics. We exploit the setup of administrative approval centers (AACs) in China, a program aiming to reduce bureaucracy in business activities, as a quasi-natural experiment. On average, AACs help to shorten the leverage rebalancing period by as much as a quarter. This acceleration pattern persists in under-leveraged firms, which issue more debt to rebalance accordingly. Cross-sectional analyses show that the positive effect of AACs on leverage adjustment is more pronounced for firms that are in poorer legal environment, with more financial constraints, or less politically connected.

Keywords: Government intervention; Bank loans; Leverage dynamics; Speed of adjustment; Bureaucracy

JEL Classification: G38, G32

* Corresponding author. All remaining errors are our own.

I. Introduction

Over the years, as the role of government and its relationship to the markets has been refined through experience, it must be acknowledged that government agencies perform important functions in protecting investors, maintaining fair and orderly markets, and promoting capital formation. At the same time, it is well recognized that excessive government intervention in financial markets has detrimental effects on financial development, sometimes referred to as financial repression, given that graft, bribery, unnecessary bureaucracy, and other forms of financial corruption by government are an unfortunate fact throughout the world. Thus, the role of government in the financial sector remains the subject of continuing controversy. To provide new insights on this debate, in this paper, we investigate how government intervention in the credit allocation process shapes firms' leverage dynamics.

Understanding a firm's optimal capital structure, and how quickly it approaches these targets when deviating, are equally important because leverage and its dynamics jointly determine a firm's value (e.g., Leary and Roberts, 2005; Faulkender *et al.*, 2012; Demarzo and He, 2021). Previous studies on leverage dynamics suggest that firms do have optimal target leverage ratios, but that the speed with which their targets are reached are impeded by adjustment costs.[1] While prior research has clearly shown that certain firm-level factors and/or characteristics are associated with the costs and speed of adjustment, we have little understanding of how a firm's leverage dynamics are shaped by government intervention in the financial market.

Potentially, this question can be even more important in emerging economies, where government frequently plays a significant role in the allocation of credit. To the extent that government intervention in the credit allocation process affects firms' access to debt financing in terms of cost and efficiency, will the speed of leverage adjustment be unexpectedly slower in such circumstances? From a policymaking perspective, does

[1] In the absence of adjustment costs, firms can continuously rebalance their capital structure, whereas with such costs, particularly if the costs of such adjustments outweigh the benefits, firms will wait to recapitalize, resulting in "extended excursions away from their targets" (Myers, 1984). See Myers (1984), Myers and Majluf (1984), Fama and French (2002), Leary and Roberts (2005), Flannery and Rangan (2006), Strebulaev (2007), Morellec *et al.* (2012), and Halling *et al.* (2016).

enhanced government efficiency in this area facilitate firms' rebalancing process and what are the implications for firm value?

While government intervention in economic activity is by no means unique to China, the Chinese setting is particularly interesting for our research question. On the one hand, in China, the administrative approval system is a means of government intervention in the market to maintain alignment with a system that still bears aspects of a planned economy, manifested by the need for firms to obtain approval from relevant government departments when they enter the market or carry out investment and financing activities. For example, although bank loans are the most important external financing channel for Chinese firms, the administrative approval system makes obtaining loans a much more complex process, involving complicated government approval procedures (Allen *et al.*, 2005).

Unlike other non-regulated economies in which loans are free commercial transactions between borrowing firms and lending banks, in China's credit market the granting of loans overwhelmingly hinges on government efficiency because the collateral registration process requires approvals from several government departments. Specifically, the various types of movable and immovable properties in China are supervised and managed by different administrative departments, and thus there has been a problem of bureaucracy in the collateral credit business for a long time. This results in significant bureaucratic delays and costly administrative fees for firms trying to acquire bank loans. Because firms rebalance their capital structure mainly by issuing and retiring debt, government intervention in the bank loan granting process can routinely impose additional adjustment costs, thus impeding the speed at which firms can move toward target leverage ratios (Leary and Roberts, 2005).

On the other hand, over recent years, the Chinese government has been making great efforts to promote reform of the administrative approval system. Among its list of associated achievements, the program for establishing administrative approval centers (AACs) is representative, through which China has overcome many challenges to put in place simplified approval procedures. Specifically, starting in the 1990s, China

established AACs, first in Shenzhen and then in other cities across the country. The program required administrative departments to centralize their offices and provide "one-stop" approvals for projects by promoting workflow characterized by "one-window acceptance, internal circulation, information sharing, joint approval and unified issuance of certificates". As a consequence of this reform, time delays in the collateral registration process were shortened from several months to as little as one to five working days; administrative fees were reduced significantly with many local governments no longer charging them at all.[2] Overall, the establishment of AAC, although does not bring additional funds to the firm, does promote the simplification of administrative collateral registration and the reduction of administrative approval fees in firm lending.

In this study, we exploit the staggered setup of the AACs as a quasi-natural experiment to examine the impact of government intervention on firms' leverage dynamics, given that it exogenously reduces bureaucracy in the bank loan granting process by simplifying approval procedures and reducing administrative fees. Our sample starts with all publicly listed firms in the Chinese stock market between 1998 and 2010, and we manually collect information about the staggered establishment of AACs in 333 prefecture-level cities across China. Overall, our difference-in-differences (DID) results show that, compared to the pre-AAC period, the speed of adjustment following the introduction of the AACs increases by 25.21%. This is of sizable economic significance because it indicates that AACs help to shorten the leverage rebalancing period (toward target leverage ratios) by as much as a quarter. These findings suggest that a reduction in bureaucracy can speed up firms' leverage rebalancing.

We are aware that for the pre-conditions of our experiment to be valid, firms that are headquartered in cities that either do or don't acquire AACs should exhibit parallel trends before the treatment. To this end, we perform a parallel trends test to exclude the

[2] See https://www.financialnews.com.cn/cj/zc/201903/t20190311_156094.html and http://www.chenghai.gov.cn/ch/zdlyxxgk/xzspxxgk/ggxx/content/post_1828298.html.

possibility of a pre-treatment trend in which the positive effect of AACs on speed of adjustment prevails for some other reasons. Our results continue to hold when we apply alternative models to the estimation of leverage adjustment speeds, use alternative sets of leverage determinants, and include alternative sets of fixed effects for robustness.

Because AACs facilitate firms with easier, faster, and less costly access to bank loans, we should observe more active rebalancing behaviors in the post-AAC period among firms whose demand for bank loans is more pressing. For example, compared to over-leveraged firms that are in a position to retire debt to rebalance their leverage, under-leveraged firms need to issue debt, and bank loans can be one potential source of financing. In line with this expectation, we find that the positive impact of AACs on firms' speed of adjustment is more pronounced for under-leveraged firms, and they issue more debt to rebalance their leverages in the post-AAC period.

We then exploit three sources of cross-sectional variation in the response of speed of adjustment to AACs, which shed further light on the mechanisms of how government intervention affects leverage dynamics. First, when the *ex ante* legal system is weak, the functioning of the market economy may push up *ex post* litigation costs, thus generating higher transaction costs (Levine, 1998). Better legal institutions lower the transaction costs associated with a firm's leverage adjustments and accelerate their speed (Oeztekin and Flannery, 2012). Despite China's efforts to improve its legal system, its legal environment is still regarded as poor and underdeveloped (Allen *et al.*, 2005; Fan *et al.*, 2007). Moreover, owing to the heterogeneities in resource endowment, local government protection, and legal enforcement quality, the quality of the legal environment differs greatly among regions. Because AACs promote a simplified approval process with accountable, transparent, and consistent regulatory rules, the transaction costs associated with bank loans are reduced more significantly in regions with poorer legal environments. Therefore, we predict that in regions with a poor legal environment, the effect of the establishment of AACs on the speed of leverage adjustment is more prominent. Our empirical results confirm the prediction that speed of adjustment is more accelerated in firms operating in poorer legal environments.

Second, it is well established that financial constraints affect firms' leverage adjustments (Faulkender *et al.*, 2012). Specifically, constrained firms adjust more slowly than unconstrained ones when they are under-leveraged, but adjust more quickly when they are over-leveraged. As an economy in transition, financial constraints are a common problem for firms in China (Allen *et al.*, 2005; Poncet *et al.*, 2010), and form an impediment to firms adjusting their leverage in a timely manner. In these circumstances, financially constrained firms are more likely to seize the opportunity to obtain bank loans for recapitalization if AACs offer quicker and less costly access to such borrowing. Therefore, we predict that, in the post-AAC period, firms with higher financial constraints exhibit greater acceleration in their leverage adjustments. Again, our empirical results show that the speed of adjustment shows greater acceleration in firms with financial constraints.

The third source of cross-sectional variation in relation to firms' leverage dynamics is political connections. Because of the underdeveloped legal and financial systems in China, ties to the government or political connections play a central role in business activities (Allen *et al.*, 2005). Studies such as Chen *et al.* (2011) show that building a relationship with the government becomes essential for firms to achieve superior economic resources and avoid discretionary fees, because the local governments in China can either grant preferential treatment or impose extra fees and fines on businesses at their discretion when allocating economic resources. Similarly, we believe that politically connected firms enjoy preferential treatment from the government when going through the administrative approval process for collateral registration. Therefore, we expect the acceleration effect in firms' leverage adjustments will be less pronounced for politically connected firms given they are less adversely affected by government intervention. Our empirical results on political connections also confirm this conjecture.

One might be concerned about the policy outcome of AACs: that is, whether their implementation genuinely reduces government intervention in the real world. This concern is key to our study because we build our argument on the premise that it does;

therefore we also take steps to alleviate this concern. The most common administrative intervention by government services in the credit process is bureaucratic delay. We measure this using the number of days, divided by 100, spent dealing with the government when applying for a bank loan. Another measure of government intervention is the probability of obtaining loans through irregular payments. This captures the likelihood of firms obtaining bank loans through rent-seeking activities such as bribery, and reflects the degree of non-marketization of the credit process in the location concerned. Our results indicate that the setup of AACs significantly eases bureaucratic delays and reduces rent-seeking activities in the credit approval process.

Our paper makes several contributions to the literature. First, previous studies have long been interested in the relationship between government and finance, but the existing literature offers no single consensual answer on the subject because government intervention is so multifaceted. For example, one strand of literature shows that government intervention is an institutional cause of financing constraints faced by firms (e.g., Beck and Demirguc-Kunt, 2006; Djankov *et al.*, 2007), whereas economists have recently reported that, in developing countries, government intervention provides a helping hand to a firm's financing (e.g., Ayyagari *et al.*, 2012; Cull *et al.*, 2015). Such conflicting views reflect the complexity of government intervention and the difficulty of balancing market power and government power in the capital market. In the case of China, given that neither its legal nor its financial system is well developed, the government's initial purpose in launching a formal loan collateral approval process was to show its commitment to preserving market incentives and promoting private economic activities, by endorsing them with a government blessing (Allen *et al.*, 2005). However, the "helping hand" function requires government to be effective yet controlled; otherwise, government can become a large number of substantially independent bureaucrats pursuing their own agendas, or a "grabbing hand" (Frye and Shleifer, 1997). Our study echoes these dichotomies by pinning down the complexity of government intervention on credit allocation: it has unintended consequences for firms' leverage dynamics.

In our second contribution, we produce evidence to enrich the extant literature on corporate financial policy and dynamic rebalancing behavior. Recently, the literature has studied the determinants of the speed of adjustment from a variety of perspectives that affect firms' adjustment costs, such as financial and cash flow features (Byoun, 2008; Faulkender *et al.*, 2012), macroeconomic conditions (Cook and Tang, 2010), country-level institutions (Oeztekin and Flannery, 2012; Çolak *et al.*, 2018), equity mispricing (Warr *et al.*, 2012), internal capital markets (Fier *et al.*, 2013), credit lines (Lockhart, 2014), corporate governance (Chang *et al.*, 2014; Liao *et al.*, 2015), information asymmetry (An *et al.*, 2015), business cycles (Halling *et al.*, 2016), cost of equity (Zhou *et al.*, 2016), debt covenants (Devos *et al.*, 2017), media coverage (Dang *et al.*, 2019), and foreign institutional ownership (An *et al.*, 2021). However, they mostly focus on market participants such as firms, banks, institutional investors, media, and other financial institutions or intermediaries. We complement this strand of literature by highlighting that the important role of government in the financial market. By inducing additional adjustment costs through the credit allocation process, its efficiency substantially affects the endogenous corporate financial policies.

The remainder of the paper proceeds as follows: Section II introduces the institutional background and Section III describes our approach, method and sample, including its descriptive statistics; Section IV presents the empirical results and explores their underlying mechanisms, while Section V looks at their broader economic consequences. Section VI concludes the study.

II. Institutional Background

A. Bank Loans in China

The banking sector has been the most important engine of China's economic growth, providing a large amount of capital to firms in the real economy (Allen *et al.*, 2005). According to the China Financial Yearbook issued by the People's Bank of China (PBC), at the end of 2002 the national bank loan balance accounted for 83.10% of social

financing, and by the end of 2010 the proportion remained at 75.67%, despite the rapid development of the stock market over this period.

There are three major types of bank loans in China: credit loans, guaranteed loans, and collateral (pledged) loans (Chen *et al.*, 2013). Credit loans, without requiring any guarantees or collateral, are usually provided to firms with strong credit and reimbursement capabilities. Guaranteed loans are for firms with guarantors with good financial status or repayment capacity should the borrower default. Collateral loans require firms to transfer control of the collateralized property to the bank(s). The types of collateral widely acceptable to most banks are land, buildings, machinery, vehicles, and stock of the firm or associated firms (Yang and Qian, 2008).

Among these types, collateral loans dominate because collateral plays a critical role in protecting creditors' interests and is, therefore, widely demanded in lending contracts by banks in China. Our data shows that, at the end of 2010, the proportion of collateral loans from financial institutions granted to domestic firms was 42.52%, and this continued to increase in subsequent years, to 44.48% by the end of 2016.[3]

B. Procedures for Obtaining Collateral Loans in China

Although collateral loans are the most important source of external financing for Chinese firms, obtaining them from target banks is a complex process. Unlike other non-regulated economies in which loans are free commercial transactions between borrowing firms and lending banks, in China's credit market the granting of loans is not solely a bilateral transaction between a firm and a bank, but also involves relevant government departments, which are therefore key to the overall efficiency of the process. The three steps in acquiring collateral or pledge loans in China are as follows (see Figure 1).

[3] According to a survey of 13 major domestic banks, collateral loans increased from 22% to 32% of all loans granted between 2000 and 2005 (Yang and Qian, 2008).

Step 1 – Application for Collateral Loan. A firm first submits a loan application form and the requisite documents to a target bank. The bank's credit appraisal department normally appraises the loan project by hiring a qualified appraisal agency, which will issue a project appraisal report following its investigation. It is worth noting that, in this process, the appraisal costs are borne by the firm seeking the loan. Then, the credit management department of the bank conducts a thorough assessment on the basis of the appraisal report and other information; if approved, the bank signs a loan contract with the borrowing firm.

Step 2 – Collateral Registration. In this step, the borrowing firm first registers its collateral at the relevant government service department via a certificate of ownership of the collateral, together with the loan contract and other related documents. The government service department instigates the registration process, which is typically complicated and extremely long-winded.[4] The borrowing firm must pay the administrative fees and collect the certificate of collateral registration when notified of its completion. All associated taxes and registration fees are generally borne by the borrowing firm. According to the Security Law of the People's Republic of China (1995) (the Security Law hereafter), property collateral should be registered at the corresponding administrative department; otherwise, the collateral-holder's interests over the property are defeasible to the claims of third parties.[5] Thus, the bank's claim can only be legally protected if the collateral is registered by the appropriate government services, rendering this step inevitable and necessary. Furthermore, the various types of fixed and mobile property in China are supervised and managed by different supervision and administration departments, giving rise to a long-standing problem of bureaucracy in the collateral credit business. For example, registration of land-based collateral is generally administered by local land administration departments, but registration of forestry-based collateral is administered by local forestry

[4] Detailed information is provided in a case in Appendix III.

[5] Article Nos. 41 and 43 of the Security Law state that the parties must register the collateralized property that is listed in Article No. 42; the collateral loan contract takes effect upon registration. If the parties have not registered such collateralized (pledged) property, their interests are defeasible to the claims of third parties.

administration departments; registration of equipment and other mobile collateral is administered by local industrial and commercial administration departments, and registration of share pledges is administered by the securities registration authorities.[6] Moreover, many collateral loans involve multiple types of collateral, thus coming under the supervision/approval of multiple government administration departments, and massively slowing the bank loan granting process as a result.

Step 3 – Granting of Loan. Once all of the collateral registration paperwork has been correctly completed, the lending banks release the loan funds to the borrowing firm's bank account.

[Insert Figure 1 about here]

C. Staggered Setup of Administrative Approval Centers

The administrative approval system is a means of government intervention in the market to maintain alignment with a system that still bears aspects of a planned economy, manifested by the need for firms to obtain approval from relevant government departments when they enter the market or carry out investment and financing activities. In recent years, to boost government efficiency, the Chinese government has vigorously pursued reforms to the administrative approval system, with the establishment of AACs being a leading example. AACs require administrative departments to centralize their offices and provide "one-stop" approval for projects by promoting the workflow

[6] Article No. 42 of the Security Law states that the administrative authorities in charge of the registration of collateral property are as follows: (1) where land use rights pertaining to land with no attachments are collateralized, registration shall be administered by the land administration departments responsible for verification and issuing of land use right certificates; (2) where urban real estate or buildings of township and village enterprises are collateralized, registration shall be administered by departments designated by local governments at county level and above; (3) where forestry trees are collateralized, the registration shall be administered by the forestry administration departments at county level and above; (4) where aircraft, ships and vehicles are collateralized, the registration shall be administered by departments in charge of the registration of means of transport; (5) where equipment and other movable property is mortgaged, the registration shall be administered by the local industrial and commercial administration departments. Article No. 78 of the Security Law states that, where legally transferable share certificates are pledged, the pledger and the pledgee shall enter into a written pledge contract and register the pledge with the securities registration authorities. Article No. 79 of the Security Law states that where legally transferable trademarks, patents or copyright privileges are pledged, the pledger and the pledgee shall enter into a written pledge contract and register the pledge with the relevant administrative authorities.

characterized by "one-window acceptance, internal circulation, information sharing, joint approval and unified issuance of certificates". In the 1990s, a number of cities including Shenzhen were the first to set up AACs to pilot administrative approval reform by implementing one-stop processing of project approvals. From 2001 onwards, with the promotion of this reform by central government, the innovation spread rapidly across China, with AACs set up in other cities accordingly. By the end of 2016, 276 prefecture-level cities in China had set up AACs. Figure 2 shows the trend of AAC establishment at prefectural level.[7]

Following AAC establishment, the administrative approval process for collateral registration is simplified, with fewer steps and less delay. For example, an AAC was set up in Shaoyang City in Hunan Province in 2003, centralizing the Bureaus of Municipal Finance, Taxation, Industry and Commerce, Public Security, Economics and Information, Housing and Urban-Rural Development, and Land Resources, as well as 37 other municipal departments with approval authority.[8] The AAC connects these departments, including the Property Rights Supervision Office and the Real Estate Transaction Center, as well as property and land appraisal agencies, accounting firms, auditing firms, and notary offices, to construct a collateral loan registration window. The implementation of one-stop processing in this window seeks to achieve the goal of "centralized acceptance, centralized charges, centralized surveys, and completion in the required timescale". Meanwhile, the AAC guidelines stipulate that the registration procedure for land collateral should not exceed ten working days, that for housing collateral should not exceed five working days, and that for movable property mortgages should not exceed three working days.[9] We provide an in-depth analysis of the impact of AAC establishment on the credit process, with the commonly used land and housing collateral as a detailed case (see Appendix III). The case shows that, following the establishment of the AACs, firms only need to go to the "one-stop"

[7] We plot the GDP per capita in 2003 versus the year of AAC establishment for each city in Appendix II, which shows that the establishment of AACs was not driven by economic conditions.
[8] See http://jxhn.zjzwfw.gov.cn/col/col46713/index.html.
[9] See http://news.sohu.com/20041228/n223684229.shtml.

collateral registration window twice; from signing the loan contract to formally obtaining the loan, the process is much simpler and the waiting time is greatly reduced.

In addition, the administrative approval fees for collateral registration reduced very significantly following AAC establishment. Previously, the collateral registration process involved many government service departments and was accompanied by unclear responsibilities, inexplicable fees, and multiple charges, greatly increasing the economic burden on firms and preventing the timely processing of collateral loans (Liu, 1997). The "one-stop" window of the AAC centralizes and levies all administrative, institutional, and service fees at the same time, and reduces the likelihood of other units charging additional fees without authorization. The Second Tractor Factory in Zhengzhou City provides an example; in 1997, because of a product backlog in previous years and low economic efficiency, the factory sought to acquire bank loans by deploying the land use rights of 160,000 square meters and the buildings thereon as collateral. According to the assessment on behalf of the Land Bureau, the value of the land was 48.08 million RMB, so the appraisal fee was about 144,000 RMB (charged at 3‰ of the assessed value), the collateral registration fee was about 96,000 RMB (charged at 2‰), and the notary fee about 48,000 RMB (charged at 1‰). The total fees for the land alone were 288,000 RMB. The buildings on the land incurred another set of appraisal, registration, and notary fees, representing a further large expense. Following establishment of the AACs, most cities standardized the collateral registration fees by charging fees per "case", regardless of the amount or value of the collateral; the range of fees in each city is now roughly between 100 and 2,000 RMB per collateral registration case.

III. Research Design

A. Econometric Model

We follow the existing literature (Faulkender *et al.*, 2012; Chang *et al.*, 2014; Li *et al.*, 2017) and use the two-stage approach of the dynamic partial adjustment model

to estimate the effect of AAC establishment on the speed of capital structure adjustment.[10] The main elements of this approach can be summarized as follows: first, specify the basic capital structure adjustment model for firms; second, estimate the target capital structure based on firms' characteristics and substitute the target capital structure estimations into the capital structure adjustment model; third, test the effect of AAC establishment on firms' capital structure adjustment speed by augmenting the original capital structure adjustment model with relevant AAC-related variables.

First, following Flannery and Rangan (2006), Lemmon *et al.* (2008) and Huang and Ritter (2009), a standard partial adjustment model of firm capital structure is estimated as:

$$L_{i,t} - L_{i,t\text{-}1} = \lambda\left(L^{*}_{i,t} - L_{i,t\text{-}1}\right) + \varepsilon_{i,t} \tag{1}$$

where $L_{i,t}$ is contemporaneous leverage, $L_{i,t\text{-}1}$ is lagged leverage, and $L^{*}_{i,t}$ is the estimated target leverage ratio, given firm characteristics at year t-1. The typical sample firm closes λ (per period) of the gap between its target leverage and its start-of-period leverage. This λ value is commonly known as the firm's speed of adjustment toward target.

In the absence of any active capital structure adjustments, the leverage changes when a firm posts its annual income to its equity account. Only active adjustments entail transaction costs; therefore, tests of target adjustment models should focus on active adjustments. Following Faulkender *et al.* (2012), the passive, mechanical component of leverage adjustment is removed from equation (1) to produce:

$$L_{i,t} - L^{p}_{i,t\text{-}1} = \gamma\left(L^{*}_{i,t} - L^{p}_{i,t\text{-}1}\right) + \varepsilon_{i,t} \tag{2}$$

where $L^{p}_{i,t\text{-}1} = \frac{D_{i,t\text{-}1}}{A_{i,t\text{-}1} + NI_{i,t}}$, and $NI_{i,t}$ is the net income in year t for firm i, $D_{i,t\text{-}1}$ is the unpaid debt in year t-1 for firm i, and $A_{i,t\text{-}1}$ is the book value of total assets in year t-1 for firm i.[11] Leverage at year t for firm i would be $L^{p}_{i,t\text{-}1}$ if the firm does not engage in

[10] This method permits easy calculations of the effects of variables of interest (here, AAC establishment) on adjustment speed, as per Faulkender *et al.* (2012).

[11] Following Faulkender *et al.* (2012), we use book leverage because decomposing the active and passive components is more straightforward.

any net capital market activities. The left-hand side of equation (2) therefore represents the firm's active "adjustment" toward target capital structure, and γ measures the proportional adjustment during one year for firms in group, namely the firm's active speed of adjustment toward target. Thus, we treat equation (2) as our basic model of capital structure adjustment.

Equation (2) relies on an estimated target leverage $L^*_{i,t}$; we follow recent studies (Flannery and Rangan, 2006; Huang and Ritter, 2009; Faulkender *et al.*, 2012) and derive the target leverage of a firm according to the following:

$$L^*_{i,t} = \beta\chi_{i,t\text{-}1} \tag{3}$$

where $L^*_{i,t}$ is the estimated target leverage ratio, given the firm's characteristics at t-1, $\chi_{i,t\text{-}1}$ is a vector of firm characteristics related to the costs and benefits of operating with various leverage ratios, and β is a coefficient vector. The firm characteristics include firm size ($SIZE_{t\text{-}1}$), market-to-book ratio ($MB_{t\text{-}1}$), profitability ($EBIT_{t\text{-}1}$), asset tangibility ($PPE_{t\text{-}1}$), non-debt tax shield ($DEP_{t\text{-}1}$), and the industry median leverage ($LEV\_MED_{t\text{-}1}$). All variable definitions are given in Appendix I.

Combining equations (2) and (3) produces:

$$L_{i,t} = \gamma\beta\chi_{i,t\text{-}1} + (1 - \gamma)L^p_{i,t\text{-}1} + \varepsilon_{i,t} \tag{4}$$

Here, we first estimate equation (4) to obtain β, and we can then calculate the target leverage $L^*_{i,t}$ using equation (3). Previous studies have used a variety of methods to calculate the optimal capital structure. An OLS approach yields biased and inconsistent results because it omits the fixed effects. Although a firm fixed-effects estimate controls for unobserved time-invariant heterogeneity, it also yields biased coefficient estimates owing to the correlation between the fixed effects and the lagged dependent variable (Baltagi, 2008). Researchers have also argued that fixed-effects estimates can over-estimate the speed of leverage adjustment (Blundell and Bond, 2000). Blundell and Bond (1998) proposed a modified generalized method of moments (system GMM) estimate to alleviate the endogeneity problem in pooled OLS and fixed-effects estimates, which, with difference GMM, can also improve the weak instrumental variable problem

(Flannery and Hankins, 2013). We follow Lemmon *et al.* (2008), Faulkender *et al.* (2012), and Li *et al.* (2017) and use system GMM to estimate equation (4). Following Flannery and Rangan (2006), Flannery and Hankins (2013), and Chang *et al.* (2014), year fixed effects are also included in the estimation.

To investigate the effect of AAC establishment on the speed of leverage adjustment toward target, we augment our basic capital structure adjustment model (equation (2)) as follows (generalized in Faulkender *et al.*, 2012):

$$L_{i,t} - L^{p}_{i,t-1} = \left(\gamma_0 + \gamma_1 TREAT \times POST + \gamma_2 TREAT\right)\left(L^{*}_{i,t} - L^{p}_{i,t-1}\right) + \varepsilon_{i,t} \quad (5)$$

where *TREAT* is the AAC establishment dummy, which takes a value of 1 if the city in which the firm is located established any AACs in the sample period, and 0 otherwise; *POST* is a post-AAC establishment dummy, which takes a value of 1 for the post-AAC period, and 0 for the pre-AAC period; γ_1 measures the effect of AAC establishment on the firm's speed of leverage adjustment, and $\gamma_1 > 0$ indicates a faster adjustment toward target leverage after AAC establishment. In addition, following Chang *et al.* (2014), we control for firm, city, and year fixed effects in the model.

For convenience, equation (5) is rewritten as equation (6), which we use to present the empirical results:

$$\begin{aligned} \Delta Lev_{i,t} = {} & \left(\gamma_0 + \gamma_1 TREAT \times POST + \gamma_2 TREAT\right) Dev_{i,t} \\ & + Firm\ FE + City\ FE + Year\ FE + \varepsilon_{i,t} \end{aligned} \quad (6)$$

where $\Delta Lev_{i,t}$ is the change in active leverage in year *t* for firm *I*, $Dev_{i,t}$ is the active deviation from target leverage in year *t* for firm *i*. Detailed variable definitions are given in Appendix I.

B. Sample Selection

Our sample starts with all of the firms listed on the Shanghai and Shenzhen Stock Exchanges between 1998 and 2010. We begin with 1998 because this is when Chinese listed firms began to report cash flow statements sufficiently detailed for our analysis. We end in 2010 because the shadow banking system in China grew very rapidly from

2011 onwards, and innovative products from shadow banking institutions have not been monitored effectively by the regulatory sector. We manually collected information about the establishment of AACs in 333 prefecture-level cities across China. Figure 2 presents the distribution of administrative approval centers at prefectural level, and shows that AAC establishment experienced a boom phase after 2001. We obtain firm-level financial and accounting information from the CSMAR database, and city-level data, including GDP, from the National Bureau of Statistics of China.

[Insert Figure 2 about here]

We further filter the sample as follows: (1) given that Jiangmen, Anshun, Bayan Nur, Ulanqab, Jiyuan, Haidong, Sansha, and Puer were not formally established as prefecture-level cities prior to the establishment of their AACs, we exclude firms located in these regions; (2) we exclude financial firms; (3) we exclude special treatment (ST) firms; (4) we exclude firms founded after the establishment of a city's AAC(s); (5) we exclude observations with missing variables. Eventually, our sample consists of 12,333 firm-year observations, involving 1,437 firms.

Table 1 shows descriptive statistics for the main variables. All continuous variables are winsorized at the 1st and 99th percentiles. In the table, the mean target leverage ($L^*_{i,t}$) is estimated to be 31.2%, whereas the mean leverages for the current ($L_{i,t}$) and preceding years ($L_{i,t\text{-}1}$) are 27.6% and 25.9%, respectively. The mean gap between firms' actual leverage and their target leverage ($Dev_{i,t}$) is 5.3%. The mean active leverage adjustment ($\Delta Lev_{i,t}$) is 1.7%, which is only one-third of the actual deviation from target leverage, possibly due to the high cost of adjustment in China. This indicates that the cost of capital structure adjustment for listed firms in China is quite high and the adjustment speed is quite slow (Li *et al.*, 2017). During the sample period, 77.9% of cities in our sample have established AACs. In addition, the mean lagged value of growth opportunity, measured by *MB*, is 2.363, the profitability as measured by *EBIT* is 5.4%, the asset tangibility ratio (*PPE*) is 30.9%, the non-debt tax shield as measured by the depreciation ratio (*DEP*) is 2.5%, and the lagged industry median leverage (*LEV_MED*)

is 26.8%.

[Insert Table 1 here]

IV. Empirical Results

A. AAC Establishment and Speed of Adjustment

Panel A of Table 2 reports the staggered difference-in-differences (DID) regression results in relation to our main prediction that firms adjust their leverage more quickly toward their targets following establishment of an AAC in the city in which they are located. Column 1 shows that the average speed of adjustment, γ, is 28.1% for Chinese listed firms during the period 1998–2010. Numerically, this is similar to the average capital structure adjustment speed of 23.45% for listed companies in 37 countries worldwide between 1991 and 2006 (Oeztekin and Flannery, 2012). The most comparable evidence is that of Faulkender *et al.* (2012), who use the same estimation method. In their study, on average, the speed of active leverage adjustment for Compustat firms between 1965 and 2006 is about 31.6%. This demonstrates the high cost and low speed of adjustment in underdeveloped financial markets. Column 2 reports the effect of AAC establishment on the speed of adjustment and shows that γ_1 is 0.059, with statistical significance at the 1% level. The effect is also economically sizable. For example, compared to the pre-AAC period whose speed of adjustment averages 0.234 (0.318 - 0.084), speed of adjustment in the post-AAC period averages 0.293 (0.318 - 0.084 + 0.059), representing a 25.21% (0.059/0.234) increase. Similarly, the average firm takes approximately 4.27 [1/(0.318 - 0.084)] years to close the gap between actual and optimal capital structure in the pre-AAC period, and just 3.41 [1/(0.318 - 0.084 + 0.059)] years in the post-AAC period. Therefore, the regression results support our prediction that firms adjust their leverage toward targets more quickly following local AAC establishment.

Further, we group the full sample into those firms with leverage lower than their targets (under-leveraged group), which are reported in column 3 of Panel A in Table 2,

and those with leverage higher than their targets (over-leveraged group), which are reported in column 4. In column 3, γ_1 is significantly positive (at 0.039), which means for firms with leverage lower than their targets, AAC establishment has facilitated levering up of debt and firms can thereby adjust leverage in a timelier manner. However, in column 4, γ_1 is -0.030, negative but not significant, which indicates that for firms with leverage higher than their targets, AAC establishment does not affect the speed of adjustment.

We are aware that for the precondition of our experiment – that is, the staggered DID research design in equation (6) – to be valid, firms with and without local AAC establishment should exhibit parallel trends prior to the treatment. Therefore, we perform a parallel trends test in which we keep only those observations from the four years before the year of AAC establishment and the four years after, with the baseline year in the model being that three years before AAC establishment. Thus, we use the following equation:

$$\Delta Lev_{i,t} = \left(\gamma_0 + \sum_{-4}^{4} \gamma_j Year(j) + TREAT \right) Dev_{i,t} + Firm\ FE + City\ FE + Year\ FE + \varepsilon_{i,t} \quad (7)$$

where *Year*(*j*) is a dummy variable that indicates whether a firm-year observation is four years, two years, or one year before the treatment (-4, -2, and -1, respectively), is in the year of the treatment (0), or is one, two, three or four years after the treatment year (1, 2, 3, and 4, respectively). γ_{-4} to γ_{-1} illustrate the difference in speed of adjustment between treatment and control groups before the treatment year, and γ_0 to γ_4 show the dynamic divergence in speed of adjustment between treatment and control groups after the treatment year. Detailed variable definitions are given in Appendix I. The regression results of this parallel trends test are shown in Panel B of Table 2.

In column 1, the coefficient on *Dev*×*Year*(*j*), (*j* = -4, -2, -1) is insignificant, which indicates that there is no difference in speed of adjustment between treatment and

control groups before the treatment year, satisfying the parallel trends assumption for our staggered DID scenario. Moreover, the coefficient on *Dev*×*Year*(0) remains insignificant, while the coefficient on *Dev*×*Year*(*j*), (*j* = 1, 2, 3, 4) turns significantly positive and the numerical values increase year by year. Columns 2 and 3 show the results for the under-leveraged and over-leveraged subsamples, respectively. In column 2, the coefficient on *Dev*×*Year*(*j*), (*j* = -4, -2, -1, 0) is insignificant and the coefficient on *Dev*×*Year*(*j*), (*j* = 1, 2, 3, 4) turns significantly and economically positive. In column 3, the coefficient on *Dev*×*Year*(*j*) remains insignificant throughout the entire [-4, 4] window around the AAC establishment year. This suggests that the role of AACs in facilitating firms to adjust leverage toward their targets is mainly through the acceleration of debt financing and boosting leverage for under-leveraged firms, which is consistent with the regression results of Panel A.

[Insert Table 2 here]

B. The Impact of AACs on Bureaucratic Delays

Our results thus far imply a positive effect from AAC establishment on firms' speed of leverage adjustment. In this section, we probe the underlying mechanisms of this effect. In general, the widespread administrative intervention by government services in the credit process is labeled as "bureaucratic delay". As an important means of promoting reform, the establishment of AACs is highly effective in streamlining the credit process, leading to reductions in administrative charges and approval time. To verify the underlying mechanism, we use the following regression model to test the effect of AAC establishment on the bureaucratic delays in the credit process:

$$BureauDelays_{i,t} = \gamma_0 + \gamma_1 TREAT \times POST + \gamma_2 TREAT + Controls + Firm\ FE + City\ FE + Year\ FE + \varepsilon_{i,t} \quad (8)$$

where $BureauDelays_{i,t}$ refers to bureaucratic delays in the credit process, measured by *GQI_GOVDAYS*, expressed as the multiple of 100 days taken to deal with the government when applying for bank loans, and *GQI_ABNORPAY*, which is the

probability of obtaining loans through irregular payments (World Bank, 2006). Specifically, *GQI_ABNORPAY* captures the likelihood of firms obtaining bank loans through rent-seeking activities such as bribery, and reflects the degree of non-marketization of the credit process in a city. We also control for other city-level characteristics associated with bureaucratic delays and non-marketization in the credit allocation process, namely: the GDP per capita in the city (*GDP_PC*); the growth in GDP per capita in the city (*GDP_GR*); the proportion of the tertiary industry in the city, measured as its GDP divided by the city's total GDP (*IND_TERTIARY*); the (natural logarithm of) population density (*DENSITY*); (the natural logarithm of) the number of industrial enterprises (*INDNUM*); the (natural logarithm of) average wage (*WAGE_PC*); the proportion of foreign investment, measured as the GDP created by foreign-invested enterprises divided by the city's total GDP (*OPEN*). It is worth noting that because the World Bank only reports data for the city-level business environment in China for 2006, the regression on *GQI_GOVDAYS* and *GQI_ABNORPAY* only covers observations in 2006, and does not include city, firm, and year fixed effects. The regression results are reported in Table 3.

Column 1 of Table 3 shows the regression results in relation to the effect of AAC establishment on bureaucratic delays (*GQI_GOVDAYS*). The coefficient on *TREAT*×*POST* is significantly negative, which indicates that AAC presence reduces the time local firms spend dealing with the government in the credit borrowing process. Meanwhile, column 2 of Table 3 shows that the coefficient on *TREAT*×*POST* for *GQI_ABNORPAY* is also significantly negative. Thus, these results imply that AAC establishment eases "bureaucratic delays" in the credit approval process, creating favorable credit conditions for firms to accelerate debt leverage and recapitalization.

[Insert Table 3 here]

C. The Impact of AAC on Debt and Equity Issuance

Firms make adjustments toward their target capital structure through various

channels, such as issuing debt, offering stocks, paying debt and stock repurchases (Hovakimian *et al.*, 2001; Korajczyk and Levy, 2003; Leary and Roberts, 2005). In China, bond issues and stock repurchase are quite rare (Hale, 2007). Firms mainly adjust their capital structure by increasing or decreasing bank loans and issuing new stocks. As clarified in the institutional background, AAC establishment principally brings about reductions in the administrative charges and approval time involved in the credit borrowing process, so it is natural to expect that the effect of AAC establishment on firms' speed of leverage adjustment is to accelerate the acquisition of bank loans, rather than the issuing of stock. To test this prediction, we use the following logit regression model:

$$\begin{aligned} P\left(Adjust\_N_{i,t}\right) = \Phi(&\gamma_0 + \gamma_1 \left|Dev_{i,t\text{-}1}\right| \times TREAT \times POST + \gamma_2 \left|Dev_{i,t\text{-}1}\right| \times TREAT \\ &+ \gamma_3 \times TREAT \times POST + \gamma_4 \times TREAT + \gamma_5 \left|Dev_{i,t\text{-}1}\right|) \\ &+ Firm\ FE + City\ FE + Year\ FE + \varepsilon_{i,t} \end{aligned} \tag{9}$$

where $|Dev_{i,t\text{-}1}|$ is the absolute value of the active deviation from target leverage at the beginning of the year (we use the absolute value for convenience when interpreting coefficients), and $Adjust\_N_{i,t}$ is a capital structure adjustment dummy. Specifically, when a firm's leverage is below its target, upward recapitalization can be achieved through increasing debt or decreasing equity assets. Therefore, *Lev_up* is a dummy variable indicating leverage increase in excess of 5% (when it takes a value of 1; otherwise 0), measured as net debt issuance minus net equity issuance, divided by book assets at the beginning of the year. Similarly, *Debt_up* is a dummy for debt increase in excess of 5%, measured as the net debt issuance in the current year divided by the book assets at the beginning of the year, and *Equity_down* is a dummy for equity decrease in excess of 5%, measured as the net equity decline in the current year divided by the book assets at the beginning of the year.

In a similar vein, when a firm's leverage is above its target, downward recapitalization can be achieved through decreasing debt or increasing equity assets. Therefore, *Lev_down* is a dummy variable indicating leverage decrease in excess of 5%, measured as net equity issuance minus net debt issuance, divided by book assets;

Debt_down is a dummy for debt decrease in excess of 5%, measured as the net debt decline in the current year divided by the book assets at the beginning of the year; *Equity_up* is a dummy for equity increase in excess of 5%, measured as the net equity issuance in the current year divided by the book assets at the beginning of the year. We use 5% for these thresholds following Hovakimian *et al.* (2001) and Leary and Roberts (2005).

The results of the regressions are reported in Table 4, with columns 1 to 3 showing the results for under-leveraged firms. In column 1, the dependent variable is *Lev_up* and the coefficient on $|Dev|\times TREAT\times POST$ is significantly positive. The coefficient on $|Dev|\times TREAT\times POST$ is also significantly positive in column 2, but not in column 3, which shows that the upward adjustment of capital structure demonstrated in column 1 is achieved by increasing debt, rather than decreasing equity. By contrast, for over-leveraged firms, as shown in columns 4 to 6, the coefficients on $|Dev|\times TREAT\times POST$ are all insignificant, for *Lev_down*, *Debt_down*, and *Equity_up*. These results show that when a firm's leverage is lower than optimal, firms located in cities with AACs can quickly increase their capital by raising debt, but AAC establishment is not associated with the adjustment of equity. In addition, AAC establishment does not facilitate leverage adjustment when a firm's leverage is higher than the optimal level because, besides not affecting equity levels, AACs also do not play any role in speeding up decreases in debt.

[Insert Table 4 here]

D. Cross-sectional Analyses

In this section, we consider a number of factors and their interactions with the role of AACs in influencing the speed of leverage adjustment. In particular, we look at the effects of legal environment, financial constraints, and political connections at firm level, all of which could potentially influence the role that AACs play in a firm's capacity to speed up the acquisition of bank loans.

1. Legal Environment

The effective operation of a market economy relies on a strong legal system. When the legal system *ex ante* is not solid, operation of a market economy may push up litigation costs *ex post*, giving rise to extremely high transaction costs. More narrowly, legal tradition significantly correlates with firms' leverage adjustment speed, and better legal institutions lower the transaction costs associated with adjustments to a firm's leverage. Since the end of 1992, China has accelerated its efforts to improve the legal system (Fan *et al.*, 2007), and the efficiency of the legal environment has been continuously improving. However, the legal system is still regarded as poor and underdeveloped (Allen *et al.*, 2005). In addition, owing to differing degrees of resource endowment, local government protection, and legal enforcement capability, the levels of the legal environment differ greatly among regions. As an important form of administrative approval reform, AACs aim to simplify the approval process and reduce transaction costs through centralized approval by a variety of departments with accountable, transparent, and consistent regulatory rules; thus, they alleviate dramatically the problems of long approval times and high costs in the credit borrowing process. In regions having a poor legal environment, it is difficult to conduct economic activities under the supervision of formal law, and thus an efficient government approval platform such as an AAC plays a more significant role. Therefore, we predict that in regions having a poor legal environment, the effect of AAC establishment on the speed of leverage adjustment will be more prominent.

To test this prediction, we group firms into two subsamples according to the quality of the legal environment of the region in which a firm is located, and then compare the regression results between the two subsamples. We use two alternative indexes to measure the quality of the legal environment in a region. First, *Legal institution index* is defined on the basis of the development of market intermediaries and the level of protection of producers' and consumers' interests, as per Fan *et al.* (2011); a higher index indicates a better legal environment. We split our sample into two groups relative to the median of the index by industry in each year, with firms placed in a *High* (above

the median) or *Low* (below the median) group accordingly. Second, *Number of lawyers* is defined as the ratio of lawyers to the total population of a province. Again, we split our sample into two groups based on the median of this measure in each year. Firms based in provinces above the median are placed in the *High* group, and otherwise in the *Low* group. The regression results are reported in Panel A of Table 5.

In column 1 of Table 5, representing the sample with low legal institution index, the coefficient on *Dev*×*TREAT*×*POST* is positive and significant at the 1% level, while the same coefficient in column 2, for the high legal institution index sample, is insignificant. A Chow test shows that the difference between these two coefficients is significant at the 5% level. Similarly, in column 3, for the sample with a low lawyer ratio, the coefficient on *Dev*×*TREAT*×*POST* is positive and significant at the 1% level, but in column 4, for the high lawyer ratio sample, the coefficient is insignificant; the difference between these two coefficients is significant at the 1% level. Therefore, in regions where the legal environment is poor and the demand for more formal regulation to reduce transaction costs is correspondingly high, the role of AACs in accelerating leverage adjustment is more significant.

2. Financial Constraints

Financial constraints are an important influence on firms' capital adjustments. Specifically, financial constraints significantly alter the speed of adjustment toward target leverage in a highly asymmetrical fashion. Constrained firms adjust more slowly than unconstrained ones when they are under-leveraged, but more quickly when they are over-leveraged. As an economy in transition, the financial constraints problem is prevalent among firms in China, and is an impediment to timely leverage adjustment. Financially constrained firms value every opportunity to obtain bank loans and accelerate recapitalization. Because AACs offer simplified administrative approval requirements with reduced time and costs in relation to bank loan borrowing, financially constrained firms are the most likely to seize the chance to thereby adjust their leverage.

Therefore, we anticipate that for firms with higher financial constraints, AAC establishment will play a more significant role in accelerating leverage adjustment.

To test this prediction, we separately investigate the speed of leverage adjustment in firms subject to low and high financial constraints, using two alternative measures. First, we use the widely recognized SA index (*Size-Age index*) following Hadlock and Pierce (2010). Specifically, the SA index equals -0.737 × *SIZE* + (0.043 × $SIZE^2$) - (0.040 × *AGE*), where *SIZE* is firm size, *AGE* is the number of years the firm is listed with a non-missing price in the market and higher values of SA index indicate higher financial constraints. We split our sample into two groups based on the median of this measure by industry in each year, with firms placed in a *High* (above-median) or *Low* (below-median) group accordingly. Second, lending constraints are expected to be lower in regions where bank services are easily accessible, for example, Jayaratne and Wolken (1999) show that branching deregulation and the subsequent increase of bank branches in regional markets resulted in lower financing constraints for SMEs. Thus, we take the inverse value of bank branches within 30 km around the firm (*1/Number of bank branches*) as our second proxy of financial constraints. Higher values of this measure indicate higher financial constraints. Again, we split our sample into two groups based on the median of this measure by industry each year. Firms with a value above the median are placed in the *High* group, and otherwise in the *Low* group.

In column 1, for the subsample with a low SA index, the coefficient on *Dev*×*TREAT*×*POST* is significantly positive at 0.045, while in column 2, for the subsample with a high SA index, the coefficient is significantly positive at 0.080, a much larger value and the difference between the two coefficients being significant at the 5% level. Further, in column 3 for the low 1/Number of bank branches subsample, the coefficient on *Dev*×*TREAT*×*POST* is marginally significant at 0.036, while in column 4 for the subsample of high 1/Number of bank branches the coefficient is positive at the significance level of 1%, but with a value (0.094) that is significantly larger than the preceding coefficients. Thus, we show that the role of AACs in facilitating upward adjustment of leverage is more important for financially constrained

firms.

3. Political Connections

Because of the underdeveloped legal and financial systems in China, ties to the government or political connections play a central role in business activities (Allen *et al.*, 2005). Studies such as Chen *et al.* (2011) show that building a relationship with the government becomes essential for firms to achieve superior economic resources and avoid discretionary fees, because the local governments in China can either grant preferential treatment or impose extra fees and fines on businesses at their discretion when allocating economic resources. Similarly, we believe that politically connected firms enjoy preferential treatment from the government when going through the administrative approval process for collateral registration. Therefore, we expect the acceleration effect in firms' leverage adjustments will be less pronounced for politically connected firms given they are less adversely affected by government intervention.

To test this prediction, we separately investigate the speed of leverage adjustment in firms with and without political connections. We adopt two measures of political connections: the political influence of ownership, which is measured by the firm's property rights, and the political influence of executives, which is measured by the political connections of the board chair and the CEO. First, we split our sample into SOEs and non-SOEs, with a firm classified as an SOE if it is ultimately controlled by the government, and as a non-SOE otherwise. We treat non-SOEs to have less political connections, and SOEs to have more political connections. Second, senior executives' political connections also play a significant role in a firm's relationship with the government, thus we take the executives' political connections as our second proxy, especially focusing on the board chairs or the CEOs. We take the firm as politically connected (Yes group) if either the board chairs or the CEOs of listed firms currently serve, or formerly served, as a bureaucrat in the local or central government or the military, and non-politically connected (No group) otherwise. Finally, we examine the

speed of leverage adjustment for firms in both groups. The subsample regression results are reported in Panel C of Table 5.

In column 1, for the subsample of non-SOEs, the coefficient on *Dev*×*TREAT*×*POST* is significantly positive at 0.096, while in column 2, for the subsample of SOEs, the coefficient is only significantly positive at 0.040, a much smaller value, and the difference between the two coefficients being marginal significant at the 5% level. Further, in column 3 for the subsample whose board chair or CEO is not politically connected, the coefficient on *Dev*×*TREAT*×*POST* is significantly positive at 0.089, while in column 4 for the subsample firms with a politically connected board chair or CEO, the coefficient is insignificant, and the value (0.027) that is significantly smaller than the preceding coefficients. Thus, we show that the role of AACs in facilitating upward adjustment of leverage is more pronounced among firms without political connections.

[Insert Table 5 here]

E. Robustness Checks

1. Dosage Tests

We first test alternative definitions of AAC establishment. Specifically, we introduce three alternative AAC "dosage" measures (*DOSE*): (1) the number of approval departments, (2) the number of approval items, and (3) the number of approval windows (all in hundreds). These dosage measures provide indications of the intensity of administrative approval reform at AACs. Because an AAC aims to centralize approval departments in one office and provide one-stop services, the numbers of departments, approval items, and windows associated with an AAC determine the breadth of departmental coordination and the extent to which transaction costs during the credit borrowing process are reduced. We use the regression model of equation (10) to test the effect of AACs on the speed of leverage adjustment, replacing the variable *TREAT* from our main regression model with *DOSE*:

$$\Delta Lev_{i,t} = \left(\gamma_0 + \gamma_1 DOSE \times POST + \gamma_2 DOSE + \gamma_2 POST\right) Dev_{i,t} + Firm\ FE + City\ FE + Year\ FE + \varepsilon_{i,t} \quad (10)$$

The results, shown in Table 6, are consistent with those in our main tests. Notably, the effect is also economically sizable. For example, compared to firms in cities without AACs, the introduction of ten approval departments in an AAC leads to an increase of 0.0184 from the pre-AAC to the post-AAC period, accounting for 6.26% (0.0184/0.294) of the average speed of adjustment.[12]

[Insert Table 6 here]

2. Alternative Measures of Speed of Adjustment

In our main tests, we follow Faulkender *et al.* (2012) and Lemmon *et al.* (2008) in using system GMM to estimate equation (4) and obtain our target leverage. However, the system GMM method ignores the range of the dependent variable and thus can over-estimate the speed of leverage adjustment (Chang and Dasgupta, 2009; Mukherjee and Wang, 2013). Because the dependent variable $Lev_{i,t}$ lies between 0 and 1, as a robustness check, we use a double-censored Tobit model to estimate the target leverage. Specifically, we use: (1) a DPF estimator, following Loudermilk (2007) and Elsas and Florysiak (2015), which is unbiased and consistent in the context of unbalanced *dynamic panel data* with a *fractional* dependent variable, and accounts for fixed effects. The DPF estimator is a maximum likelihood estimator that builds on the work of Loudermilk (2007) and changes her specification of the presumed fixed effects distribution, such that it allows for unbalanced panel data, which we encounter in almost every corporate finance study; (2) a firm-fixed effects estimator, following Fama and French (2002) and Flannery and Rangan (2006), which makes the partial adjustment model a dynamic panel model and better fits the data in Flannery and Rangan (2006); (3) a least-squares dummy variable corrected (LSDVC) estimator, according to Kiviet (1995) and Bruno (2005), which is the bias-corrected estimator for dynamic models.

[12] During our sample period, the mean and standard deviation of approval department are 45.17 and 15.01, respectively.

The results are reported in Table 7 Panel A: the coefficients on *Dev*×*TREAT*×*POST* are positive and significant at the 1% level in the regressions for all of these alternative estimators; our results in the two-stage approach are robust to alternative methods of estimation.

We used the two-stage approach of the dynamic partial adjustment model in the previous regressions to better show the effect of AAC, as per Faulkender *et al.* (2012) and Chang *et al.* (2014). Here, we adopt the traditional one-stage approach to conduct a further robustness check. Specifically, we augment the standard dynamic partial adjustment model of equation (5) to produce the model of equation (11), following Flannery and Rangan (2006), Elsas and Florysiak (2015), and Halling *et al.* (2016), and redo the test. It should be noted that (1 - δ_1) measures the effect of AAC establishment on a firm's active speed of adjustment. However, in the regression results, the coefficient of *TREAT*×*POST*×Lev_{t-1} is δ_1, which merits attention when interpreting the results. In addition, we adopt three alternative methods in the one-stage approach: (1) a DPF estimator, following Loudermilk (2007) and Elsas and Florysiak (2015); (2) a firm-fixed effects estimator, following Fama and French (2002) and Flannery and Rangan (2006); (3) a GMM system estimator as proposed by Blundell and Bond (1998). The results are reported in Panel B of Table 7. The coefficients of *TREAT*×*POST*×Lev_{t-1} are all significantly negative, which in turn represents a significant positive effect of AAC establishment on firms' active speed of adjustment. Therefore, our results still hold under a one-stage approach.

$$Lev_{i,t} = \alpha + \left(1 - (\delta_0 + \delta_1 TREAT \times POST + \delta_2 TREAT)\right) \times Lev_{i,t-1} + \beta\chi_{i,t-1} + \mu_i + \varepsilon_{i,t} \quad (11)$$

[Insert Table 7 here]

3. Placebo Test

Given that, over time, our results may be driven by the subsequent introduction of other city-level policies or regional economic developments, we implement a placebo test to exclude any such omitted time-series-related factors. Following Blundell and Bond (1998), we randomly select a year during the sample period as the pseudo-year for AAC establishment for each city. We then re-estimate the regression of column 2 of Table 2 Panel A by replacing the actual years of AAC establishment with these "placebo" years. We repeat this estimation 1000 times and compare the observed coefficients for the key variables *Dev*×*TREAT*×*POST* from these randomized placebo samples with those of our original (baseline) regression.

Figure 3 presents a histogram of the distribution of the coefficients of the interaction term *Dev*×*TREAT*×*POST* from the tests based on 1000 simulated pseudo-establishment samples, and compares the results with the coefficient for the interaction term based on the actual AAC establishment samples, as reported in column 2 of Table 2 Panel A.

[Insert Figure 3 about here]

We observe that the coefficient estimates from 1000 simulated pseudo-establishment samples display a normal distribution centered on 0.02, while the coefficient for *Dev*×*TREAT*×*POST* from our baseline regression (0.059) lies well to the right in the histogram plot. Moreover, the number of coefficient estimates from the placebo test that are greater than 0.059 was just 16 (1.6%), meaning that just 3.2% of the total sample lay further from the center. This is less than the critical level of 5%, meaning that our results satisfied the placebo test with a statistical significance at the 5% level. Unreported results show that the mean and median of the coefficient estimates for *Dev*×*TREAT*×*POST* from the 1000 simulated pseudo-establishment samples are both 0.022, and most of the placebo estimates are statistically insignificant.[13]

To summarize, the results from the placebo test indicate that the timing of AAC establishment supports the causal interpretation of the empirical evidence.

[13] These results can be provided upon request.

V. Economic Consequences

We further examine the economic consequences of AAC establishment. The existing accounting literature finds that firms with financial flexibility have improved investment ability and therefore increased performance in the longer term (Marchica and Mura, 2010). Thus, an increase in speed of leverage adjustment among firms located in cities with AACs may, in turn, lead to an increase in operating performance. If this is the case, then the positive if unintended consequence of AAC establishment on corporate capital structure flexibility will essentially induce further real effects on firms. To verify this prediction, we separately test the effect of AAC establishment on the total factor productivity (TFP), accounting performance, and market performance of firms according to the following design:

$$\begin{aligned} TFP\_OP_{i,t} / TFP\_LP_{i,t} / ROE_{i,t} / EXROE_{i,t} / Tobin's\ Q_{i,t} = {} & \gamma_0 + \gamma_1 TREAT \times POST \\ & + \gamma_2 TREAT + Controls + Firm\ FE \\ & + City\ FE + Year\ FE + \varepsilon_{i,t} \end{aligned} \quad (12)$$

where *i* refers to the firm, and *t* to the year. Left-hand variables in equation (12) measure firm-level TFP, accounting performance, and market performance: *TFP_OP* is the TFP of firms based on the method of Olley and Pakes (1996); *TFP_LP* is the TFP of firms based on the method of Levinsohn and Petrin (2003) method; return on equity (*ROE*) is calculated as net income scaled by net assets; *EXROE* is calculated as net income minus government subsidy, scaled by net assets; *Tobin's Q* is market performance, and one element (*Tobin's Q_A*) is measured as the book value of total assets minus the book value of equity plus the market value of equity, divided by the book value of assets, while the other (*Tobin's Q_B*) is measured as the book value of total assets minus the book value of equity plus the market value of equity, divided by the book value of assets minus the net value of intangible assets and goodwill. Other variables are defined in Appendix I.

The results of the regressions are reported in Table 8. Columns 1 to 6 show that the coefficients for *TREAT*×*POST* are significantly positive after controlling for firm-

level characteristics and firm, city, and year fixed effects; that is, the real effect of AAC establishment is also economically sizable. For example, compared to the non-AAC cities, the numerical value of *Tobin's Q_B* increased by 0.122 in the post-AAC period, from 2.674 in the pre-AAC period, representing a 4.56% (0.122/2.674) improvement. Therefore, the results support our prediction that AAC establishment brings about real effects on firm value.

[Insert Table 8 here]

VI. Conclusion

We exploit the staggered rollout of AACs in China, a program aiming to alleviate bureaucracy in the bank loan granting process, to study the effect of government intervention on firms' leverage dynamics. We show that, on average, AACs help to shorten the leverage rebalancing period (toward target leverage) by up to one-quarter. The positive impact of AACs on speed of adjustment is more pronounced for under-leveraged firms, which issue more debt to rebalance leverage in post-AAC periods. Our results suggest that government intervention in bank loan granting process negatively affect leverage dynamics through increasing firms' adjustment costs.

Our cross-sectional analyses also show that the speed of leverage adjustment is accelerated more for firms that are in poorer legal environments, with more financial constraints, or less politically connected, because the reduction in adjustment costs that they experience following the setup of AACs is more significant. Finally, to the extent that attaining target capital structure enhances firm value, we note that the faster speed of adjustment that follows AAC establishment translates into higher firm value. Overall, we provide evidence that government intervention has unintended consequences on leverage dynamics and reducing it can accelerate firms' leverage rebalancing.

In the case of China, given its historically weak legal institutions, the government's initial purpose in launching a loan collateral approval process was intended to show its commitment to preserving market incentives and promoting private economic activities. However, the "helping hand" function requires government intervention to

be effective but limited; otherwise, government can effectively become a large number of substantially independent bureaucrats pursing their own agendas, or a "grabbing hand". Our study echoes Frye and Shleifer (1997) by further illustrating the complexities of government intervention and the difficulty of balancing market power and government power in capital markets when it comes to impacts on firms' leverage dynamics.

References:

Allen, F., Qian, J., & Qian, M. (2005). Law, finance, and economic growth in China. *Journal of Financial Economics*, 77(1), 57-116.

An, Z., Chen, C., Li, D., & Yin, C. (2021). Foreign institutional ownership and the speed of leverage adjustment: International evidence. *Journal of Corporate Finance*, 68, 101966.

An, Z., Li, D., & Yu, J. (2015). Firm crash risk, information environment, and speed of leverage adjustment. *Journal of Corporate Finance*, 31, 132-151.

Ayyagari, M., Demirgüç-Kunt, A., & Maksimovic, V. (2012). Financing of firms in developing countries: Lessons from research. *World Bank Policy Research Working Paper*(6036).

Baltagi, B. H. (2008). *Econometric analysis of panel data*. New York: John Wiley & Sons.

Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance*, 30(11), 2931-2943.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115-143.

Blundell, R., & Bond, S. (2000). GMM estimation with persistent panel data: An application to production functions. *Econometric Reviews*, 19(3), 321-340.

Bruno, G. S. F. (2005). Approximating the bias of the LDSV estimator for dynamic unbalanced panel data models. *Economics Letters*, 87(3), 361-366.

Byoun, S. (2008). How and when do firms adjust their capital structures toward targets? *The Journal of Finance*, 63(6), 3069-3096.

Chang, X., & Dasgupta, S. (2009). Target behavior and financing: How conclusive is the evidence? *The Journal of Finance (New York)*, 64(4), 1767-1796.

Chang, Y. K., Chou, R. K., & Huang, T. H. (2014). Corporate governance and the dynamics of capital structure: New evidence. *Journal of Banking & Finance*, 48, 374-385.

Chen, C. J. P., Li, Z., Su, X., & Sun, Z. (2011). Rent-seeking incentives, corporate political connections, and the control structure of private firms: Chinese evidence. *Journal of Corporate Finance*, 17(2), 229-243.

Chen, J. Z., Lobo, G. J., Wang, Y., & Yu, L. (2013). Loan collateral and financial reporting conservatism: Chinese evidence. *Journal of Banking & Finance*, 37(12), 4989-5006.

Çolak, G., Gungoraydinoglu, A., & Öztekin, Ö. (2018). Global leverage adjustments, uncertainty, and country institutional strength. *Journal of Financial Intermediation*, 35, 41-56.

Cook, D. O., & Tang, T. (2010). Macroeconomic conditions and capital structure adjustment speed. *Journal of Corporate Finance*, 16(1), 73-87.

Cull, R., Li, W., Sun, B., & Xu, L. C. (2015). Government connections and financial constraints: Evidence from a large representative sample of Chinese firms. *Journal of Corporate Finance*, 32,

271-294.

Dang, T. L., Dang, V. A., Moshirian, F., Nguyen, L., & Zhang, B. (2019). News media coverage and corporate leverage adjustments. *Journal of Banking & Finance*, 109, 105666.

Demarzo, P. M., & He, Z. (2021). Leverage dynamics without commitment. *The Journal of Finance*, 76(3), 1195-1250.

Devos, E., Rahman, S., & Tsang, D. (2017). Debt covenants and the speed of capital structure adjustment. *Journal of Corporate Finance*, 45, 1-18.

Djankov, S., McLiesh, C., & Shleifer, A. (2007). Private credit in 129 countries. *Journal of Financial Economics*, 84(2), 299-329.

Elsas, R., & Florysiak, D. (2015). Dynamic capital structure adjustment and the impact of fractional dependent variables. *Journal of Financial and Quantitative Analysis*, 50(5), 1105-1133.

Fama, E. F., & French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *Review of Financial Studies*, 15(1), 1-33.

Fan, G., Wang, X., & Zhu, H. (2011). *NERI Index of Marketization of China's Provinces 2011 Report*. Beijing: Economic Science Press(China).

Fan, Y., Liao, H., & Wei, Y. (2007). Can market oriented economic reforms contribute to energy efficiency improvement? Evidence from China. *Energy Policy*, 35(4), 2287-2295.

Faulkender, M., Flannery, M. J., Hankins, K. W., & Smith, J. M. (2012). Cash flows and leverage adjustments. *Journal of Financial Economics*, 103(3), 632-646.

Fier, S. G., McCullough, K. A., & Carson, J. M. (2013). Internal capital markets and the partial adjustment of leverage. *Journal of Banking & Finance*, 37(3), 1029-1039.

Flannery, M. J., & Hankins, K. W. (2013). Estimating dynamic panel models in corporate finance. *Journal of Corporate Finance*, 19, 1-19.

Flannery, M. J., & Rangan, K. P. (2006). Partial adjustment toward target capital structures. *Journal of Financial Economics*, 79(3), 469-506.

Frye, T., & Shleifer, A. (1997). The invisible hand and the grabbing hand. *American Economic Review*, 87(2), 354-358.

Hadlock, C. J., & Pierce, J. R. (2010). New evidence on measuring financial constraints: Moving beyond the KZ index. *Review of Financial Studies*, 23(5), 1909-1940.

Hale, G. (2007). Prospects for China's corporate bond market. *FRBSF Economic Letter*, 2007(7), 1-3.

Halling, M., Yu, J., & Zechner, J. (2016). Leverage dynamics over the business cycle. *Journal of Financial Economics*, 122(1), 21-41.

Hovakimian, A., Opler, T., & Titman, S. (2001). The debt-equity choice. *The Journal of Financial and Quantitative Analysis*, 36(1), 1.

Huang, R., & Ritter, J. R. (2009). Testing theories of capital structure and estimating the speed of adjustment. *Journal of Financial and Quantitative Analysis*, 44(2), 237-271.

Jayaratne, J., & Wolken, J. (1999). How important are small banks to small business lending?: New evidence from a survey of small firms. *Journal of Banking & Finance*, 23(2), 427-458.

Kiviet, J. F. (1995). On bias, inconsistency, and efficiency of various estimators in dynamic panel data models. *Journal of Econometrics*, 68(1), 53-78.

Korajczyk, R. A., & Levy, A. (2003). Capital structure choice: Macroeconomic conditions and financial constraints. *Journal of Financial Economics*, 68(1), 75-109.

Leary, M. T., & Roberts, M. R. (2005). Do firms rebalance their capital structures? *Journal of Finance*, 60(6), 2575-2619.

Leary, M. T., & Roberts, M. R. (2014). Do peer firms affect corporate financial policy? *The Journal of Finance*, 69(1), 139-178.

Lemmon, M., Roberts, M., & Zender, J. (2008). Back to the beginning: Persistence and the cross-section of corporate capital structure. *Journal of Finance*, 63, 1575-1608.

Levine, R. (1998). The legal environment, banks, and long-run economic growth. *Journal of Money, Credit and Banking*, 30(3), 596-613.

Levinsohn, J., & Petrin, A. (2003). Estimating production functions using inputs to control for unobservables. *The Review of Economic Studies*, 70(2), 317-341.

Li, W., Wu, C., Xu, L., & Tang, Q. (2017). Bank connections and the speed of leverage adjustment: Evidence from China's listed firms. *Accounting & Finance*, 57(5), 1349-1381.

Liao, L. C., Mukherjee, T., & Wang, W. (2015). Corporate governance and capital structure dynamics: An empirical study. *Journal of Financial Research*, 38(2), 169-192.

Liu, W. (1997). Current problems and difficulties of mortgage loans and countermeasures. *Financial Management Science*(01), 57-60.

Lockhart, G. B. (2014). Credit lines and leverage adjustments. *Journal of Corporate Finance*, 25, 274-288.

Loudermilk, M. S. (2007). Estimation of fractional dependent variables in dynamic panel data models with an application to firm dividend policy. *Journal of Business & Economic Statistics*, 25(4), 462-472.

Marchica, M., & Mura, R. (2010). Financial flexibility, investment ability, and firm value: Evidence from firms with spare debt capacity. *Financial Management*, 39(4), 1339-1365.

Morellec, E., Nikolov, B., Schürhoff, N., & Di Li. (2012). Corporate governance and capital structure dynamics. *The Journal of Finance*, 67(3), 803-848.

Mukherjee, T., & Wang, W. (2013). Capital structure deviation and speed of adjustment. *Financial Review*, 48(4), 597-615.

Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance*, 39(3), 574-592.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187-221.

Oeztekin, O., & Flannery, M. J. (2012). Institutional determinants of capital structure adjustment speeds. *Journal of Financial Economics*, 103(1), 88-112.

Olley, G. S., & Pakes, A. (1996). The dynamics of productivity in the telecommunications equipment industry. *Econometrica*, 64(6), 1263.

Poncet, S., Steingress, W., & Vandenbussche, H. (2010). Financial constraints in China: Firm-level evidence. *China Economic Review*, 21(3), 411-422.

Strebulaev, I. A. (2007). Do tests of capital structure theory mean what they say? *The Journal of Finance*, 62(4), 1747-1787.

Warr, R. S., Elliott, W. B., Koëter-Kant, J., & Öztekin, Ö. (2012). Equity mispricing and leverage adjustment costs. *Journal of Financial and Quantitative Analysis*, 47(3), 589-616.

World Bank. (2006). China: Governance, investment climate, and harmonious society: Competitiveness enhancements for 120 cities in China. *World Bank Report 37759-CN*.

Yang, J., & Qian, H. (2008). Survey evidence on commercial bank mortgage loans. *Journal of Financial Research*, 333, 79-87.

Zhou, Q., Tan, K. J. K., Faff, R., & Zhu, Y. (2016). Deviation from target capital structure, cost of equity and speed of adjustment. *Journal of Corporate Finance*, 39, 99-120.

Table 1 Descriptive Statistics

This table shows the descriptive statistics of the main variables, definitions of which are provided in Appendix I.

Variable	Obs.	Mean	Std.	Min	P25	P50	P75	Max
TREAT	12,333	0.779	0.415	0.000	1.000	1.000	1.000	1.000
POST	12,333	0.485	0.500	0.000	0.000	0.000	1.000	1.000
ΔLev	12,333	0.017	0.073	-0.191	-0.023	0.010	0.055	0.244
Dev	12,333	0.053	0.152	-0.315	-0.052	0.056	0.169	0.357
$L^*_{i,t}$	12,333	0.312	0.062	0.139	0.270	0.310	0.357	0.495
$L_{i,t}$	12,333	0.276	0.164	0.000	0.151	0.272	0.395	0.652
$L_{i,t-1}$	12,333	0.259	0.160	0.000	0.135	0.250	0.373	0.642
SIZE	12,333	21.370	1.060	19.290	20.640	21.220	21.960	24.840
MB	12,333	2.363	1.416	0.882	1.378	1.934	2.875	8.435
EBIT	12,333	0.054	0.061	-0.190	0.030	0.054	0.083	0.227
PPE	12,333	0.309	0.175	0.017	0.174	0.281	0.428	0.780
DEP	12,333	0.025	0.016	0.001	0.013	0.022	0.033	0.080
MED_LEV	12,333	0.268	0.086	0.042	0.210	0.263	0.325	0.497
LEV	12,333	0.473	0.179	0.066	0.343	0.481	0.609	0.860
AGE	12,333	9.672	4.410	1.000	6.000	9.000	13.000	21.000
ROE	12,333	0.049	0.161	-0.939	0.026	0.068	0.113	0.317
EXROE	12,333	0.042	0.162	-0.953	0.021	0.063	0.108	0.309
GQI_GOVDAYS	1,035	0.767	0.302	0.081	0.589	0.712	0.896	1.298
GQI_ABNORPAY	1,035	9.369	8.716	0.000	3.200	6.300	10.900	28.000
MKTIDX_CREDIT	12,333	9.398	3.789	0.000	6.730	10.040	12.940	14.650
GDP_PC	12,333	18.370	13.120	0.464	8.535	16.360	25.020	174.300
GDP_GR	12,333	15.580	6.871	0.309	11.190	15.130	18.920	44.640
IND_TERTIARY	12,333	44.540	10.610	22.900	37.050	43.890	49.940	75.100
DENSITY	12,333	6.376	0.766	1.740	5.986	6.486	6.772	7.904
INDNUM	12,333	7.553	1.284	3.135	6.613	7.580	8.654	9.954
WAGE_PC	12,333	9.814	0.589	8.561	9.364	9.840	10.270	11.060
OPEN	12,333	6.504	4.735	0.051	2.486	6.138	8.685	23.580

Table 2 The Establishment of AACs and the Speed of Leverage Adjustment

This table presents the main results of the impact of AAC establishment on the speed of leverage adjustment. A firm is grouped as under-leveraged if its leverage at the beginning of the year is below target leverage, and over-leveraged otherwise. Panel A reports the staggered DID estimation results, where columns 1 and 2 report the regression results for all firms, column 3 reports results for under-leveraged firms, and column 4 reports results for over-leveraged firms. Panel B reports the parallel trends estimation results. The sample period in Panel B is a window of [-4, 4] years around the AAC establishment year, and the baseline year is the third year before AAC establishment. Change in active leverage (*ΔLev*) is measured as the active leverage ratio less the adjusted lagged leverage ratio ($L_{i,t} - L^{p}_{i,t-1}$). Active deviation (*Dev*) is measured as target leverage ratio less adjusted lagged leverage ratio ($L^{*}_{i,t} - L^{p}_{i,t-1}$). An AAC establishment dummy (*TREAT*) takes a value of 1 if the city in which the firm is located established any AAC in the sample period, and 0 otherwise. A post-establishment dummy (*POST*) takes a value of 1 during the post-AAC period, and 0 during the pre-AAC period. *Year*(*j*) is a dummy variable indicating whether a firm-year observation is four years, two years, or one year before AAC establishment (-4, -2, and -1, respectively), is in the year of establishment (0), or is one, two, three, or four years after the establishment (1, 2, 3, and 4, respectively). All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are robust to heteroskedasticity and clustered at the firm level with *t*-statistics reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A Staggered DID Estimations

	Full sample		Under-leveraged	Over-leveraged
	1	2	3	4
	ΔLev	*ΔLev*	*ΔLev*	*ΔLev*
Dev×*TREAT*×*POST*		**0.059*****	**0.039****	**-0.030**
		(4.55)	**(2.24)**	**(-1.13)**
Dev×*TREAT*		-0.084***	-0.078**	-0.030
		(-3.61)	(-2.14)	(-0.56)
Dev	**0.281*****	0.318***	0.351***	0.455***
	(30.96)	(16.15)	(11.44)	(9.83)
Constant	0.005	0.008	-0.080***	0.093***
	(0.26)	(0.40)	(-2.85)	(5.75)
Firm, City & Year FEs	Yes	Yes	Yes	Yes
Observations	12,333	12,333	7,862	4,471
Adj. R-squared	0.171	0.173	0.108	0.197

Panel B Parallel Trends Test

	Full sample	Under-leveraged	Over-leveraged
	1	2	3
	ΔLev	*ΔLev*	*ΔLev*
Dev×*Year*(-4)	-0.026	-0.036	-0.001
	(-0.97)	(-1.17)	(-0.02)
Dev×*Year*(-2)	0.001	-0.002	-0.026
	(0.05)	(-0.09)	(-0.63)
Dev×*Year*(-1)	0.032	0.015	0.010
	(1.24)	(0.50)	(0.19)
Dev×*Year*(0)	0.038	0.036	-0.066
	(1.49)	(1.18)	(-1.44)
Dev×*Year*(1)	**0.086*****	**0.071****	**-0.021**
	(3.01)	**(2.02)**	**(-0.41)**
Dev×*Year*(2)	**0.123*****	**0.111*****	**-0.003**
	(4.40)	**(3.07)**	**(-0.06)**
Dev×*Year*(3)	**0.134*****	**0.149*****	**-0.025**
	(4.69)	**(3.94)**	**(-0.46)**
Dev×*Year*(4)	**0.130*****	**0.147*****	**-0.033**

	(4.31)	**(3.52)**	**(-0.53)**
Dev×TREAT	-0.037	-0.047	0.051
	(-1.14)	(-0.98)	(0.74)
Dev	0.320***	0.356***	0.459***
	(15.83)	(11.42)	(9.72)
Constant	0.005	-0.078***	0.069***
	(0.68)	(-4.28)	(8.49)
City, Firm & Year FEs	Yes	Yes	Yes
Observations	8,449	5,448	3,001
Adj. R-squared	0.209	0.133	0.231

Table 3 The Impact of AACs on Bureaucratic Delays

This table presents the mechanism analysis results of the impact of AAC establishment on bureaucratic delays in the credit process. Columns 1 and 2 reports the effect on bureaucratic delays in the credit process: *GQI_GOVDAYS* is the multiple of 100 days taken to deal with the government when applying for a bank loan; *GQI_ABNORPAY* is the probability of obtaining loans through irregular payments. *GDP_PC* is the GDP per capita for the city. *GDP_GR* is the growth of GDP per capita for the city. *IND_TERTIARY* is the proportion of the tertiary industry, measured as the tertiary industry GDP divided by the total GDP of the city. *DENSITY* is the natural logarithm of the city's population density. *INDNUM* is the natural logarithm of the number of industrial enterprises in the city. *WAGE_PC* is the natural logarithm of the average wage of the city. *OPEN* is the proportion of foreign investment in the city, measured by GDP created by foreign-invested enterprises divided by total GDP. Other variables are defined in Appendix I. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are robust to heteroskedasticity and clustered at the firm level with *t*-statistics reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2
	GQI_GOVDAYS	*GQI_ABNORPAY*
TREAT×POST	**-0.155*****	**-2.592*****
	(-6.95)	**(-4.50)**
TREAT	-0.119***	-3.293***
	(-3.47)	(-3.72)
GDP_PC	0.001	0.093***
	(1.22)	(3.33)
GDP_GR	0.012***	0.417***
	(4.75)	(6.28)
IND_TERTIARY	0.001	-0.210***
	(0.51)	(-4.05)
DENSITY	0.038**	1.013**
	(2.47)	(2.55)
INDNUM	-0.175***	-4.528***
	(-12.78)	(-12.78)
WAGE_PC	0.131***	-0.334
	(2.60)	(-0.26)
OPEN	-0.001***	-0.034***
	(-5.47)	(-4.88)
Constant	0.493	57.238***
	(1.24)	(5.58)
City, Firm & Year FEs	No	No
Observations	1,035	1,035
Adj. R-squared	0.301	0.439

Table 4 The Impact of AACs on Debt and Equity Issuance

This table presents the separate impacts of AAC establishment on debt and equity adjustment by estimating the logit model. A firm is grouped as under-leveraged if its leverage at the beginning of the year is below target leverage, and over-leveraged otherwise. Columns 1 to 3 report the impact on under-leveraged firms and their leverage-increasing decisions; columns 4 to 6 report the impact on over-leveraged firms and their leverage-decreasing decisions. *Lev_up* is the dummy for leverage increase in excess of 5% (when it takes a value of 1; otherwise 0), measured as net debt issuance minus net equity issuance, divided by book assets. Likewise, *Debt_up* is the dummy for debt increase in excess of 5%, measured as the net debt issuance in the current year divided by the book assets at the beginning of the year; *Equity_down* is the dummy for equity decrease in excess of 5%, measured as the net equity decline in the current year divided by the book assets at the beginning of the year; *Lev_down* is the dummy for leverage decrease in excess of 5%, measured as net equity issuance minus net debt issuance, divided by book assets; *Debt_down* is the dummy for debt decrease in excess of 5%, measured as the net debt decline in the current year divided by the book assets at the beginning of the year; *Equity_up* is the dummy for equity increase in excess of 5%, measured as the net equity issuance in the current year divided by the book assets at the beginning of the year. |*Dev*| is the absolute value of active deviation at the beginning of the year. Other variables are defined in Appendix I. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are robust to heteroskedasticity and clustered at the firm level with *t*-statistics reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Under-leveraged			Over-leveraged		
	Leverage increase	Debt increase	Equity decrease	Leverage decrease	Debt decrease	Equity increase
	(1)	(2)	(3)	(4)	(5)	(6)
	Lev_up	*Debt_up*	*Equity_down*	*Lev_down*	*Debt_down*	*Equity_up*
|*Dev*|×*TREAT*×*POST*	**0.318****	**0.333****	**0.076**	**-0.253**	**-0.227**	**-0.178**
	(1.99)	**(2.00)**	**(0.70)**	**(-0.92)**	**(-1.09)**	**(-0.89)**
|*Dev*|×*TREAT*	-0.370	-0.605**	-0.262*	0.128	0.133	-0.204
	(-1.63)	(-2.56)	(-1.70)	(0.36)	(0.49)	(-0.78)
TREAT×*POST*	-0.024	-0.027	0.006	-0.002	0.002	0.025
	(-0.72)	(-0.78)	(0.25)	(-0.04)	(0.07)	(0.70)
TREAT	-0.402	-0.496	-0.777	-0.667	0.017	0.660
	(-0.53)	(-0.63)	(-1.50)	(-0.70)	(0.02)	(0.96)
|*Dev*|	1.318***	1.008***	0.594***	1.138***	0.565***	0.488**
	(7.12)	(5.24)	(4.72)	(4.08)	(2.69)	(2.41)
Constant	0.746	0.657	0.296	0.768	-0.106	-0.290
	(1.59)	(1.35)	(0.93)	(0.89)	(-0.16)	(-0.46)
Firm, City & Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,862	7,862	7,862	4,471	4,471	4,471
Pseudo R-squared	0.040	0.117	0.152	0.061	0.109	0.058

Table 5 Cross-sectional Analyses

This table presents the cross-sectional results for the impact of AAC establishment on firms' capital structure adjustment. Panel A shows the subsample regression results in relation to the legal environment: *Legal institution index* is measured as the development of market intermediaries and the level of protection of producers' and consumers' interests; *Number of lawyers* is measured as the number of lawyers in a province scaled by its total population. Panel B shows the subsample regression results in relation to financial constraints. *SA index* is the *Size-Age index* following Hadlock and Pierce (2010), which equals - 0.737 × *SIZE* + (0.043 × $SIZE^2$) - (0.040 × *AGE*), where *SIZE* is firm size, *AGE* is the number of years the firm is listed with a non-missing price in the market. *1/Number of bank branches* is the inverse of the number of bank branches within 30 km around the firm. Both measures are direct proxies for financial constraints, and a higher value indicates greater financial constraints. The sample is split in two according to the median of each measure by industry in each year. If a firm belongs to a group above the median, we place it in the *High* group, otherwise in the *Low* group. Panel C shows the subsample regression results in relation to political connection. We adopt two measures of political connections: the political influence of ownership, which is measured by the firm's property rights, and the political influence of executives, which is measured by the political connections of the board chair and the CEO. Firms are split according to property rights, into *SOE* and *Non-SOE* groups, with a firm classified as an SOE if it is ultimately controlled by the government, and considered as non-SOE otherwise. Executives' political connections are defined as Yes if either the board chairs or the CEOs of listed firms currently serve, or formerly served, as a bureaucrat in the local or central government or the military, and No otherwise. Other variables are defined in Appendix I. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are robust to heteroskedasticity and clustered at the firm level with *t*-statistics reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A Legal Environment

	Legal institution index		Number of lawyers	
	Low	High	Low	High
	1	2	3	4
	ΔLev	*ΔLev*	*ΔLev*	*ΔLev*
Dev×TREAT×POST	**0.070*****	**0.025**	**0.088*****	**0.010**
	(2.90)	**(1.20)**	**(3.71)**	**(0.44)**
Difference Test	***chi2(1) = 3.96***		***chi2(1) = 6.79***	
	Prob>chi2 = 0.0467		***Prob>chi2 = 0.0092***	
Dev×TREAT	-0.071***	-0.051**	-0.092***	-0.053**
	(-2.91)	(-2.52)	(-3.83)	(-2.33)
Dev	0.299***	0.299***	0.295***	0.313***
	(21.73)	(23.87)	(23.62)	(19.21)
Constant	-0.082***	-0.011	-0.021**	-0.022**
	(-5.77)	(-1.18)	(-2.05)	(-2.42)
Firm, City & Year FEs	Yes	Yes	Yes	Yes
Observations	6,298	6,035	7,023	5,310
Adj R-squared	0.181	0.178	0.173	0.191

Panel B Financial Constraints

	SA index		1/Number of bank branches	
	Low	High	Low	High
	1	2	3	4
	ΔLev	*ΔLev*	*ΔLev*	*ΔLev*
Dev×TREAT×POST	**0.045****	**0.080*****	**0.036***	**0.094*****
	(2.49)	**(3.70)**	**(1.94)**	**(4.72)**
Difference Test	***chi2(1) = 3.61***		***chi2(1) = 5.54***	
	Prob>chi2 = 0.0573		***Prob>chi2 = 0.0186***	
Dev×TREAT	-0.052	-0.089**	-1.098***	-0.091***
	(-1.37)	(-2.55)	(-6.29)	(-3.27)

Dev	0.323***	0.352***	1.364***	0.316***
	(9.24)	(13.38)	(7.88)	(15.62)
Constant	0.011	-0.014*	-0.088***	0.016
	(0.67)	(-1.86)	(-7.64)	(0.73)
Firm, City & Year FEs	Yes	Yes	Yes	Yes
Observations	6,421	5,912	5,888	6,445
Adj. R-squared	0.201	0.186	0.178	0.190

Panel C Political Connections

	Property rights		Executives' political connections	
	Non-SOEs	SOEs	No	Yes
	1	2	3	4
	ΔLev	*ΔLev*	*ΔLev*	*ΔLev*
Dev×TREAT×POST	**0.096*****	**0.040*****	**0.089*****	**0.027**
	(3.58)	**(2.59)**	**(3.62)**	**(1.50)**
Difference Test	***chi2(1) = 3.69***		***chi2(1) = 5.26***	
	Prob>chi2 = 0.0546		***Prob>chi2 = 0.0219***	
Dev×TREAT	-0.165**	-0.071***	-0.156***	-0.062*
	(-1.97)	(-2.85)	(-3.66)	(-1.94)
Dev	0.444***	0.313***	0.461***	0.340***
	(5.16)	(16.22)	(13.03)	(13.01)
Constant	-0.079***	-0.031***	-0.062**	-0.023***
	(-4.32)	(-5.11)	(-2.34)	(-3.81)
Firm, City & Year FEs	Yes	Yes	Yes	Yes
Observations	3,433	8,900	6,267	6,066
Adj. R-squared	0.252	0.172	0.236	0.172

Table 6 Dosage Test

This table presents the dosage test results. We introduce three additional AAC dosage measures (*DOSE*): the number of approval departments, the number of approval items, and the number of approval windows (all in hundreds). Panel A shows the results by the number of approval departments, Panel B by the number of approval items, and Panel C by the number of approval windows. A firm is grouped as under-leveraged if its leverage at the beginning of the year is below target leverage, and over-leveraged otherwise. Column 1 reports the regression results for all firms; column 2 reports the results for under-leveraged firms; column 3 reports the results for over-leveraged firms. Other variables are defined in Appendix I. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are robust to heteroskedasticity and clustered at the firm level with *t*-statistics reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A *DOSE* = Number of approval departments

	Full sample	Under-leveraged	Over-leveraged
	1	2	3
	ΔLev	*ΔLev*	*ΔLev*
Dev×*DOSE*×*POST*	**0.184****	**0.204****	**-0.134**
	(2.56)	**(2.13)**	**(-0.93)**
Dev×*DOSE*	-0.152***	-0.153**	0.073
	(-3.63)	(-2.46)	(0.73)
Dev×*POST*	-0.017	-0.045	0.010
	(-0.54)	(-0.98)	(0.17)
Dev	0.294***	0.336***	0.423***
	(18.16)	(13.92)	(12.94)
Constant	0.006	-0.080***	0.096***
	(0.30)	(-2.88)	(6.10)
Firm, City & Year FEs	Yes	Yes	Yes
Observations	11,987	7,651	4,336
Adj. R-squared	0.172	0.108	0.199

Panel B *DOSE* = Number of approval items

	Full sample	Under-leveraged	Over-leveraged
	1	2	3
	ΔLev	*ΔLev*	*ΔLev*
Dev×*DOSE*×*POST*	**0.013****	**0.012***	**0.005**
	(2.51)	**(1.76)**	**(0.46)**
Dev×*DOSE*	-0.014***	-0.011*	-0.010
	(-3.27)	(-1.81)	(-0.94)
Dev×*POST*	0.014	-0.006	-0.039
	(0.75)	(-0.21)	(-1.03)
Dev	0.285***	0.317***	0.450***
	(19.90)	(14.73)	(15.09)
Constant	0.007	-0.079***	0.093***
	(0.35)	(-2.82)	(5.87)
Firm, City & Year FEs	Yes	Yes	Yes
Observations	12,333	7,862	4,471
Adj. R-squared	0.173	0.108	0.197

Panel C *DOSE* = Number of approval windows

	Full sample	Under-leveraged	Over-leveraged
	1	2	3
	ΔLev	*ΔLev*	*ΔLev*
Dev×*DOSE*×*POST*	**0.065*****	**0.055****	**-0.037**

	(3.76)	**(2.42)**	**(-0.85)**
Dev×DOSE	-0.055***	-0.056**	0.004
	(-3.82)	(-2.58)	(0.09)
Dev×POST	-0.009	-0.018	-0.002
	(-0.41)	(-0.60)	(-0.06)
Dev	0.290***	0.329***	0.436***
	(19.32)	(14.95)	(14.06)
Constant	0.007	-0.079***	0.094***
	(0.32)	(-2.83)	(6.03)
Firm, City & Year FEs	Yes	Yes	Yes
Observations	12,333	7,862	4,471
Adj. R-squared	0.173	0.108	0.197

Table 7 Alternative Measures of Speed of Adjustment

This table presents the staggered DID estimation results from alternative measures of speed of adjustment. Panel A shows the results based on the two-stage approach in the model of equation (6). Column 1 shows the results of a DPF estimator following Loudermilk (2007) and Elsas and Florysiak (2015), column 2 shows the results of a firm-fixed effects estimator following Fama and French (2002) and Flannery and Rangan (2006), and column 3 shows the results of a LSDVC estimator following Kiviet (1995) and Bruno (2005). Panel B shows the results based on the one-stage approach in the model of equation (11), in which column 1 shows the results of a DPF estimator following Bruno (2005) and Elsas and Florysiak (2015), column 2 shows the results of a firm-fixed effects estimator following Fama and French (2002) and Flannery and Rangan (2006), and column 3 shows the results of a system GMM estimator as proposed by Blundell and Bond (1998). Change in active leverage (*ΔLev*) is measured as the active leverage ratio less the adjusted lagged leverage ratio ($L_{i,t}$ - $L^{p}_{i,t-1}$), active leverage ratio $L_{i,t}$ is the total debt divided by book assets in the current period, and adjusted lagged leverage ratio $L^{p}_{i,t-1}$ is the sum of total debt in the previous period and net income in the current period divided by the book assets in the current period. Active deviation (*Dev*) is measured as target leverage ratio less adjusted lagged leverage ratio ($L^{*}_{i,t}$ - $L^{p}_{i,t-1}$), target leverage ratio $L^{*}_{i,t}$ is estimated using the method presented in the model of equation (3), following Blundell and Bond (1998), Chang *et al.* (2014), and Flannery and Hankins (2013). An AAC establishment dummy (*TREAT*) takes a value of 1 if the city in which a firm is located established any AAC in the sample period, and 0 otherwise. A post-establishment dummy (*POST*) takes a value of 1 for the post-AAC period, and 0 for the pre-AAC period. Panel B is missing 644 observations from Panel A because typical applications of the DPF and system GMM estimators are panel regressions with a lagged dependent variable (LEV_{t-1} here); we keep observations with non-missing dependent variables. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are robust to heteroskedasticity and clustered at the firm level with *t*-statistics reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A Two-stage Approach

	DPF	FE	LSDVC
	1	2	3
	ΔLev	*ΔLev*	*ΔLev*
Dev×*TREAT*×*POST*	**0.043*****	**0.045*****	**0.031*****
	(3.21)	**(3.12)**	**(3.38)**
Dev×*TREAT*	-0.090***	-0.092***	-0.078***
	(-3.19)	(-3.21)	(-2.89)
Dev	0.363***	0.363***	0.359***
	(14.56)	(14.47)	(14.53)
Constant	-0.008	0.004	-0.056**
	(-0.38)	(0.18)	(-2.54)
Firm, City & Year FEs	Yes	Yes	Yes
Observations	12,333	12,333	12,333
Adj. R-squared	0.158	0.158	0.158

Panel B One-stage Approach

	DPF	FE	SYSGMM
	1	2	3
	LEV	*LEV*	*LEV*
LEV_{t-1}×*TREAT*×*POST*	**-0.019****	**-0.016***	**-0.017***
	(-2.19)	**(-1.95)**	**(-1.84)**
LEV_{t-1}×*TREAT*	-0.273***	0.067***	-0.162***
	(-20.28)	(3.62)	(-3.03)
LEV_{t-1}	1.019***	0.625***	0.952***
	(120.95)	(38.55)	(11.15)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

Observations	11,689	11,689	11,689
Adj. R-squared		0.360	

Table 8 Economic Consequences of AAC Establishment

This table presents the results of an analysis of the economic consequences of AAC establishment on firm-level total factor productivity (TFP), accounting performance, and market performance: columns 1 and 2 report the effect on TFP; columns 3 and 4 report the effect on accounting performance; columns 5 and 6 report the effect on market performance. *TFP_OP* is the TFP of firms based on the method of Olley and Pakes (1996); *TFP_LP* is the TFP of firms based on the method of Levinsohn and Petrin (2003), *ROE* is calculated as net income scaled by net assets, and *EXROE* is calculated as net income minus government subsidy, scaled by net assets. *Tobin's Q_A* is the book value of total assets minus the book value of equity plus the market value of equity, divided by the book value of assets, and *Tobin's Q_B* is the book value of total assets minus the book value of equity plus the market value of equity, divided by the book value of assets minus the net value of intangible assets and goodwill. Other variables are defined in Appendix I. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are robust to heteroskedasticity and clustered at the firm level with *t*-statistics reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5	6
	TFP_OP	*TFP_LP*	*ROE*	*EXROE*	*Tobin's Q_A*	*Tobin's Q_B*
TREAT×POST	**0.047****	**0.042***	**0.038****	**0.044****	**0.109****	**0.122****
	(2.01)	**(1.73)**	**(2.24)**	**(2.54)**	**(2.39)**	**(2.49)**
TREAT	-0.918***	-1.153***	-0.437*	-0.413	-0.132	0.493
	(-3.57)	(-3.70)	(-1.70)	(-1.62)	(-0.35)	(1.53)
SIZE	0.702***	0.533***	0.024	0.002	-0.487***	-0.533***
	(30.27)	(21.69)	(1.10)	(0.08)	(-6.60)	(-6.86)
MTB	0.000	0.001	-0.091***	-0.102***	0.064**	0.070**
	(0.32)	(0.83)	(-5.13)	(-5.34)	(2.16)	(2.30)
LEV	-0.032	-0.072	-0.433***	-0.372***	-1.423***	-1.475***
	(-0.42)	(-0.91)	(-5.36)	(-4.20)	(-5.92)	(-5.80)
AGE	0.019	0.022	0.005	0.004	0.010	0.006
	(0.77)	(0.72)	(0.25)	(0.21)	(0.25)	(0.16)
Constant	-0.660	-0.650	0.925*	1.381**	13.452***	14.205***
	(-1.21)	(-1.11)	(1.79)	(2.50)	(8.45)	(8.64)
Firm, City & Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,249	10,249	12,333	12,333	12,333	12,333
Adj. R-squared	0.679	0.585	0.402	0.448	0.544	0.533

Figure 1 Flowchart for Acquisition of Collateral or Pledge Loans by Firms

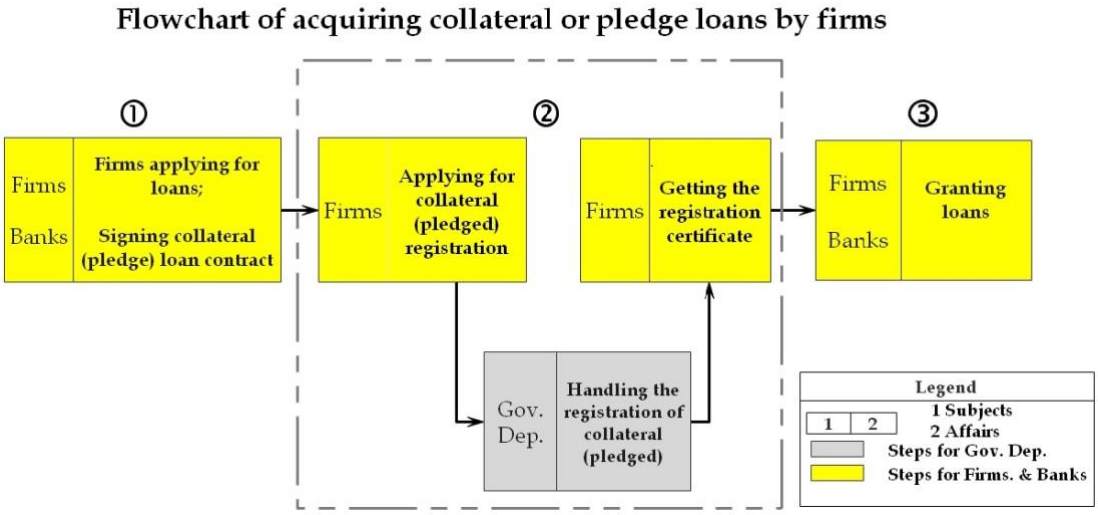


Figure 2 Annual Distribution of Establishment of Administrative Approval Centers (AACs) in Prefecture-level Cities

This figure illustrates the development trend in relation to prefectural AACs. The gray bars show the numbers of new establishments of prefectural AACs each year, and the black dotted line shows the cumulative number of prefectural AACs established.

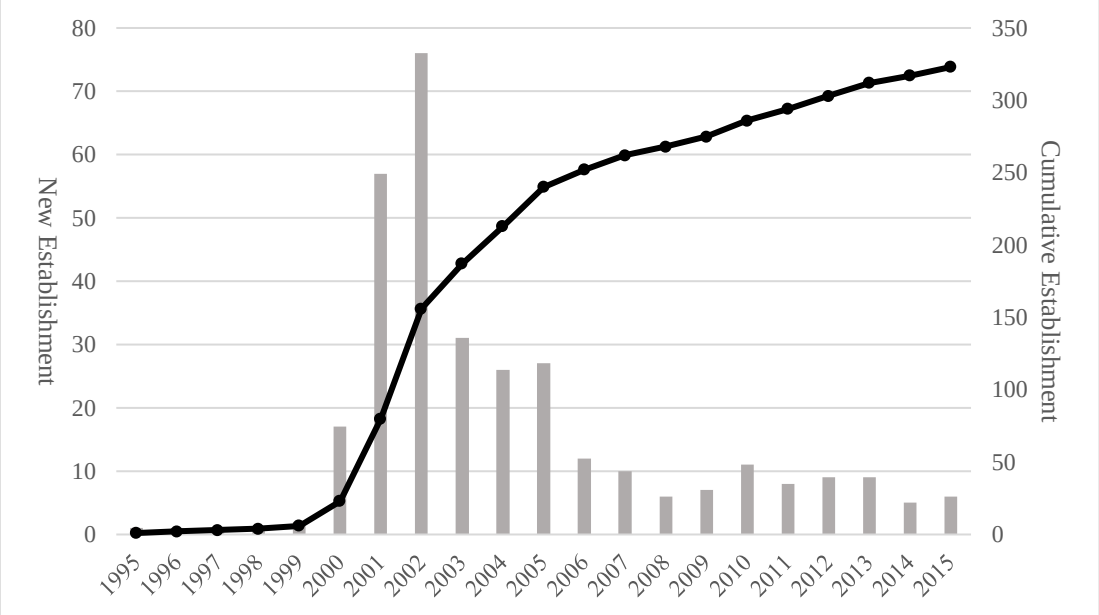
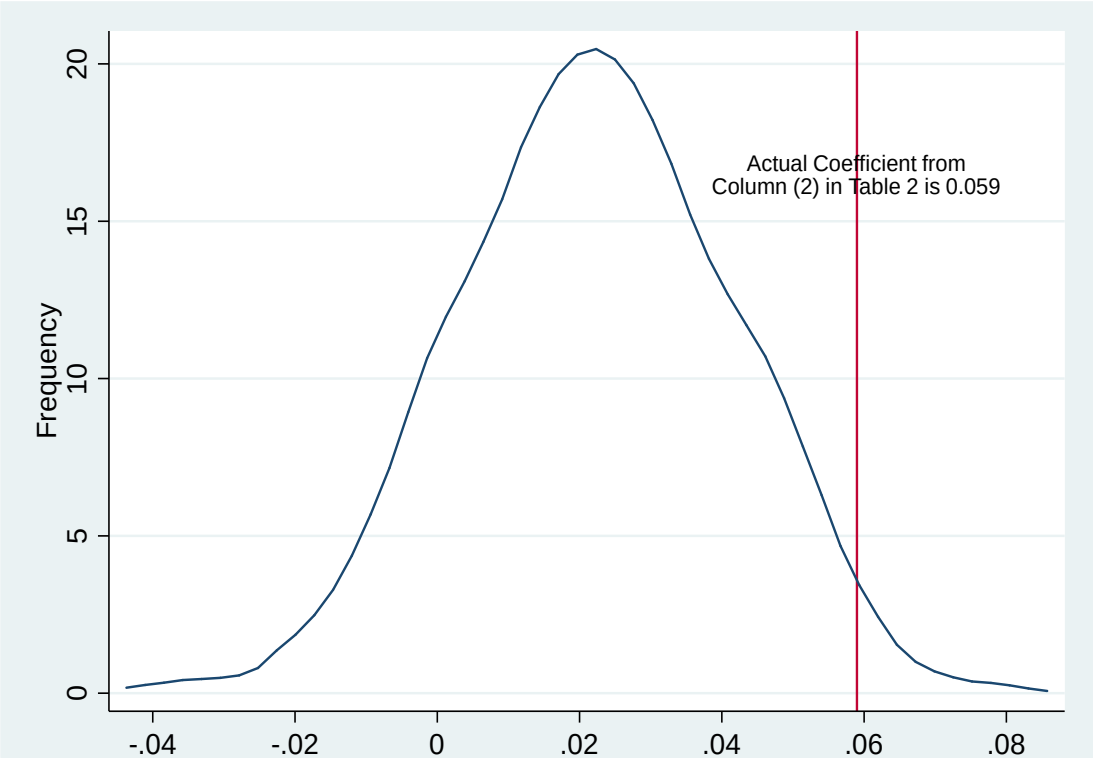


Figure 3 Placebo Test: Histogram Distribution of Regression Coefficients

This figure presents a histogram of the distribution of the regression coefficients of *Dev*×*TREAT*×*POST* in the model of equation (6) following a placebo test in which we randomly generated years within the sample period as the (pseudo-)AAC establishment years for each city and then re-estimated column 2 of Table 2 Panel A; the process was repeated 1000 times to produce 1000 regression results. The red vertical line shows the actual coefficient from column 2 of Table 2 Panel A.

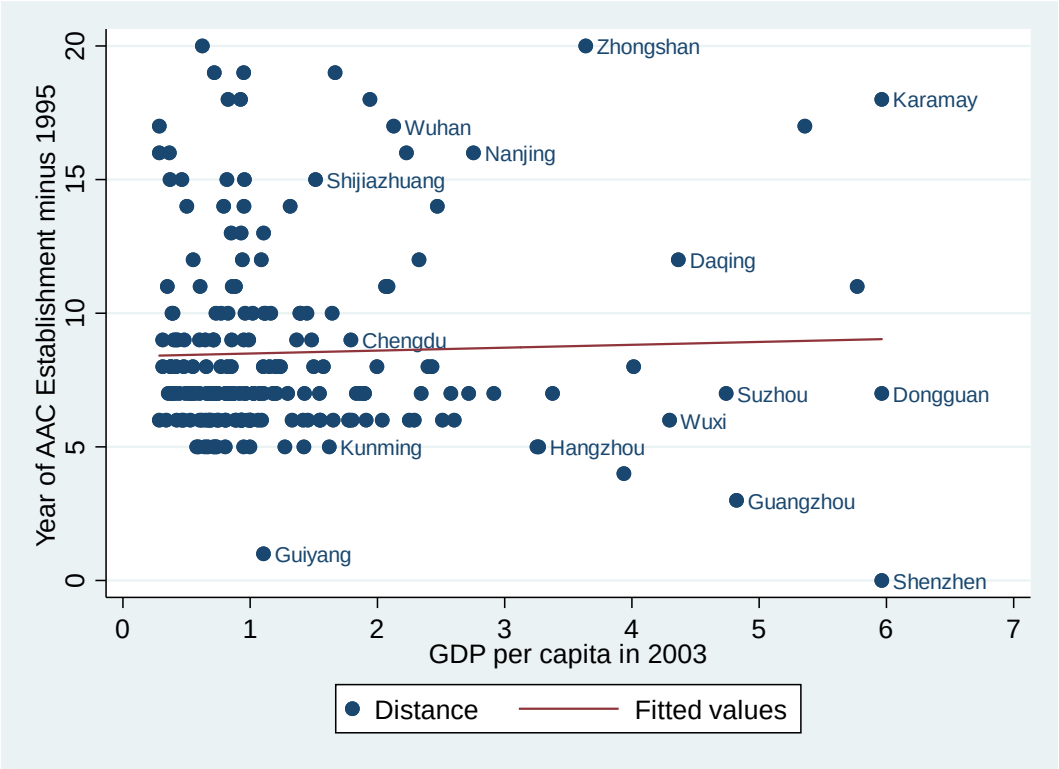


Appendix I Variable Definitions

Variable	Definition
ΔLev	Change in active leverage, measured as the active leverage ratio less the adjusted lagged leverage ratio, namely $L_{i,t} - L^{p}_{i,t-1}$ in the model of equation (5). $L_{i,t}$ is the active leverage ratio, measured as total debt divided by book assets in the current period, and $L^{p}_{i,t-1}$ is the adjusted lagged leverage ratio, measured as the sum of total debt in the previous period and net income in the current period, divided by the book assets in the current period.
Dev	Active deviation from target leverage, measured as the target leverage ratio less the adjusted lagged leverage ratio, namely $L^{*}_{i,t} - L^{p}_{i,t-1}$ in the model of equation (5). Target leverage ratio $L^{*}_{i,t}$ is estimated using the method presented in the model of equation (3), following Blundell and Bond (1998), Chang *et al.* (2014), and Flannery and Hankins (2013).
TREAT	AAC establishment dummy, takes a value of 1 if the city in which a firm is located established any AAC in the sample period, and 0 otherwise.
POST	Post-AAC establishment dummy, takes a value of 1 for the post-AAC period, and 0 for the pre-AAC period.
SIZE	Firm size, measured as the natural logarithm of the firm's total assets at the end of the fiscal year.
MB	Market-to-book ratio, measured as the sum of total market value and total book debt, divided by total book assets at the end of the fiscal year.
EBIT	Income before interest and taxes divided by total book assets at the end of the fiscal year.
PPE	Property, plant, and equipment ratio, measured as the sum of net fixed assets and net construction in progress, divided by total assets at the end of the fiscal year.
DEP	Firm non-debt tax shield, measured as the depreciation of a firm's fixed assets divided by its total assets at the end of the fiscal year.
MED_LEV	Industry capital structure, measured as the median of the leverage ratio of a firm's industry.
LEV	Firm leverage, measured as total liability divided by total book assets at the end of the fiscal year.
AGE	Firm age, measured as the number of years of listing prior to the observation year.
TFP_OP	The total factor productivity (TFP) of firms based on the method of Olley and Pakes (1996).
TFP_LP	The TFP of firms based on the method of Levinsohn and Petrin (2003).
ROE	Firm performance, measured as net income scaled by net assets.
EXROE	Firm performance, measured as net income minus government subsidy, scaled by net assets.
Tobin's Q_A	Book value of total assets minus the book value of equity plus the market value of equity, divided by the book value of assets.
Tobin's Q_B	Book value of total assets minus the book value of equity plus the market value of equity, divided by the book value of assets minus the net value of intangible assets and goodwill.
GQI_GOVDAYS	Multiple of 100 days needed to deal with the government when applying for bank loans (World Bank, 2006).
GQI_ABNORPAY	Probability of obtaining loans through irregular payments (World Bank, 2006).
MKTIDX_CREDIT	Marketization of credit allocation in the city (Fan *et al.*, 2011).
GDP_PC	GDP per capita for the city.
GDP_GR	Growth in GDP per capita for the city.
IND_TERTIARY	Proportion of tertiary industry, measured as the tertiary industry GDP divided by the total GDP of the city.
DENSITY	The natural logarithm of the population density of the city.
INDNUM	The natural logarithm of the number of industrial enterprises in the city.
WAGE_PC	The natural logarithm of the average wage per citizen in the city.
OPEN	Proportion of foreign investment, measured by GDP created by foreign-invested enterprises divided by total GDP for the city.

Appendix II GDP Per Capita in 2003 and in the Year of AAC Establishment

This figure presents the GDP per capita in 2003 (*x*-axis) and in the year of AAC establishment relative to 1995 (*y*-axis) for each city; 1995 is when Shenzhen established China's first AAC.



Appendix III Case: Enterprise Acquisition of a Bank Loan Using Land and Housing as Collateral

This appendix illustrates the impact of AACs on the credit process, using the common example of a firm using housing and land as collateral for a bank loan.[14]

As illustrated in Figure A1, prior to the establishment of AACs the specific process for a firm to obtain a bank loan using collateral involved:[15]

① **Signing the loan contract and the collateral contract.**

② **Registering the collateral**. This involves dealing with different government departments and is complicated and tedious, as follows:

1) Verifying the file at the information inquiry windows of the Housing Administrative Bureau (HAB hereafter) and the Land Administrative Bureau (LAB hereafter). The firm will receive the verification certificates of housing and land rights status, respectively, once verification has been completed.

2) Filing the collateral contract at the transaction filing windows of the HAB and LAB. Again, the firm will receive the collateral contract filing certificates of housing and land rights status, respectively, once filing has been completed.

3) Registering the collateral at the collateral registration windows of the HAB and LAB. This is the most critical step, required to provide documentation including collateral registration application forms for housing and land, letter of attorney (if necessary), financial and business licenses of the bank, assessment reports on housing and land, list of collateral, certificates/copies for housing and land, ID card/copies for mortgagee and bank manager, collateral contract, and loan contract. In addition, as mortgagee, the firm is required to provide appropriate resolutions of a shareholders' meeting and the board of directors, its business license, its articles of incorporation, an authorization letter from the firm, ID cards of the legal executive and the manager, and certificate of the legal executive. After submission to the relevant windows, each window completes four steps of acceptance, review, registration, and certification, as follows:

i. Acceptance. The windows check the identity of the firm and bank, whether they are handled by this registry, whether the relevant materials are complete, and ask for information related to collateral registration. This step also involves cross-agency information inquiries; specifically, checking the identity information of firms and banks requires input from the public security department, checking the business license of firms and banks requires input from the market supervision department, checking the financial license of banks requires input from the banking and insurance supervision department, and so on.

ii. Review. The windows check the registers of housing and land, whether there is any ban or seizure on the collateral being registered, and the specific information on the loan and collateral contracts. Checking the registers of housing and land needs the file information from the information inquiry window, and checking for bans or seizures on collateral needs the registration filing information from the

[14] Land use rights and ownership of the buildings on the land are usually collateralized at the same time, as required by Article 31 of the *Urban Real Estate Management Law of the People's Republic of China (1994)* (http://gtghj.wuhan.gov.cn/hs/pc-246-818.html).

[15] For convenience, only the process of collateral registration is shown in Figure 4.

transaction filing window.

iii. Registration. The collateral registration window registers the housing and land matters in the register according to the specific information in the loan and collateral contracts.

iv. Certification. The window makes and prints the collateral registration certificates for the housing and land, then notifies the firm to retrieve the real estate and land certificates, and provides the bank with the collateral registration certificates of housing and land.

4) Payment of fees. Having received notice from the collateral registration office, the borrowing firm goes to the fee payment window to pay the collateral registration fee.

5) Receiving the certificate. The firm retrieves the real estate and land certificates, and the bank gets the collateral registration certificates, with proof of the associated fee payments.

③ Granting of loan by bank.

The process described above shows that, prior to AAC establishment, multiple government departments were involved in granting administrative approval of a collateral-based loan to a firm before a bank could formally issue a loan. In particular, the collateral registration step requires a firm to go to multiple windows of the HAB and LAB, and repeatedly submit multiple materials. A total of seven steps are involved and, in areas where the relative responsibilities of the housing and land departments are unclear, it can consume even more time.

Following the establishment of the AACs, the specific process required for a firm to obtain a collateral-based bank loan, as illustrated in Figure A2, is as follows:

① Signing the loan contract and the collateral contract.

② Registering the collateral.

1) Collateral registration at the "one-stop" window of AAC. This only requires the borrowing firm and the bank to submit relevant materials at the "one-stop" window for collateral registration. The window will complete the four steps of acceptance, review, registration, and certificate production. The checks of acceptance, review, and so on are completed within the AAC, generally only taking three working days, after which firms and banks will be notified to retrieve the collateral registration certificate and other property certificates.

2) Paying the fee and receiving the certificate. Having received notice from the AAC, the firm goes to the "one-stop" service window for collateral registration to pay the fee and retrieve the real estate and land certificates, and the bank is provided with the collateral registration certificates.

③ Granting of loan by bank.

The process described above shows that, following the establishment of the AACs, a firm only needs to contact the government administrative service department twice to obtain a collateral-based loan; the process is much simplified, from seven to two steps, and the time is greatly reduced. The process for the government departments is also reduced (from four steps to three), and the approval departments collaborate with each other to improve the efficiency of the approval process and reduce the time involved.

Figure A1 Flowchart of Acquiring Bank Loans Using Land and Housing as Collateral Prior to AAC Establishment

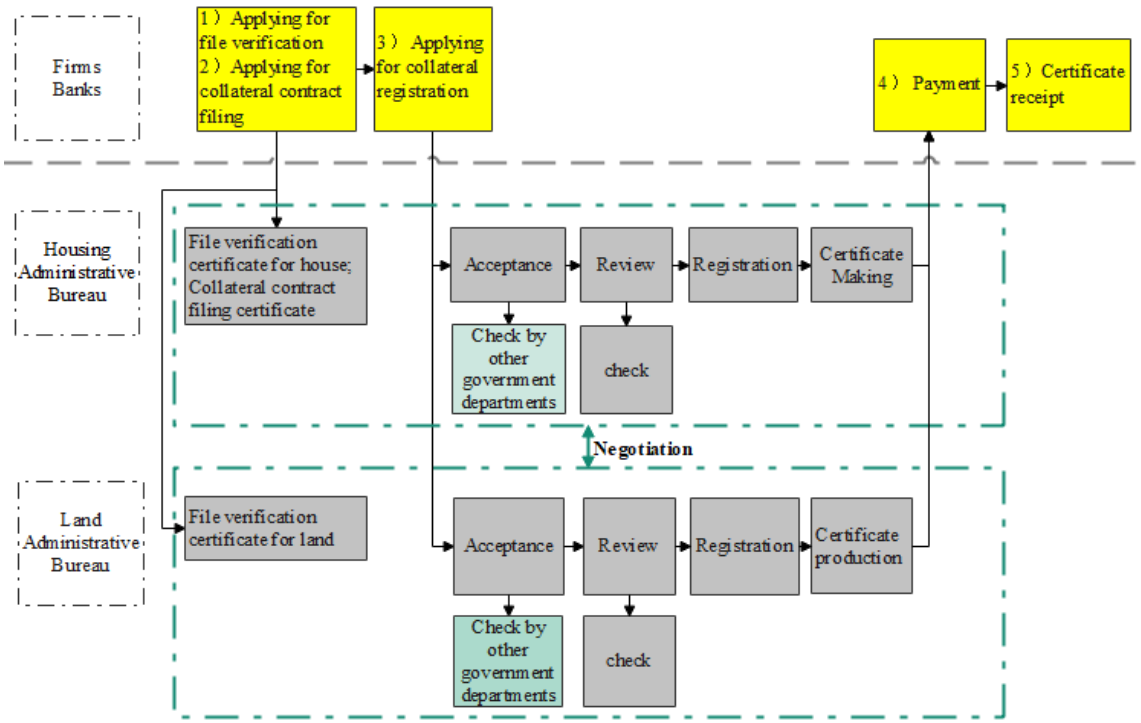


Figure A2 Flowchart of Acquiring Bank Loans Using Land and Housing as Collateral after AAC Establishment