Unleashing Mass Entrepreneurship: Firm-Level Evidence on the Impact of China's Registered Capital Reform

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Abstract

We study a major reform of business entry regulations in China and its impact on business creation. To stimulate entrepreneurship, an amendment of China's Company Law in 2013 eliminated minimum "registered capital" requirements, allowing firms to form without significant equity investment. Using a confidential taxpayer dataset of all firms in a large province and a regression discontinuity design, we investigate the legislation's causal impact on the size, performance, and financing choices made by newly registered firms, and on aggregate firm entry. We find that the reform enabled firms to start with 31.6% lower assets and 94.1% lower equity capital, but generate similar levels of revenues as firms registered before the reform, indicating an improvement in investment efficiency. On average the newly registered firms are just as profitable as prior firms, but profitability in the smallest firms (by revenue) is higher, suggesting the entrance of productive but wealth-constrained firms. The reform also allowed firms to optimize their financing structure by borrowing more and smoothing equity contributions over time. Firm registration substantially increased, especially among firms owned by single individual entrepreneurs.

Keywords: Capital structure; Entrepreneurship, Entry regulation, Informality, Registered capital

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1 Introduction

The regulation of business entry is among the world's most widely debated policy topics. Early cross-country studies (Djankov et al., 2002; Klapper et al., 2006) argue that regulations hamper business creation and are detrimental to economic growth. The influence of this view, magnified by the World Bank's Doing Business Rankings, led to reforms in over a hundred countries since the early 2000s to lower barriers to business entry (Djankov, 2009). Yet more recent studies based on quasi-experimental design challenge this orthodox view and suggest that reducing costs of entry may have limited or no effect on firms' decisions to formalize (Bruhn and McKenzie, 2014), while formalization itself may not give rise to better firm performance (Benhassine et al., 2018; Ulyssea, 2020). Still, some theories predict—with some empirical support—that reducing business entry costs may have positive effects at the aggregate level, especially when binding financial constraints can be relaxed in addition to entry cost reduction (Bazzi et al., 2023; Lopez-Martin, 2019; Ulyssea, 2018).

In this paper, we study China's amendment of the Company Law (CL) in 2013, which removed mandatory minimum capital contribution requirements in favor of a regime where shareholders merely declare intentions to contribute capital in the future. The Chinese government undertook this reform of registered capital (RC) regulation as a part of its effort to stimulate entrepreneurship.[1] The reform significantly reduced the initial costs of forming limited liability companies, the primary corporate form in China. It also provided companies with greater flexibility in their financing choices. In contrast to entry regulation reforms examined in previous studies (Branstetter et al., 2014; Bruhn and McKenzie, 2014; Kaplan et al., 2011), China's RC reform offers a unique opportunity to study entry regulation's impact on corporate finance in small private firms.

We start by outlining a simple model for understanding how a minimum equity requirement affects business formation and new firms' financing choices. Following Evans and Jovanovic (1989), our model features heterogeneity in productivity and wealth among entrepreneurs and predicts that the RC reform may affect new firms on both extensive and intensive margins. On the one hand, lowering entry barriers may induce both entrepreneurs with low productivity—-those that would not have found the fixed cost of a new company worthwhile—-and productive entrepreneurs—who would have been pre-

[1] China specifically aimed to improve China's place in the Doing Business Rankings. The 2013 CL amendment stood at the beginning of a series of policy measures that China enacted in the ensuing years to improve the business environment. The World Bank suspended its Doing Business Rankings in 2021 after allegations that Bank executives may have yielded to pressures from several governments, including China, to change ranking methodologies. By 2020, before the Ranking was suspended, China had risen to the 31st place.

vented from forming a business because of limited wealth—to launch new firms. On the other hand, eliminating the RC requirements allows newly registered firms to optimize the level of initial investments and the debt/equity mix.

Using a confidential administrative dataset from a large Chinese province and a regression discontinuity (RD) design, we causally identify the new RC regime's impact on the size and performance of newly formed firms, as well as on firms' financial decisions and firm entry. Our first set of results relates to firm size. RD analysis shows that firms registered just after the reform report on average 31.6% smaller total assets than firms registered just before, and such gap is persistent for at least three years. Yet strikingly, on average, post-reform firms resembled pre-reform firms in terms of revenue, costs, and other operational characteristics such as accounts receivable and inventory. Moreover, post-reform firms reported only a small decline in employee count. In other words, the real operational scale of post-reform firms is comparable to firms formed earlier, implying that the entry of optimally small, unproductive firms was not the dominant effect of lowering regulatory barriers. Moreover, given that post-reform firms had significantly lower assets, investment efficiency dramatically improved.

These initial findings suggest that, when the RC regime is binding, revenue is a better indicator of firm size than assets. We leverage this insight and examine the reform's heterogeneous impact on large and small firms (defined as firms in the top and bottom quartiles, respectively, of the revenue distribution). We find that the reform caused declines in assets and employee count only in small but not large firms, confirming the theoretical prediction that lower entry barriers should induce entry of marginal firms mainly among small firms. Moreover, firm profitability increased among small firms, while loss-making probability shows no change between firms formed before the reform and after, regardless of firm size. We interpret this as evidence for changes in the composition of new firms—in particular, for the entry of productive entrepreneurs who are wealth-constrained.

We next examine firms' financing decisions. After the reform, shareholders in a large proportion of firms elected to contribute (almost) zero equity, and on average paid-in capital declined by 94%. This change is observed among both small and large firms. Similarly, firm liabilities also increased across the board, by an average of 188%. We confirm that this increase in liability—especially notable given the reduction in total asset size—is observed in multi-shareholder firms: it is thus unlikely to have resulted from a mere re-labeling of equity as debt. Moreover, large firms displayed a significant increase in accounts payable, suggesting that firms made greater use of trade credit as well as bank borrowing. Overall, we find strong evidence that post-reform firms benefited from new financing flexibility and preferred debt financing.

Finally, we examine three sets of extensive margin outcomes: the number of new firm registrations, firm exit rates and changes in shareholder structure. Using difference-in-differences (DiD), we show that firm formation significantly increased (by 33-36%) after the reform. Our estimate of the entry effect is substantially larger than previous estimates from other countries regarding the impact of entry deregulation. While we cannot rule out the possibility that many new entrants would have operated as unincorporated sole proprietors in the absence of the reform, we show that new entries cannot be explained by substitution away from unincorporated entity forms (e.g. partnerships). As for the firm exit, we find insignificant changes for firms at age 1, but a significant increase for firms at age 2. We also find a significant increase in the number of firms owned by a single individual.

Our study contributes to several existing literatures in developmental economics, law and finance, and entrepreneurship and business dynamism in China. The first literature our work relates to is studies of the impact of entry deregulation on entrepreneurial activities. While existing empirical studies of entry deregulation focus on the administrative cost of registration (Benhassine et al., 2018; Branstetter et al., 2014; De Andrade et al., 2016), minimum capital requirements continue to present significant barriers to entry in many countries rich or poor (DLA Piper, 2023).[2] Arguably, such requirements amount to more than "static" entry barriers (Bazzi et al., 2023) and resemble ongoing financial constraints. Utilizing the rich dataset on firm characteristics, we provide a comprehensive evaluation of firm investment, performance, and financing choices to answer the question: how did minimum capital requirements distort market entry decisions and financing choices made by newly formed businesses?

Our study is closely related to the contemporaneous work of Barwick et al. (2022), which analyzes business entry liberalization in China's Guangdong province between December 2012 and March 2014. The Guangdong reform both relaxed RC requirements and simplified business registration: in effect, they implemented, on an experimental basis, both the nationwide reform of the RC regime in 2014 and a set of business registration simplification measures rolled out elsewhere in 2015-2016. Barwick et al. (2022) use the reform's staggered introduction in Guangdong to identify its causal effect on business dynamism and productivity. Our study is distinct from theirs in three respects. First, the nature of Guangdong's reform was such that one cannot separate the effects of RC rule changes and those of cutting registration red tape. In contrast, we sharply identify the effect of eliminating the RC requirement alone. We thereby reveal a mechanism of pro-

[2]Hansen (2019), for example, reports a recent Danish policy controversy that resulted in a reinstatement of minimum capital requirements after several years of liberalization.

ductivity enhancement–improvements in investment efficiency–that they do not consider. We also emphasize the reform's impact even on infra-marginal firms, which we believe to be an important perspective in evaluating the 2013 CL amendment. Second, while Barwick et al. (2022) focuses on increased market turnover, we give greater attention to firms' financing decisions and firm-level dynamics. Third, our RD design complements their DiD design by identifying the immediate impact of the reform, which is helpful given the multiplicity of Chinese government policies showered upon small businesses that may confound the reform's observed effect over longer periods of time.

A second literature to which we contribute is the study of the financing behavior of privately-held firms. Brav (2009) documents extensive differences in capital structure among UK private and public firms consistent with more costly equity financing for private firms. In light of such higher costs, minimum capital requirements for private firms are especially likely to be distortionary. While a number of studies have emerged to analyze private firm capital structure in developed countries Bigelli and Sánchez-Vidal (2012); Cole (2013); Gao et al. (2013), Colla et al. (2020) highlights the dearth of studies of private firm capital structure in developing countries. Our study not only helps to fill this gap but also uses a quasi-natural experiment to provide support for the pecking order of financing options postulated in the prior literature.

A third literature germane to our paper examines entrepreneurship and business dynamism in China. Brandt et al. (2012) finds that net business entry accounted for two thirds of China's total factor productivity growth during 1998-2007, and suggests that policies liberalizing business entry played an important role. Jiang et al. (2022) similarly shows that reform-induced business entry accounted for a substantial portion of productivity growth in China's manufacturing sector during 2004-7, and identifies multiple channels for such effect. Brandt et al. (2020) further focuses on entry barriers and shows that a measure of such barrier—calibrated by data from the World Bank's Doing Business Index for Chinese cities in 2008—predicts inter-provincial variations in labor productivity. Cerdeiro and Ruane (2022) argues that declining business dynamism may explain China's slower productivity growth in the 2010s compared to the 2000s. The 2013 CL amendment we study can be seen as a part of the Chinese government's response to this threat of declining business dynamism, a response that may turn out to be as important as regulatory reforms in the late 1990s. Our study is not only among the first to examine the impact of this new policy, but also offers a unique perspective by identifying the granular causal impact of the policy on the choices of new entrants.

In the following, Section 2 summarizes the background of the 2013 CL amendment. Section 3 presents a simple model that delivers our main predictions. Section 4 describes

our data and preliminary graphic evidence of the impact of the RC reform, while also discussing our empirical strategy and how challenges to identification are resolved. Section 5 provides results regarding the RC reform's impact on firm size, performance, and financial decision. It also addresses concerns about potential anticipation effects of policy announcement, and offers additional robustness checks, including using different bandwidths for the benchmark and heterogeneity RD analyses and applying placebo tests to validate the RD design. Finally, Section 6 reviews evidence regarding firm entry, exit, and changes in ownership composition. The Conclusion discusses the implications of our findings.

2 Policy Background

Registered capital (RC) rules—also known as "legal capital" requirements—were a common feature of company law regimes around the world and generally comprised two components (Armour, 2006): a requirement of minimal capital contributions by shareholders upon company formation, and a requirement to maintain any declared amount of equity capital (above the minimum) in the company by limiting distributions to shareholders. Legal capital requirements were generally abolished under state law in the U.S. by the 1970s, have been eroded in Europe due to regulatory competition, and are currently required under EU law only for public companies. Critics of the legal capital requirement argue that the requirement does little to protect creditors (or do so in an extremely crude way) while hindering entrepreneurship, and that contract and insolvency laws render the requirement redundant (Armour, 2006; Schön, 2004).

We refer to China's Company Law prior to its 2013 amendment as the "2005 CL" (the statute had its previous amendment in 2005) while the statute after its 2013 amendment as the "2013 CL." Under both the 2005 CL and the 2013 CL, in principle, a shareholder is liable to the company to the extent of their subscribed capital contributions. Under the 2005 CL, this principle was implemented in part through the RC rules. A company's RC is the total amount of shareholder-subscribed capital that is reported to the business registration authority and stated in the company's business license. The 2005 CL provided that for a company to be properly established, shareholders must contribute a minimum amount of equity capital, and such contributions must be verified by qualified third parties. For most limited liability companies (*youxian zeren gongsi* or LLCs), [3] the minimum capital

[3]The LLC form is restricted to no more than 50 shareholders. We ignore CL provisions regarding companies limited by shares (*gufen youxian gongsi*), which permit more shareholders but are relevant mainly when companies aim for stock market listing and therefore are rare in our sample.

required to be contributed upon company formation was the greater of (i) CNY100,000 for an LLC owned by a single individual, or CNY 30,000 otherwise, and (ii) 20% of the RC that shareholders intend to be declared on the company's business license. Any portion of a company's RC not contributed upon company formation must be contributed within two years. The company's business license must offer information about the cumulative aggregate contributions made towards the company's RC. Each company must also maintain a record of shareholders with the registration authority, listing each shareholder's actual capital contribution.

China's National People's Congress (NPC) amended the CL on December 28, 2013, with the sole aim of changing the RC system. The amended CL took effect on March 1, 2014, and entirely removed the mandatory minimal RC requirement: a company can be formed even with just CNY 1 of RC. Moreover, restrictions on the timing by which subscribed capital must be actually contributed were removed, leaving such timing to shareholder agreements and company charters. In short, the 2013 CL no longer imposes any requirement on actual capital contributions to back up shareholder subscriptions to RC. Correspondingly, although an RC amount still needs to appear on the company's business license, no capital contribution or capital verification is required for company formation; the business license no longer states the actual amount of capital contributed (and is no longer updated in this respect), and the shareholder registry filed with the registration authority no longer needs to offer information about actual contributions. Further, a previous requirement that at least 30% of the company's RC must be contributed in cash is removed. Table 1 summarizes these changes introduced by the 2013 CL.

The 2013 CL clearly lowered both the regulatory barrier to company formation and regulatory burdens on corporate operations. Not only are shareholders freed from committing to a minimum amount of equity capital and to a restricted period for capital contributions at the start of a company, but they are also freed from the red tape of making changes to the business license and publicly-filed shareholder registry whenever new shareholder capital contributions are made. An equally important set of implications (though their empirical manifestations is beyond the scope of this paper) relates to corporate distributions. The 2013 CL leaves unchanged a number of provisions on distributions that are tied to the concept of RC. Nominally, changing RC constitutes a major corporate change and must be approved by shareholder meetings. Moreover, "capital reductions"—understood as the reduction of RC—must be preceded by an accounting of the company's assets and liabilities and by notices to creditors. Before the 2013 CL, since RC and actual capital contributions were tied together (subscribed capital must be contributed within 2 years), changes in actual capital typically required changes to RC and would trigger the requirements of

Table 1: Main Changes to Registered Capital Requirements in 2013 Company Law Amendment

	2005 Company Law	**2013 Company Law**
Minimum initial capital contribution at company formation	The greater of CNY30,000 and 20% of RC; CNY100,000 for an LLC owned by a single individual.	None.
Time limit on full contribution of RC	Generally, within 2 years for company formation.	None.
Limitations on types of capital contribution	Cash contribution must be at least 30% of RC.	None.
Capital verification	All contributions must be verified by a qualified 3rd party; required for registration.	Only in-kind contributions need to be verified.
Business license reference to contributed capital	A business license must state the company's actual contributed capital.	No statement of contributed capital.
Shareholder registry filed with public authority	Must contain contributed capital for each shareholder.	Shareholder contribution omitted.
Limitations on capital reduction	RC cannot be reduced below statutory minimum (same as for initial contribution).	No statutory minimum.

shareholder meetings and notifications for creditors. Once the 2013 CL severed the relation between RC and actual contributions, however, shareholders have greater freedom with respect to distributions as well as contributions——both can be made without changing the company's RC.[4]

The legislative history of the 2013 CL amendment is relevant for our research design. On March 14, 2013, China's State Council presented a comprehensive package of regula-

[4]Moreover, under both the 2005 CL and the 2013 CL, 10% of current-year profits must be retained by the company in a "statutory common reserve" until the reserve reaches 50% of RC, before distributions can be made. Therefore the freedom to lower the RC also permits greater flexibility in payouts.

tory reform principles to the NPC. The idea of converting the RC system from an "actual contribution" to a "subscription only" system was mentioned in one sentence, but neither specific terms nor the timelines for implementing this change was given. In essence, the NPC gave the State Council mandate to make more specific proposals.

On October 25, 2013, the State Council was reported to have approved a Plan for Reforming the Registered Capital and Business Registration System, but the plan was not released to the public until after the CL amendment. The details of the RC reform came to be known only when the State Council presented draft legislation to the NPC on December 23, 2013. The 2013 CL was enacted 5 days later. There was thus little opportunity for the public to anticipate the details of the CL amendment before December 28, 2013. The main anticipation period of the new RC rules lasted from December 28, 2013 to February 28, 2014.

The reform led by the executive branch was quickly implemented throughout China. Judicial response and elaboration of the consequences of the change of the RC requirement would not come until years later.[5]

3 Theoretical Motivation

This section lays out a model of firm entry decisions by potential entrepreneurs. The model follows Evans and Jovanovic (1989) and introduces two sources of entrepreneurial heterogeneity, productivity and wealth. To keep the model simple, we study a static environment and focus on how a minimum equity requirement forces potential entrepreneurs to stay out of the market and distorts new firms' financing and investment decisions. For brevity, we outline the optimization problems and model results here. The detailed model derivation will be included in a forthcoming Appendix.

3.1 Setup

Assume a mass of heterogeneous agents, endowed with wealth a and productivity θ, each drawn from independent distributions. At the beginning of the period, an agent faces

[5]The radical change to the RC regime brought about by the 2013 CL left many questions open—critically, how a shareholder's obligations to the company to the extent of subscribed capital contributions is to be enforced. According to China's Supreme People's Court (SPC), subscribed capital that has not been contributed is considered a part of a company's assets at liquidation. Creditors may enforce the contribution of subscribed but unpaid capital when a company's assets are insufficient for debt repayment. A 2019 SPC interpretation, however, limited the circumstances under which creditors can pursue such enforcement.

an opportunity to start a business.[6] If she starts a business, she chooses capital input k financed from equity investment e and firm debt b. The firm faces a borrowing constraint: $b \leq \phi a$. Firm equity comes from entrepreneur wealth and faces a wealth constraint: $e \leq a$. Assume the production function to be Cobb-Douglas with decreasing return to scales: $f(\theta, k) = \theta k^{\alpha}$, where $\alpha < 1$.

To model the RC requirement before the 2013 CL, the entrepreneur faces a minimum equity requirement to start the firm: $e \geq \underline{e}$. The price $p(\tilde{e})$ of the good sold by the firm is assumed to be determined in part by its declared RC $\tilde{e}$, which equals the equity investment under the old regime. The rationale of this setting is that declared RC may be a useful signal to a firm's potential trade partners in evaluating the firm's financial stability and business opportunities. In particular, the price function is assumed to be $p(e, \theta) = \left(\frac{e}{e^*(\theta)}\right)^{\gamma}$ with $\gamma < 1 - \alpha$, where $e^*(\theta)$ is the optimal equity investment for wealth-unconstrained entrepreneurs with productivity θ (discussed shortly below). Employing $e^*(\theta)$ as the numeraire in the price function simplifies the calculation without losing the main mechanisms of the RC effects. The decision to initiate a business is contingent upon the firm's economic profit $L(\theta, a)$ being non-negative, as expressed below:

$$L(\theta, a) = \max_{k,e,b} (1 - \tau)\big(p(e, \theta) f(\theta, k) - rb - c\big) - r^d e \geq 0 \tag{1}$$
$$s.t.\ k = e + b, b \leq \phi a, e \leq a, e \geq \underline{e}$$

where τ is the corporate tax rate, c is the fixed cost, and r and r^d are the exogenous borrowing and saving rates, with $r^d \leq r$. We start by solving the unconstrained problem with all three inequalities slack. When all constraints are slack, the agent's entry and investment decisions should only depend on productivity θ, with the optimal equity investment being denoted as $e^*(\theta)$ and $e^*_\theta > 0$.

Minimum equity requirement The direct impact of the minimum equity requirement is to prevent agents with wealth $a < \underline{e}$ from entering the market. It is important to note that natural barriers to entry already exist. Given that $L(\theta, a)$ increases with both inputs, we could derive the minimum productivity threshold $\underline{\theta}$ by setting $L(\theta, \underline{e}) = 0$. Similarly, we could derive the minimum asset threshold $a_L(\theta)$ by setting $L(\theta, a) = 0$ in the absence of the equity requirement. These conditions indicate that agents with $\theta \geq \underline{\theta}$ and $a \geq a_L(\theta)$ will enter the market in the absence of the minimum equity requirement. Consequently, the equity requirement stops potential entrepreneurs with limited wealth from entering:

[6] Agents only live for one period and consume all wealth by the period's end. We thus show how productivity and wealth determine firm entry and investment decisions in the absence of inter-temporal choices.

agents with productivity $\theta \geq \underline{\theta}$ and wealth $\underline{e} > a \geq a_L(\theta)$ are forced to stay out of the market. We refer to this type of firm as ***wealth-marginal entrants***.

The second effect of the minimum equity requirement is to distort firm entry behaviors for unproductive agents. In the absence of the minimum equity requirement, the minimum productivity threshold, denoted as $\underline{\theta}^o$, is derived by setting $L(\theta, e^*(\theta)) = 0$, with $\underline{\theta}^o < \underline{\theta}$. Agents with $\underline{\theta} > \theta > \underline{\theta}^o$ and $a \geq \underline{e}$ will choose not to enter the market under the minimum equity requirement. We refer to this type of entrepreneur as ***productivity-marginal entrants***.[7]

Lastly, the equity requirement has also distorted the investment behaviors of certain infra-marginal entrants. To understand this impact, we first identify agents who are unaffected by this requirement. By setting $e^*(\theta) = \underline{e}$, we can derive the productivity threshold θ_r such that agents with $a \geq \underline{e}$ and $\theta \geq \theta_r$ are unaffected by the minimum equity requirement. Therefore, agents with $\theta_r > \theta > \underline{\theta}$ and $a \geq \underline{e}$ are forced to increase equity investment to meet the requirement.

3.2 The RC reform

The RC reform has two components: (i) removing the minimum equity requirement; and (ii) reforming the RC system from compulsory to voluntary, which suggests the signaling effect of the declared RC becomes invalid and the price function is no longer affected by the RC, i.e. $p(e) = 1$.

Impacts on marginal entrants The RC reform frees two types of potential market entrants: (i) wealth marginal entrepreneurs with $\theta \geq \underline{\theta}$ and $a_L(\theta) < a < \underline{e}$; (ii) productivity marginal entrepreneurs with $\underline{\theta} > \theta \geq \underline{\theta}'$ and $a > \tilde{a}_L(\theta)$, where $\underline{\theta}'$ denotes the minimum productivity after the reform and $\tilde{a}_L(\theta)$ denotes the minimum asset required to enter the market after reform.[8]

Impacts on infra-marginal entrants Both components of the RC reform affect the infra-marginal entrants. Consider first the impact of the voluntary RC system. Before the reform, the signaling effect of the declared RC on the price function provided higher marginal returns to equity than debt and gave entrepreneurs an additional incentive to use equity investment. After the reform, this incentive no longer existed. With $r(1-\tau) < r^d$, we predict that (i) agents with $\theta > \theta_r$ and $a > \frac{1+\delta}{\phi} e^*(\theta)$ will change from equity to debt

[7] If $\underline{e} < e^*(\underline{\theta}^o)$, productivity-marginal entrants do not exist: when the minimum equity requirement is smaller than the optimal equity for any market participants, it doesn't affect any agents' firm entry decisions.

[8] Note that $\underline{\theta}' < \underline{\theta}$ and $a_L(\theta) < \tilde{a}_L(\theta)$, see Appendix **??** for discussion.

financing without affecting capital investments, where δ signifies the pre-reform optimal debt to equity ratio; (ii) agents with $\theta > \theta_r$ and $\frac{1}{1+\phi}k_c(\theta) < a < \frac{1+\delta}{\phi}e^*(\theta)$ will reduce both equity and capital investments without changing debt investment, where $k_c(\theta)$ is the optimal capital input when wealth constraint is slack and borrowing constraint binds. Given the impact of the minimum equity requirement discussed in the previous subsection, the removal of such requirement leads to a reduction in equity and capital investment for agents with $\theta_r > \theta > \underline{\theta}$ and $a \geq \underline{e}$, with an increase in the debt investment. [9]

Firm characteristics of entrants Given the impacts of the RC reform on both marginal and infra-marginal entrants, the reform leads to changes in the characteristics of average entrants in terms of firm size, financial characteristics, and productivity.

Specifically, the average firm size (measured by asset) and equity investment decline after the reform, a result of both marginal and infra-marginal entrants. The average debt position increases after the reform, driven by changes in financing methods. As for firm productivity, the result is more complex. The first type of market entrants would drive down average productivity, while the second type would increase it. To investigate the overall effect, we first derive the difference between the average productivity under the old and new regimes:

$$\begin{aligned} E^0(\theta_i|entrant) - E^1(\theta_i|entrant) =& E(\theta|\theta \geq \underline{\theta}', a \geq \tilde{a}_L(\theta)) - E(\theta|\theta \geq \underline{\theta}, a \geq \underline{e}) \\ =& \underbrace{E(\theta|\theta \geq \underline{\theta}', a \geq \tilde{a}_L(\theta)) - E(\theta|\theta \geq \underline{\theta}, a \geq \tilde{a}_L(\theta))}_{\text{productivity change by unproductive entrants}} \\ &+ \underbrace{E(\theta|\theta \geq \underline{\theta}, a \geq \tilde{a}_L(\theta)) - E(\theta|\theta \geq \underline{\theta}, a \geq \underline{e})}_{\text{productivity change by productive entrants}} \end{aligned}$$

The first component represents the productivity change caused by the unproductive entrants. The second component captures the productivity change due to relaxing the financial constraint. Because $a'_L(\theta) < 0$, the probability of $a \geq \tilde{a}_L(\theta)$ increases with θ, whereas the probability of $a \geq \underline{e}$ is constant for all agents with productivity θ.[10] Intuitively, the higher productivity θ an agent is characterized by, the less initial investment she needs to

[9] However, if $r(1-\tau) > r^d$, equity financing would always be preferred. The RC reform would lead to decreases in capital investments without affecting firms' capital structure.

[10] This is because wealth and productivity distributions are assumed to be independent of each other. If the two distributions are positively correlated, the productivity change due to financially constrained firms will be smaller.

make the firm profitable. For a given level of wealth, productive agents are more likely to be precluded from entry by the minimum equity requirement than a less productive one. Therefore, by allowing the productive but financially constrained agents to enter the market, the second component should increase the average entrant's productivity.

Proposition 1: The RC reform leads to increases in firm entry, decreases in the average firm size (total assets) and equity investment, and ambiguous changes in firm productivity. If debt financing is preferred to equity financing, debt level increases as well.

4 Data and Empirical Strategy

4.1 Data and Motivating Facts

Our analyses use a confidential, de-identified administrative data set from a large and prosperous Chinese province.[11] The data is extracted from the comprehensive database used by the provincial tax agency for all of its activities, including taxpayer risk assessment and inspections. One portion of the dataset, the taxpayer registry, records information for all firms registered before mid-2017—including, inter alia, establishment date, RC, employees (either upon initial registration or as subsequently updated by the taxpayers), and industry. Another portion of the dataset covers the period 2012-2016 and contains a large number of variables from firms' annual income tax returns and financial statements.

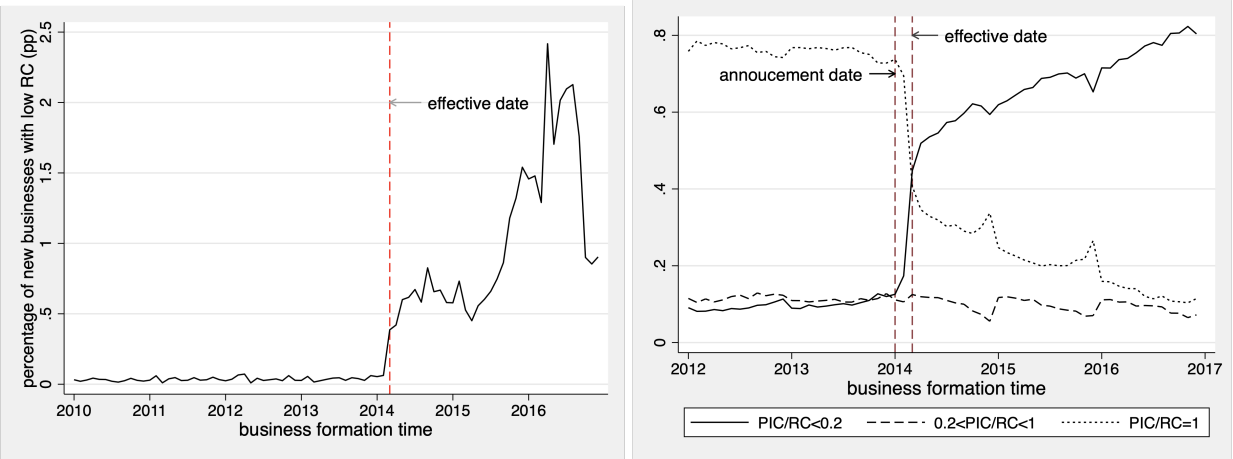
Our data covers all firms regardless of sector and size. In contrast, recent research using firm-level data from China generally relies on data on larger firms (e.g. listed firms, "above-scale" firms in the Annual Survey of Industrial Firms, and large and medium firms sampled in the National Taxpayer Survey), which is inadequate for studying firm entry and small firms. For the purpose of this study, we restrict the sample to firms registered between March 2013 and December 2014 with positive assets and revenue in the year 2014.[12]

As a preliminary indication of the RC reform's effect, Figure 1 (a) illustrates the percentage of firms registered with RC below 30,000 yuan, the minimum amount required under the 2005 CL. This percentage immediately increased in March 2014 and reached 2.5% by 2016, clearly reflecting the legislative change. Another effect of the RC reform is to allow a firm's actually contributed capital or paid-in capital (PIC) to differ from its RC. We do not directly observe a firm's PIC, but can compute this variable for each firm-year by subtracting undistributed profits from its total shareholder equity.[13] Prior to the re-

[11] This dataset has been used in Cui et al. (2021), Cui et al. (2022a) and Cui et al. (2022b).
[12] We also exclude all firms registered on weekends and national holidays to avoid potential anomalies.
[13] Table C.1, Panel (C) provides summary statistics relevant to this calculation.

form, a newly registered firm was required to invest at least 20% of its declared RC in the first year, resulting in a minimum PIC/RC ratio of 0.2. Figure 1 (b) plots the percentage of firms with a PIC/RC ratio at the end of each firm's first year below 0.2 (shown in solid line), between 0.2 and 1 (shown in dashed line), and equal to one (shown in dotted line), respectively. The percentage of firms with PIC/RC below 0.2 surged from 20% in February 2014 to approximately 50% in March and this proportion continued to increase thereafter. At the same time, the proportion of firms with PIC/RC of 1 declined from nearly 80% to 40% between February and March and this trend also persisted.

Figure 1: RC time series for new registrants



(a) new registrants with low RC

(b) PIC/RC ratio of new registrants

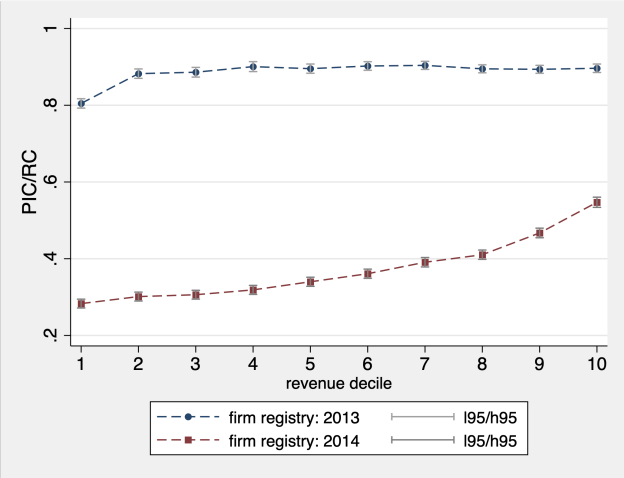
Note: Panel (a) plots the monthly percentage of startups with RC below CNY30,000, the minimum requirement under the 2005 CL, from January 2010 to December 2016. The dashed line corresponds to March 2014. Panel (b) plots the monthly percentage of startups with PIC/RC ratio below 0.2, larger or equal to 0.2 and smaller than 1, and equal to 1. The left (right) dashed line corresponds to January (March) 2014.

Figure 2 plots the average PIC/RC ratios of firms registered before and after the reform across revenue deciles.[14] The large decline in the ratio is clear across firms of all sizes, though it is the greatest for the smallest firms. Table C.1 provides a more detailed summary of paid-in capital, where we find that close to 40% of post-reform firms had zero PIC in 2014, compared to just over 7% firms in the pre-reform group. Moreover, the large share of zero-PIC firm persists in the next two years.

To offer a glimpse of how the RC reform affected real business formation, Figure 3 plots the first-year asset, revenue and employee distributions for firms registered between March and December of each of 2013 and 2014, respectively. Panel (a) shows that the distribution of assets became more dispersed after the reform, with more firms in the left

[14]We explain in Section 5.1 why firm revenue is our preferred measure of firm size.

Figure 2: PIC-to-RC ratio by revenue deciles



Note: This figure plots average PIC/RC ratios for firms in each decile of first-year revenue. Decile thresholds are determined by the revenue distribution for firms registered after the reform.

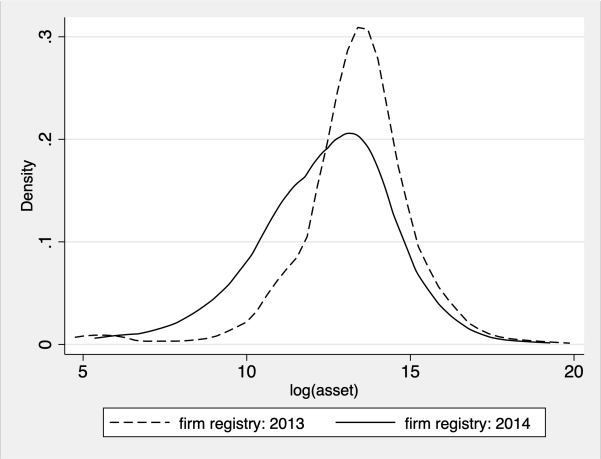
tail. This is consistent with our model prediction that relaxing the minimum equity requirement allows market entrants to start businesses with lower initial investments. Panel (b) shows that the post-reform revenue distribution shifted only slightly to the left. Intuitively, if firms entering after the reform have significantly lower assets but only slightly lower revenues, capital efficiency has improved. Finally, panel (c) shows that the left-ward shift of the employee count distribution resembles the change in the revenue distribution more than it resembles the change in the asset distribution.

Table 2 presents summary statistics for firm size, financial characteristics, and performance of firms registered within half-year before and after the policy date. The difference in average PIC between the pre- and post-reform groups is again striking, with the pre-reform group contributing roughly 261 times (557 log points) more capital than the post-reform group. In Section 6.3, we will show that the decline in PIC reflects declines in both the average number of investors per firm and the average contribution per investor. Table C.3 provides additional summary statistics for the RC, PIC, and assets of four firm cohorts.

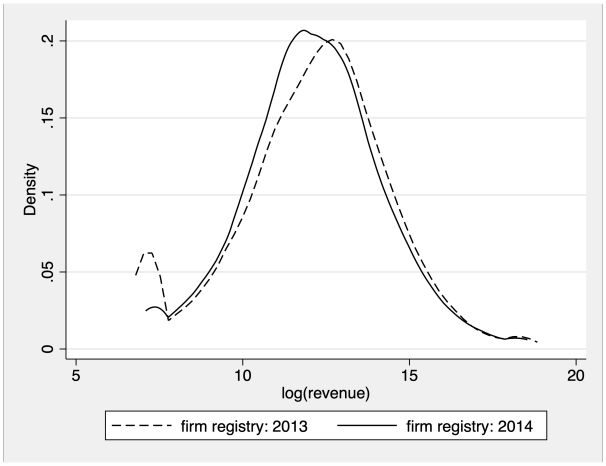
4.2 Empirical Strategy

To study the effect of RC reform on business formations, we employ a regression discontinuity in time (RDiT) design using daily business registration information to compare changes in firm characteristics for firms registered immediately before and after the re-

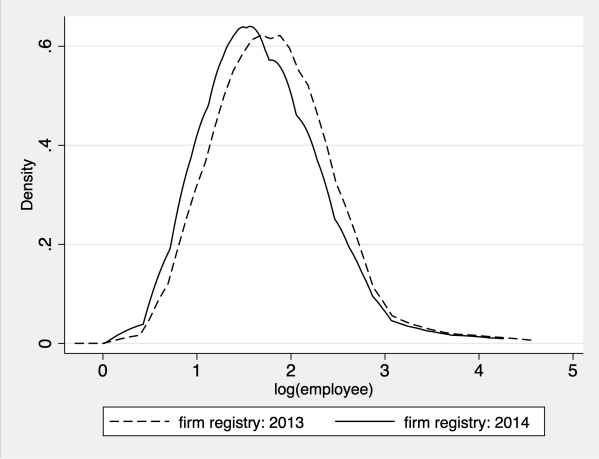
Figure 3: Firm characteristic distributions



(a) asset distribution



(b) revenue distribution



(c) employee distribution

Note: Panel (a), (b) and (c) plot the first-year distributions of revenue, assets and employee count,m respectively, for firms registered before and after the reform. Each group includes firms registered between March 1 and December 31 in 2013 and in 2014, respectively, to make the distributions comparable.

form date. Specifically, we use the following regression form:

$$y_{it} = \alpha + \beta D_{it} + f(t) + D_{it}g(t) + \phi_w + \phi_j + \phi_d + \epsilon_{it}, \tag{2}$$

where the running variable t measures the firm-entry date relative to the policy date, centered at zero; y_{it} is the variable of interest for firm i registered at time t; D_{it} equals one for firms registered from March 1, 2014, and onward; f(t) and g(t) are smooth functions of the running variable; and ϕ_j denotes industry fixed effects. To mitigate potential contamination from seasonal trends, we incorporate day-of-the-week and week-of-the-month

Table 2: Summary Statistics

Variables	Mean	Std. Dev.	10^{th} Percentile	Median	90^{th} Percentile
A. Pre-reform group					
ln(asset)	13.58	1.58	11.54	13.65	15.43
ln(financial liability)	7.13	5.98	0	9.31	14.03
ln(paid-in capital)	12.49	3.40	10.82	13.12	14.64
ln(revenue)	13.17	2.04	10.60	13.23	15.67
profit margins	-0.26	0.61	-0.88	-0.012	0.035
loss-making prob.	0.61	0.49	0	1	1
ln(employee)	1.81	0.57	1.10	1.79	2.40
N	27,450				
B. Post-reform group					
ln(asset)	12.53	2.05	9.90	12.84	14.83
ln(financial liability)	8.47	5.31	0.12	10.80	13.54
ln(paid-in capital)	6.92	6.56	0	10.31	13.83
ln(revenue)	12.34	2.02	9.78	12.34	14.85
profit margins	-0.23	0.62	-1.03	-0.022	0.033
loss-making prob.	0.66	0.47	0	1	1
ln(employee)	1.70	0.59	1.10	1.61	2.40
N	47,957				

Note: Pre-reform observations include firms registered within half-year before March 1st, 2014. Post-reform observations include firms registered within half-year after March 1st, 2014 RC, and 1 is added to the value of the financial liability, PIC and employee variables before taking the log to include the zero-valued observations. Profit margins are measured as profits divided by revenue. Loss-making probability is defined as firms with non-positive profits.

fixed effects as ϕ_d and ϕ_w. We will explore results using both day-of-the-month and day-of-the-week specifications to ensure the robustness of our findings.

For each outcome variable, we follow Calonico et al. (2014) to choose the integrated mean squared error (IMSE)-optimal bandwidth to minimize mean squared errors and estimation bias in the RD estimates. This means each dependent variable may be estimated with a different bandwidth. We employ a local linear RD estimator for all outcome variables, and local quadratic estimators in some cases: Gelman and Imbens (2019) argues that these should be preferred over global high-polynomial functions. We use the rectangular kernel for all the baseline analyses. To alleviate concerns about estimation bias from local nonlinear variations, we test the sensitivity of our estimates to various bandwidth choices, kernel functions, and polynomial orders.

The identifying assumption in the classic sharp RD requires the relationship between

error term ϵ_{it} and the running variable, registration date, to change smoothly around the policy date. Specifically, the function form f(t) and g(t) capture any smooth relationship between registration date and error term ϵ_{it}. If this assumption holds, β captures the effect of the removing RC restriction on the outcome variables. We cannot run the McCrary (2008) density test on the pre-determined covariate, as such covariates do not exist before a firm registers. Instead, we address several specific sets of identification challenges.

The first major challenge to identification is the manipulation of running variables. As the policy was announced on December 28, 2013, two months before its effective date, one may be concerned that business formation patterns in the pre-treatment period changed after the policy announcement. For instance, owners of smaller businesses that would have found the minimum equity requirement binding may choose to delay registration until the new policy takes effect. If this happened systematically, we should expect (i) a decrease in the number of business registrations during the anticipation period combined with a bunching of registrations immediately after the policy effective date, and (ii) an increase in firm size (as well as other changes in firm characteristics) during the policy anticipation period.

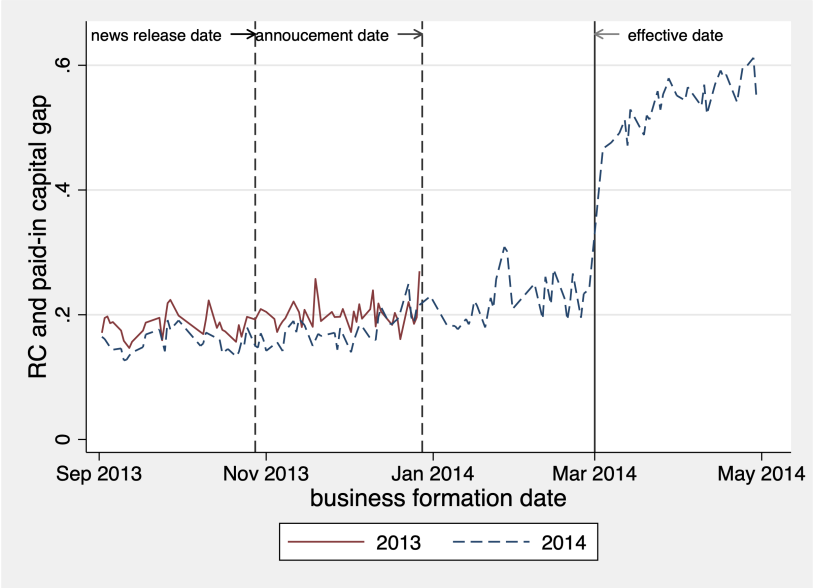
While Figure B.1 in the Appendix shows that there is no obvious bunching in business registration after March 1, 2014—registration by limited liability companies closely tracking registration of other firm types in the first-week post-reform—we directly confront the issue of anticipation in Section 5.4. There, we implement a combination of difference-in-differences and RD test (difference-in-discontinuity, DiRD) around the policy announcement date (December 28, 2013) to investigate whether firms registered during the anticipation period display any selection effect (i.e. with smaller firms selecting into later registration). We find no significant difference in firm characteristics for firms registered during the anticipation period.

A second threat to identification is that the reform may have a retroactive effect. Shareholders of businesses registered under the 2005 CL were allowed to complete their full contribution of RC within two years. For businesses registered between March 1st, 2012, and February 28th, 2014, the 2013 CL may release owners from the obligation to contribute subscribed capital if they have not fulfilled it by the policy date. If such a retroactive effect is significant, we should expect the effect of 2013 CL to be underestimated, as the pre-treatment group will effectively have received partial treatments.

To investigate this possibility, we analyze the gap between a firm's declared RC and PIC, measured at the end of 2013 and 2014 separately. Figure 4 plots this gap (averaged for firms registered on the same date) based on firms' registration date. The solid red line represents the gap at the end of 2013 and the blue dashed line represents the gap

at the end of 2014. Focusing first on firms registered before the policy announcement, on average firms contributed around 80% of their declared RC in the registration year, and the gap remains at similar levels in the second year.[15] If there was spillover to the pre-treatment group, we should expect a significant increase in the RC gap for businesses registered during the policy anticipation period (or even after the October news release date on the 2013 CL). However, any such increase before the policy effective date seems gradual and small relative to the jump on March 1, 2014. Nor do we find strong evidence of PIC reduction for the pre-treatment firms after the 2013 CL took effect.

Figure 4: Daily average gap between RC and paid-in capital



Note: this figure plots the daily average RC gap, measured as the ratio of (i) the difference between RC and PIC to (ii) RC, for businesses formed from September 1st, 2013 to May 31st, 2014. The figure covers four periods (separated by the vertical dashed lines): (a) the two months before the first news release about the RC reform (October 28, 2013), (b) the period between the news release date and the 2013 CL announcement date (December 28, 2013), (c) the policy anticipation period, and (d) two months after the 2013 CL effective date. Because PIC is time-varying, the solid red line refers to the RC gap at the end of 2013, and the dashed blue line the RC gap at the end of 2014.

A third set of challenges, regarding the implementation of RDiT, are highlighted by Hausman and Rapson (2018), who note that RDiT designs often require observations far from the temporal threshold to obtain sufficient statistical power, which could lead to bias resulting from unobserved confounders. They recommend avoiding long-time horizons and global polynomials. Our implementation addresses their concerns. First, the availability of daily frequency data with a large number of firm registrations per day allows us

[15]Table C.1, Panel A, shows that around 70-80% of these firms fully contributed their declared RC in the first year, and this ratio remains stable in the next three years.

to select a relatively narrow bandwidth. The specific bandwidth utilized in our analysis varies from 37 to 80 days, depending on the dependent variable. All baseline analyses are restricted to local linear smooth functions. Second, Hausman and Rapson (2018) also note the time-series nature of the data-generating process, which we account for by clustering the standard errors at the industry-month level. Third, following Hausman and Rapson (2018) suggestions, we report regression results excluding observations within 5 days from the policy date to mitigate concerns about the anticipation effect, as firms that delay their business registration may bunch near the threshold date. Additionally, we conduct a placebo test using a placebo policy date set one and two years before the actual reform date. Furthermore, we perform a permutation test using multiple placebo dates to ensure the robustness of our findings. Lastly, to further strengthen the validity of our results and address concerns about time-invariant cyclical factors, we conduct a DiRD test using observations around the policy date one and two years ago as the control groups. This test provides additional evidence that our observed effects are not driven by time-invariant cyclical patterns.

A final type of concern relates to economic or policy shocks that may have occurred in the same short time window around the date when the 2013 CL took effect. To the best of our knowledge, there were no such other policy shocks.

5 Reform Impact on Firm-level Characteristics

This section analyzes the RC reform's impact on business formation in terms of firm size, performance, and financing decisions. Section 3's theoretical framework shows that such impact can work through two main mechanisms. First, the reform enables the entry of marginal (both productivity-marginal and wealth-marginal) firms. This should result in a decrease in entrants' average size, while its effect on average productivity is ambiguous. Second, the reform relaxes the financing restrictions on new entrants, allowing greater flexibility in financing decisions for both marginal and infra-marginal firms.

5.1 Firm size

We first analyze changes in firm size measured by assets, revenue, and employees. A decrease in average assets may be driven by both lower assets among newly eligible entrants and a reduction in over-investment by infra-marginal firms. At the same time, if the reform led to a higher influx of smaller-scale businesses, we should observe a decline in production scale, as captured by firm revenue and employees.

Figure 5 presents regression discontinuity (RD) plots for total assets, revenue and employees.[16] Panel (a) shows the trend in total assets (reported on 2014 balance sheets) of firms formed in the one-year period centered around the 2013CL effective date. Each dot represents the average assets for firms registered in a given month. Average total assets exhibit a gradually decreasing trend in both the pre- and post-reform periods, suggesting that size initially increases with firm age. Around the cutoff date, we find a clear discontinuous drop by around 37 log points (equivalent to a 31% reduction). Panel (b) presents changes in the annual revenue of firms registered in a similar one-year period. The average revenue also decreases with the registration date for pre- and post-reform periods, with a small drop around the policy date. However, the change is not only smaller, it also turns out to be sensitive to the choice of time window used to generate the RD figure. In Figure B.2, average revenue is shown to change continuously around the policy date when using a shorter time window of 60 days to 90 days. In the regressions, we resolve this issue by employing IMSE-optimal bandwidth selection as per Calonico et al.(2014).

Panel (c) shows the trend in employee count for new firms. Unlike our measures of assets and revenue (and other firm financial characteristics), we do not observe employee count on an annual basis but only from the firm registry, where it is unclear whether each observation reflects the (expected) employee count at the time of firm formation or the (actual) employee count at a later date. The employee count in our data thus may not be a reliable measure of firm operations. Noting this caveat, panel (c) shows a small drop in firm employee count around the policy date.

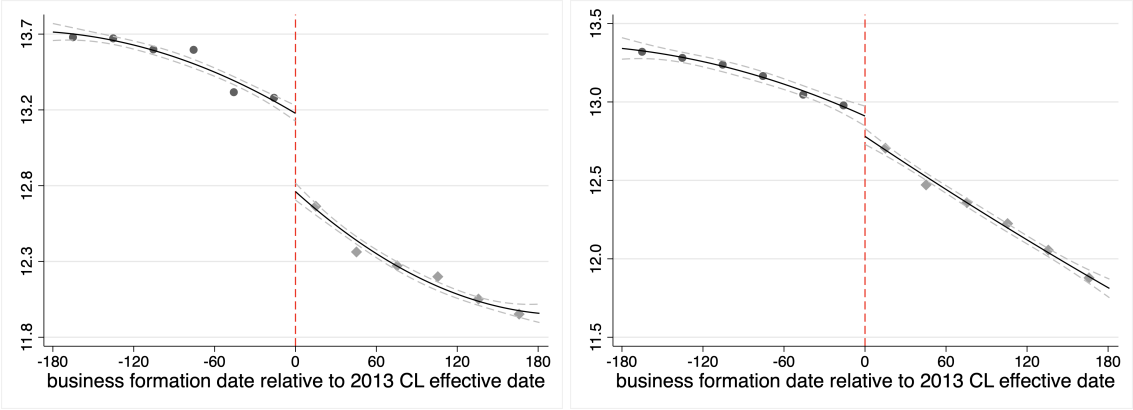
Table 3 confirms Figure 5 with RD estimates. Column 1 in Panel A suggests that firms registered under the 2013 CL have total assets 38 log points (31.6%) smaller than firms registered prior to the reform. Columns 2 and 3 present robust RD estimates, with Column 2 controlling for day-of-the-week, week-of-the-month, and industry fixed effects, and Column 3 including day-of-the-month and industry fixed effects. Column 4 excludes firms registered within 5 days of the policy date to mitigate concerns regarding anticipation. The estimated effect on firm assets remains consistent across specifications.

In Table C.4, we show that the asset gap persists after three years, with a 20 log points (18%) gap in 2016. To better understand the nature of this gap, Table C.5 decomposes the observed drop in average assets into changes in liquid, fixed, and other (including intangible) assets following the same bandwidths as columns 2-3 of Table 3.[17] Liquid assets

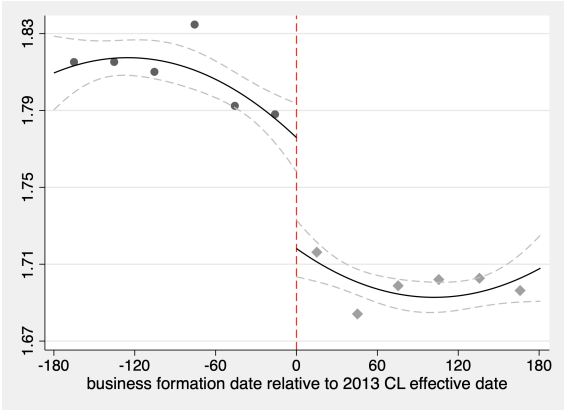
[16]The RD figure employs quadratic smooth functions to draw fitted lines, to account for any potential nonlinear trends observed in the raw data over a longer time period. We show the RD results using both local linear and quadratic regressions to ensure the robustness of our results.

[17]Table C.3 offers summary statistics for detailed categories of assets and liabilities. It shows, for example, that for over 60% of newly registered firms, liquid assets equal total assets.

Figure 5: Effect of reform on firm size



(a) ln(assets) (b) ln(revenue)



(c) ln(employee)

Note: Panels (a) and (b) plot the average log-form of assets and annual revenue in 2014 by business formation date in a half-year bandwidth around the 2013 CL effective date. Panel (c) plots the average log-form of reported employees, after being added by one to to include zero-valued observations for all subsequent analyses. The fitted line on each side is separately estimated with a local quadratic regression. 95% confidence intervals are plotted around the fitted line.

decreased by approximately the same magnitude as total assets, fixed assets decreased by around 25 log points (22%) in the benchmark specification, and "other assets" showed much smaller changes. Among liquid assets, cash shows a significant 36 log point (30%) decline, while the changes in accounts receivable and inventory are mostly insignificant. Notably, the last row in Table C.5 shows that there is no change in the cash-to-total-asset ratio between pre- and post-reform firms, suggesting that the 30% minimum cash contribution requirement under the 2005 CL was not binding on most newly formed firms.

Table 3 Panel B shows that the revenue gap between firms in the pre- and post-reform groups is statistically insignificant. Table C.4 shows that the two groups of firms remain similar in average revenue for two additional years. This presents a strong contrast to

Table 3: Effect of reform on firm size

	(1)	(2)	(3)	(4)
Panel A: ln(asset)				
β	-0.38**	-0.37***	-0.40***	-0.40***
	(0.18)	(0.038)	(0.038)	(0.039)
Control mean	13.31	14.04	14.03	14.02
Bandwidth (days)	77	53	54	45
N(effective)	35098	27594	28403	27668
Panel B: ln(revenue)				
β	-0.072	0.02	-0.037	-0.044
	(0.18)	(0.043)	(0.041)	(0.044)
Control mean	12.92	13.16	13.19	13.18
Bandwidth (days)	81	40	43	37
N(effective)	37073	20254	21011	20621
Panel C: ln(employee)				
β	-0.035	-0.034***	0.028*	-0.047***
	(0.066)	(0.012)	(0.015)	(0.015)
Control mean	1.77	2.01	2.01	1.99
Bandwidth (days)	83	43	43	45
N(effective)	37982	21011	21011	21543
Days of week FE		Y		Y
Week of month FE		Y		Y
Day of the month FE			Y	
Industry FE		Y	Y	Y
Post-reform days excluded	0	0	0	5

Note: this table reports the estimated effect of the RC reform on firm size. The dependent variables are in log-form. The running variable is the date of firm registration relative to March 1st, 2014. Estimates reported are obtained using a local linear RD estimator with a triangular kernel and bandwidth selection as per Calonico et al. Column 1 reports the estimates without any fixed effects, column 2 reports the conventional estimates after controlling for day-of-the-week and week-of-the-month, and industry fixed effects, column 3 reports the estimate after including day-of-the-month and industry fixed effects, and column 4 reports the estimate after excluding firms registered within 5 days since the policy date. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

the reform's impact on firm assets. To corroborate this null finding on revenue, Table C.6 presents RD estimates of changes in firm costs, measured by the cost of goods sold (COGS) and total costs (including management expenses). There is no statistically insignificant difference between the pre- and post-reform groups for COGS and total costs.

Table 3, Panel C, shows that the decline in employee count is statistically significant but small in magnitude (around 3-4% decline on a mean of 7 employees). This reinforces

the impression that the operational scale of new firms formed shortly after the reform—as reflected in revenue, accounts receivable, inventory, and COGS—is very similar to firms that entered before the reform, despite the very significant changes in asset size.

Three implications follow from these contrasting findings on firm size. First, despite the 31.6% drop in total assets, new firms produced similar levels of revenues as pre-reform firms. The new firms thus appear immediately more efficient in their investments, which strongly implies over-investment among pre-reform firms. Second, the model in Section 3 suggests that newly eligible entrants may include productivity-marginal firms, which should operate at smaller scales than previously eligible firms. Our finding that the change in average operating scale is small and (mostly) insignificant suggests that the influx of productivity-marginal firms is not the main outcome of RC reform. Instead, productive, wealth-marginal firms as well as infra-marginal firms dominate entry.

Third, the preceding results suggest that at least in the context of China's RC reform, revenue is a more accurate measure of firm business scale than assets: the latter may be inflated purely for regulatory reasons. Therefore, we utilize firm revenue to categorize firms into different size categories and examine the reform's heterogeneous impacts on firm assets. This classification allows us to distinguish between marginal and infra-marginal firms, as they exhibit disparities in firm size. Specifically, we use firms' 2014 monthly revenue to measure operational scale.[18] We define small (large) firms as firms with monthly revenue in 2014 falling into the bottom (top) quartile of the monthly revenue distribution in 2013 for firms in the pre-reform group.[19]

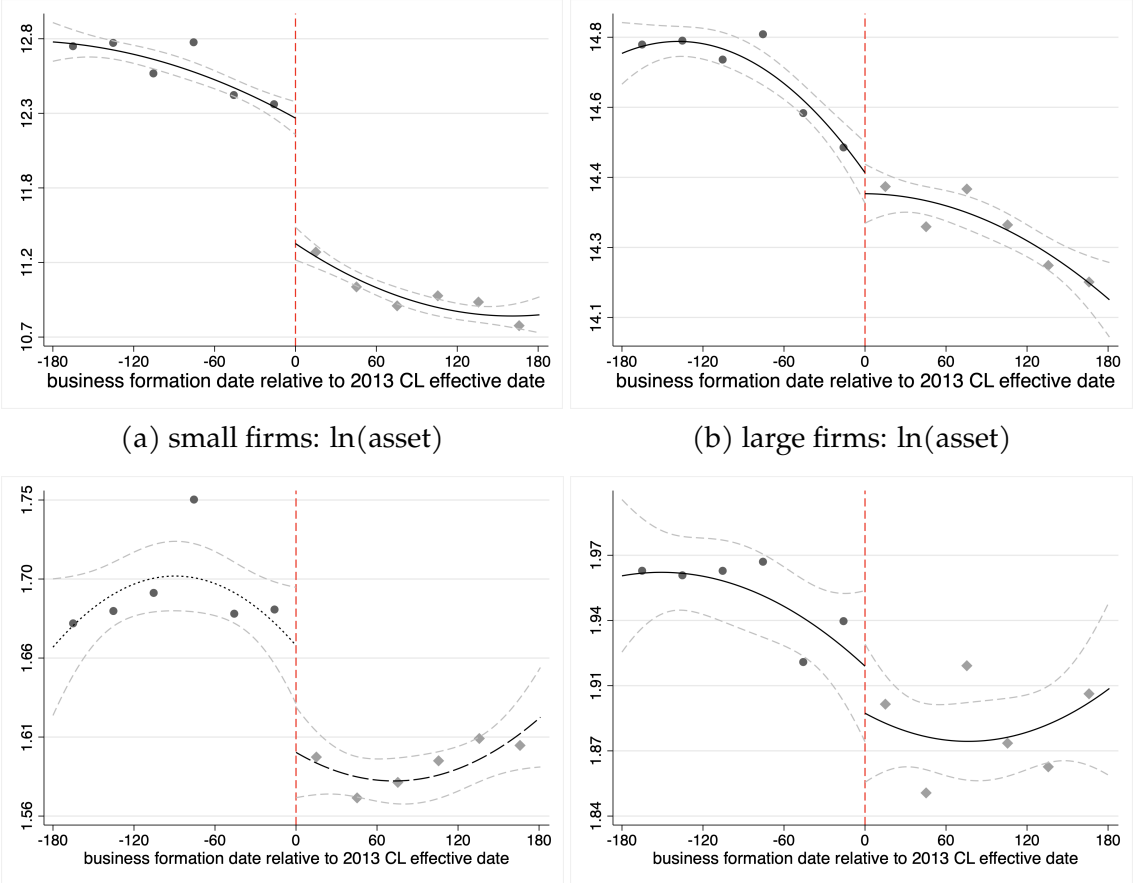
To make causal inferences, the heterogeneity test of RD requires additional assumptions. Following Hsu and Shen (2019), we impose two assumptions: (i) the potential outcome variable needs to be continuous on the running variable (days) by firm size group; (ii) the probability of the firm revenue below (or above) the threshold conditional on the running variable is continuous in the absence of the RC reform. The second assumption requires the firm revenue distribution to change smoothly around the policy date in the absence of the RC reform.

Figure 5 presents the changes in firm assets separately for small and large firms. A decline in assets (79 log points) is observed among small firms, whereas asset changes for large firms are insignificant. This suggests that large firms did not inflate their assets due to the RC requirement as much as small firms. Similarly, a significant drop in employee

[18]This reflects the fact firms registered after March 1, 2014, operated for only part of the year.

[19]The revenue distribution in the pre-reform group is less likely to have been affected by the reform. The first and third quartiles in the monthly revenue distribution are approximately 8,500 RMB and 119,000 RMB, respectively. Firms with monthly revenue between the first and third quartiles are omitted from the firm size analysis, as they may comprise both marginal and infra-marginal firms.

Figure 6: The effect of policy announcement on firm size: small vs large firms.



(a) small firms: ln(asset)

(b) large firms: ln(asset)

(c) small firms: ln(employee)

(d) large firms: ln(employee)

Note: panel (a) - (d) plot total assets and employees for small firms and large firms registered by business formation date in a half-year bandwidth around the 2013 CL effective date, respectively. Small (large) firms are defined as firms with monthly revenue below 8,500 RMB (above 119,000 RMB). The fitted line on both sides is separately estimated with a local quadratic regression. 95% confidence intervals are plotted around the fitted line.

count is observed only for small firms (though only by 7 log points) and not for large firms. Table 4 confirms these heterogeneity results. Panel A shows that the asset drop in small firms is both highly significant and substantially larger than the average effect reported in Table 3, while the asset change for large firms is insignificant. Panel B shows that the decline in employee count is statistically significant only for small firms. Both are consistent with Section 3's prediction that the entry of marginal firms induced by the 2013CL should be concentrated among small firms. Indeed, one may think of the large firms (as we define them) as comprising predominantly infra-marginal firms, while the small firms are more likely to allow detection of marginal firms. We leverage this insight when analyzing firm performance next.

Table 4: Effect of reform on firm size: heterogeneity analysis

	small firms			**large firms**		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: ln(asset)						
β	-0.76***	-0.79***	-0.82***	-0.017	0.022	0.023
	(0.18)	(0.078)	(0.078)	(0.092)	(0.049)	(0.05)
Control mean	12.25	13.14	13.20	14.47	14.80	14.87
Bandwidth (days)	72	58	57	81	59	61
N(effective)	7493	6639	6540	9329	7592	7663
Panel B: ln(employee)						
β	-0.044	-0.07***	-0.061***	-0.021	0.006	0.012
	(0.046)	(0.018)	(0.02)	(0.094)	(0.019)	(0.02)
Control mean	1.66	1.89	1.92	1.91	2.14	2.17
Bandwidth (days)	80	66	65	113	55	50
N(effective)	6540	7066	6943	12539	7444	6493
Days of week FE		Y			Y	
Week of month FE		Y			Y	
Day of month FE			Y			Y
Industry FE		Y	Y		Y	Y

Note: this table reports the estimated effects of 2013 CL reform on newly registered firms' size for small and large firms, respectively. Small (large) firms are defined as firms with monthly revenue below 8,500 RMB (above 119,000 RMB). The running variable is the date of firm registration relative to March 1st, 2014. Estimates reported are obtained using a local linear RD estimator with a triangular kernel and bandwidth selection as per Calonico et al. Column 1 reports the estimates without any fixed effects, column 2 reports the estimates after controlling for day-of-the-week, week-of-the-month, and industry fixed effects, and column 3 reports the estimates controlling for day-of-the-month and industry fixed effects. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

5.2 Firm performance

We are interested in firm performance to distinguish between different types of entrants as discussed in Section 3, and we want to focus especially on small firms because theory predicts that newly eligible entrants should be at the left tail of the revenue distribution.

Instead of employing structural methods to estimate firm total factor productivity (TFP), we use profit margins and the probability of firms operating at a loss as proxies for firm productivity.[20] Increases in productivity-constrained entrants should lead to a decline in profit margins and an increase in the probability of operating at a loss. In contrast, wealth-constrained marginal entrants should exhibit the opposite pattern, with higher profit margins and a similar probability of operating at a loss as infra-marginal firms.

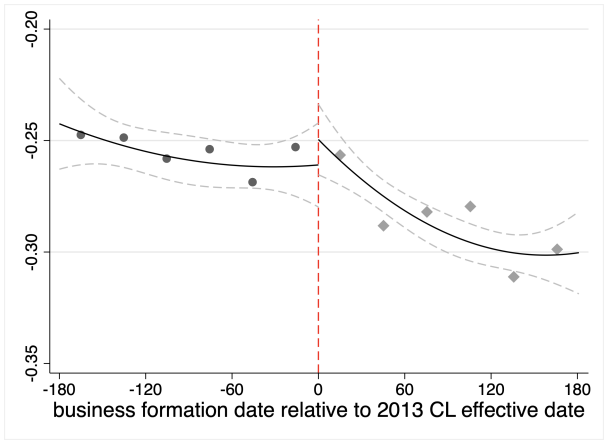
Figure 7 presents the performance of firms registered within a 1-year period centered on the 2013 CL effective date by plotting their 2014 average profit margins and loss-making probabilities. Panel (a) shows that profit margin is slightly increasing in firm age; a small, noisy increase is observed around the policy date. Panel (b) shows a negative relationship between loss-making probability and firm age for both pre- and post-reform periods, but there is no significant change around the policy date. Panel (c) reveals a discrete jump in the profit margin around the policy date for small firms, while panel (e) shows that the profit margin for large firms is highly variable and exhibits no significant changes around the policy date. Finally, Panels (d) and (f) indicate that neither small nor large firms experience any discontinuous changes in loss-making probability.

Table 5 presents RD estimates for firm performance outcomes. Columns 1-3 indicate no significant difference in profit margins between firms registered in the pre-reform v. the post-reform periods. This does not necessarily mean that infra-marginal entrants dominated business formation post-reform: the effects of high-productivity and low-productivity marginal entrants may cancel each other out. Columns 4 and 5 focus on small firms and reveal a significant increase of approximately 6-7 p.p. in profit margin after the reform. This suggests that the reform, by reducing entry barriers, attracted more productive marginal firms to enter. In contrast, Columns 6 and 7 show null results for large firms.

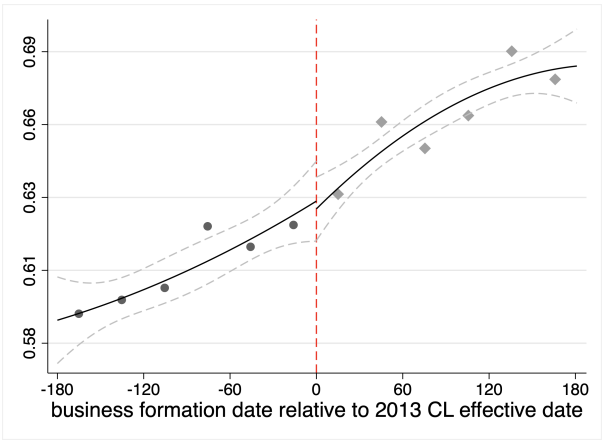
Panel B of Table 5 estimates changes in loss-making probability (measured by the binary value of reporting negative profits). The results in columns 1-3 indicate mostly insignificant differences between firms registered in the pre-reform and post-reform periods. If one thinks of low-productivity firms as more likely to be loss-making, this suggests that

[20] Our dataset comprises firms from various sectors, with a significant proportion of post-reform observations coming from the service sector. However, accurately quantifying firm inputs for service firms poses challenges in measuring TFP. Moreover, labor productivity is often used as a proxy for TFP, but employment data in our dataset is incomplete.

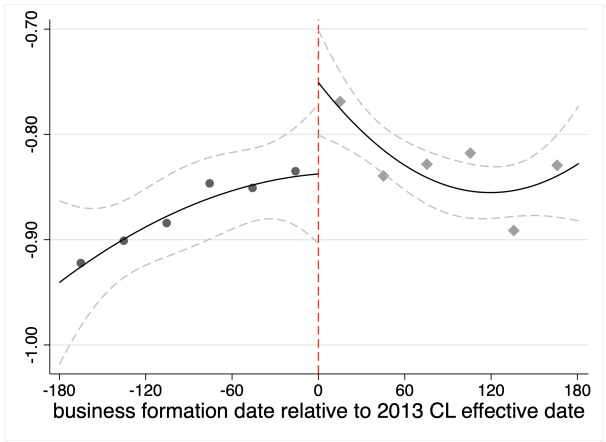
Figure 7: Effect of reform on firm performance



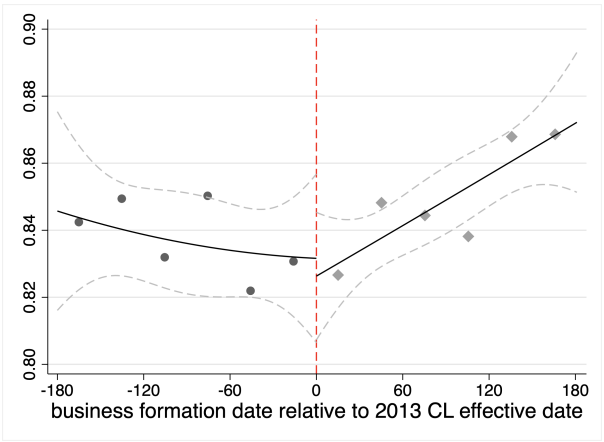
(a) profit margins



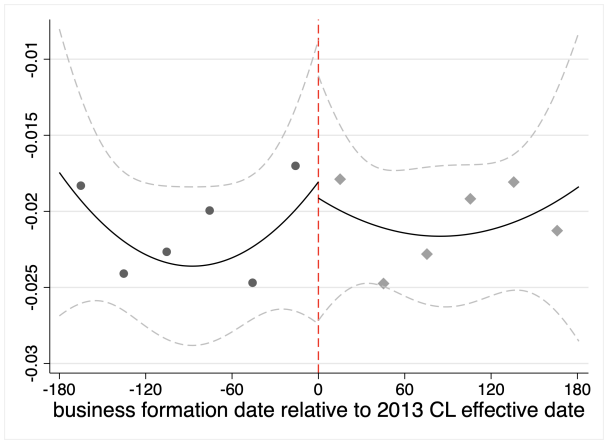
(b) loss-making probability



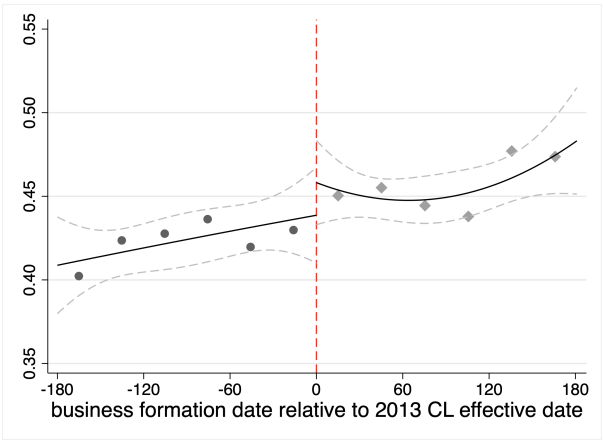
(c) small firms: profit margins



(d) small firms: loss-making prob.



(e) large firms: profit margins



(f) large firms: loss-making prob.

Note: panel (a) - (b) plot the profit margins and loss-making probability in 2014 for firms registered within a 1-year bandwidth around the 2013 CL effective date. Panel (c)-(f) plots the profit margins and loss-making probability for small and large firms separately. Small (large) firms are defined as firms with monthly revenue below 8,500 RMB (above 119,000 RMB). Fitted lines are separately estimated with a local quadratic regression. 95% confidence intervals are plotted around the fitted line.

Table 5: Effect of reform on firm performance

	all firms			small firms		large firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: profit margins							
β	0.013	0.003	0.011	0.078**	0.068**	-0.000	0.001
	(0.011)	(0.011)	(0.01)	(0.028)	(0.03)	(0.005)	(0.005)
BW (*days*)	70	78	63	79	83	70	66
N(*effective*)	32396	34022	30105	8104	8642	8198	7900
Panel B: loss-making probability							
β	-0.013*	-0.006	-0.014	-0.012	-0.005	0.004	-0.005
	(0.008)	(0.008)	(0.009)	(0.013)	(0.015)	(0.015)	(0.015)
BW (*days*)	50	45	53	105	53	100	82
N(*effective*)	25121	22730	26407	10521	6210	11149	9467
Days of week FE	Y		Y	Y		Y	
Week of month FE	Y		Y	Y		Y	
Days of month FE		Y			Y		Y
Industry FE	Y	Y	Y	Y	Y	Y	Y
Post-reform days excluded	0	0	5	0	0	0	0

Note: this table reports the estimated effect of the RC reform on firm performance for all firms, small and large firms, respectively. Profit margin is defined as total profit divided by revenue. Loss-making probability is a binary indicator of negative profit. The running variable is the date of firm registration relative to March 1st, 2014. Estimates reported are obtained using a local linear RD estimator with a triangular kernel and bandwidth selection as per Calonico et al. Standard errors clustered by industry-month are in parentheses. (2014). * p <0.1, ** p <0.05, *** p <0.01.

the reform did not increase the prevalence of low-productivity firms. Similarly, columns 4 to 7 show null results for the loss-making probability among both small and large firms.

5.3 Firm financing characteristics

We next examine changes in financing decisions among firms newly registered under the 2013 CL. As Section 4.1 already showed, paid-in capital significantly declined after the reform. This may be attributable to two factors: (1) the presence of newly eligible entrants facing wealth constraints or being optimally small firms, and (2) infra-marginal firms transitioning from equity financing to debt financing. Our main measure of debt financing is financial liability, constructed by subtracting accounts, taxes, and interest payable from to-

tal liability.[21] We also use accounts payable as a measure of trade credit. We will consider both average effects and heterogeneous effects on firms of different sizes.

Figure 8 illustrates the trends in PIC and financial liability for all firms formed in the one-year period centered around the 2013 CL effective date, as well as for small and large firms separately. Panel (a) shows a slightly decreasing trend in PIC both pre- and post-reform, mirroring the trend observed in total assets. But this is dwarfed by a large dip of around 200 log points (86.5%) around the policy date. Panels (c) and (e) demonstrate similar patterns of PIC decline for both small and large firms, with larger declines observed among the small firms (consistent with the theoretical prediction). Table 6 Panel A confirms the visual evidence with regressions: columns 1-3 indicate that PIC dropped by 283 log points (94.1%); columns 4 to 7 show that the effects of the reform on PIC are significant for both small and large firms, with around 308 log points (95.4%) and 208 log point (87.5%) declines in PIC for small and large firms, respectively.

The fact that large firms also chose to reduce equity investments after the reform is striking: they are unlikely to be restricted by the *minimum* equity requirement, and as shown earlier, they did not show significant asset decline on average. This suggests that the RC requirement distorted their financing decisions. Figure 8 Panel (b) demonstrates the trend in financial liability, which displays a clear discontinuous increase by 100 log points around the cutoff date. Panel (d) and (f) show that this discontinuous increase in financial liability holds for both small and large firms.

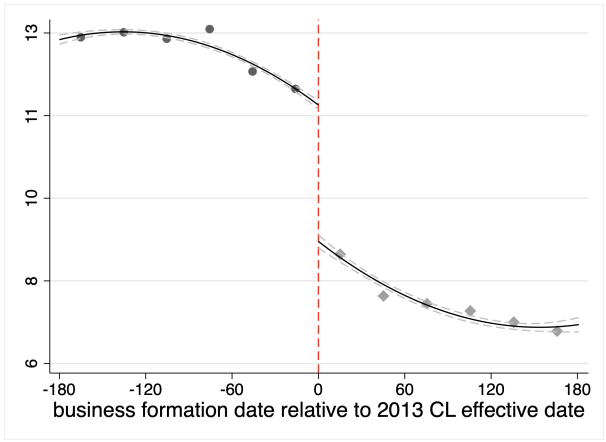
Table 6 Panel B reveals that the average financial liability in the post-reform group experienced a substantial increase of 106 log points (188%) compared to the pre-reform group.[22] While the increase among small firms seems more pronounced in percentage terms (columns (4) and (5) compared with (6) and (7)), it is important to consider absolute levels. Just before the policy date, small firms had an average financial liability of around 97 RMB: an increase of 157 log points (380%) merely reflects an increase of 368 RMB—which is far smaller than the average reduction of PIC for such firms. In contrast, large firms showed financial liabilities of around 55,300 RMB before the policy date. An increase of 66 log points (93.5%) thus reflects an increase of around 51,700 RMB.

In the finance literature, firm size is commonly used as an indicator of a firm's borrowing capacity (Almeida and Campello, 2007; Hadlock and Pierce, 2010; Whited and Wu, 2006). One thus might expect increased external borrowing to be more relevant to the PIC reduction of larger firms. However, our data does not allow us to distinguish between

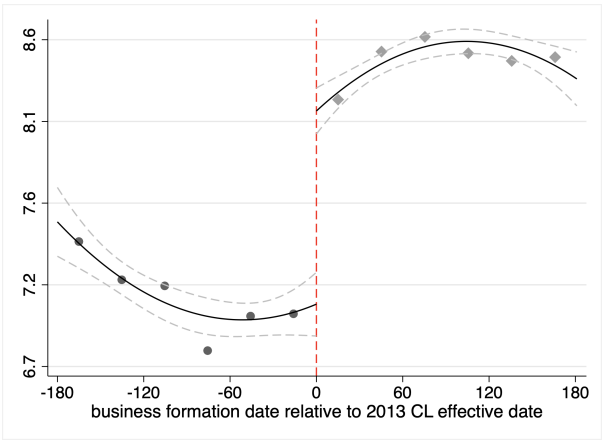
[21] We directly observe firms' total, short-term, and long-term liabilities, along with accounts, taxes, and interest payable. See Table C.3 for summary statistics.

[22] Table C.4 again shows that the differences between the pre- and post-policies groups in respect of PIC and financial liability persist for two years.

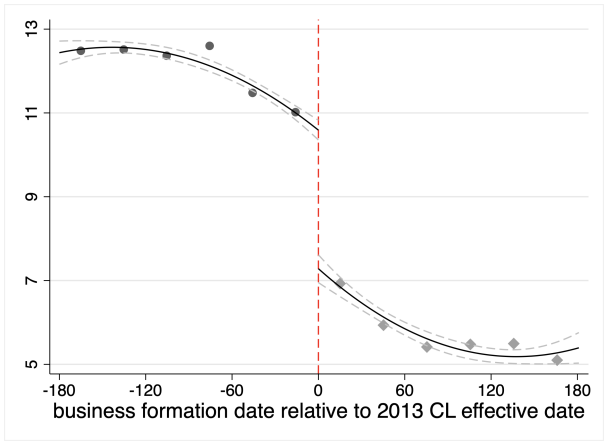
Figure 8: Effect of reform on firm financial characteristics



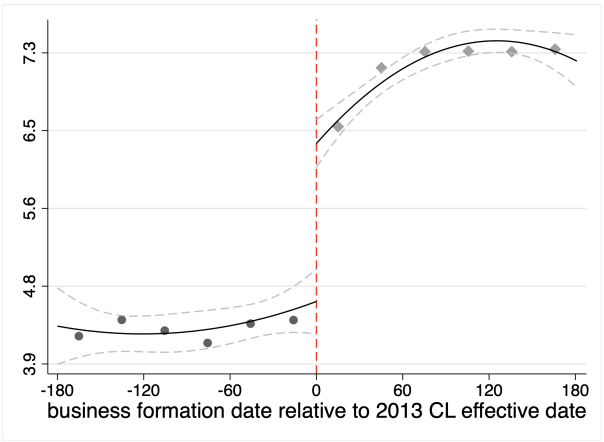
(a) ln(paid-in capital)



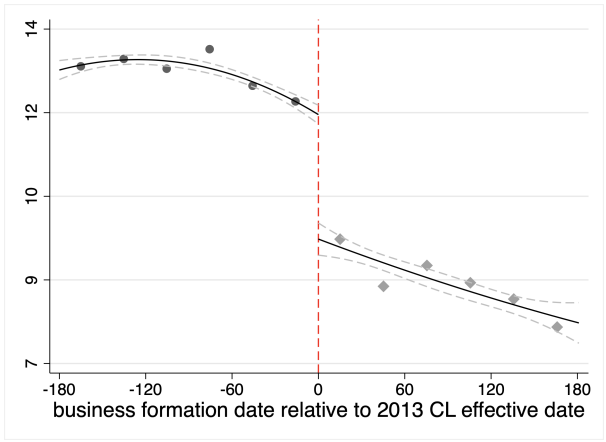
(b) ln(financial liability)



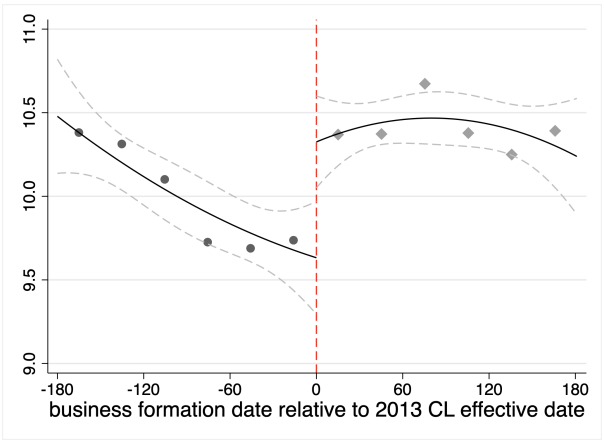
(c) small firms: ln(paid-in capital)



(d) small firms: ln(financial liability)



(e) large firms: ln(paid-in capital)



(f) large firms: ln(financial liability)

Note: panel (a) - (b) plot the log-form of PIC and financial liabilities in 2014 for firms registered within a 1-year bandwidth around the 2013 CL effective date. Panel (c) - (f) plot the same for small and large firms separately. PIC and financial liabilities values are increased by 1 before taking log transformation to include zero-valued observations for all subsequent analyses. Small (large) firms are defined as firms with monthly revenue below 8,500 RMB (above 119,000 RMB). The fitted lines on both sides are separately estimated with a local quadratic regression. 95% confidence intervals are plotted around the fitted line.

Table 6: Effect of reform on firm financial characteristics

	all firms			small firms		large firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: ln(paid-in capital)							
β	-2.83***	-2.99***	-2.96***	-3.08***	-3.28***	-2.08***	-2.18***
	(0.20)	(0.20)	(0.22)	(0.24)	(0.27)	(0.27)	(0.27)
Control mean	12.57	12.67	12.33	12.07	12.21	13.10	12.45
BW (days)	51	57	51	54	58	45	44
N(effective)	25977	28854	24790	6420	6639	5887	5645
Panel B: ln(financial liability)							
β	1.06***	1.01***	1.09***	1.57***	1.63***	0.66**	0.62***
	(0.13)	(0.13)	(0.14)	(0.17)	(0.19)	(0.20)	(0.23)
Control mean	8.03	7.86	8.08	4.57	4.80	10.92	10.83
BW (days)	66	66	45	62	46	99	94
N(effective)	31098	31098	28952	6846	6621	10991	10178
Days of week FE	Y		Y	Y		Y	
Week of month FE	Y		Y	Y		Y	
Days of month FE		Y			Y		Y
Post-reform days excluded	0	0	5	0	0	0	0

Note: this table reports the estimated effect of the RC reform on firm financial characteristics for all firms, small and large firms, respectively. The dependent variables are in log form with actual observations added by 1. The running variable is the date of firm registration relative to March 1st, 2014. Estimates reported are obtained using a local linear RD estimator with a triangular kernel and bandwidth selection as per Calonico et al. Standard errors clustered by industry-month are in parentheses. (2014). * p <0.1, ** p <0.05, *** p <0.01.

third-party financial liabilities and loans from shareholders. Another threat to our interpretation of increased borrowing is that the use of shareholder loans (often informal and undocumented) is prevalent in Chinese business practice. If reflected in financial statements at all, they are reported as "other payables" (not observed in our data). Moreover, as shown in Table C.3, only a very small fraction of firms in our data report long-term liabilities: the entire increase in average financial liabilities is attributable to short-term liabilities. This might accentuate a concern that the increase in financial liabilities merely reflects a re-labeling of shareholder equity as loans. If the RC reform merely triggered such re-labeling, the impact on firm financing may be dismissed as inconsequential.

One counter-argument is that informal shareholder loans are less prevalent among large firms. We go further and explore evidence against the shareholder loan hypothesis by examining changes in financial liability in multi-shareholder firms. Arguably, informal shareholder loans are less likely to be used in such firms, since loans hold priority in repayment. Table C.7 shows that the financial liability increases by 126-129 log points (more than 250%) among multi-shareholder firms. This should mitigate concerns that shareholder equity has simply been relabeled loans post-reform.

Additional perspective is provided by the impact of the RC reform on other liability categories. Our data offer less detailed breakdowns of liabilities than for assets. Panel A in Table C.8 shows that on average, total liability increased for the post-reform firms. There is no significant change in the average level of accounts payable for new firms. This is consistent with the null results for accounts receivable and inventory on the asset side (Table C.5). However, Panel B in Table C.8 shows that among *large* firms, accounts payable significantly increased. This suggests that such firms—likely infra-marginal—increased borrowing in the form of trade credit.

5.4 Potential Anticipation Effect

As explained in Section 2, the 2013 CL took effect two months after clearing the legislature. If entrepreneurs delayed firm start-up in anticipation of the new RC regime, and if this anticipation effect is greater among small firms, our RDiT estimates may be biased towards finding greater magnitudes and significance for outcomes associated with small firm entry. A bias towards finding increased entry after the policy effective date may also affect our analysis in the next Section. Therefore, we must determine if the 2013 CL amendment affected business formation during the policy anticipation period.

The simplest approach to answering this question is to implement an RD analysis using firms registered within 63 days before and after December 28, 2013, as the anticipation

period lasted 63 days. However, the policy announcement date was only 3 days away from the New Year Holiday and the post-reform period covered the Chinese New Year holiday season, during which economic activities slow down. Although our analyses exclude all holidays, the remaining observations may still be subject to holiday spillover effects, which may not be captured by smooth functions or time fixed effects.

To test whether business formation displays a holiday effect, we use firms registered within 63 days before and after December 28, 2012 as a placebo group and examine their characteristics along with those formed during the same time windows a year later. Figure B.3 confirms our concern: assets and PIC exhibited discontinuous changes around December 28, 2012. These patterns challenge the standard RD analysis' identification assumption. To disentangle the policy announcement effect from seasonal factors, we employ the Differences-in-Discontinuities (Di-RD) approach developed by Grembi et al. (2016).

The idea of Di-RD is to use a previous year's observation as the control group to capture time-invariant discontinuous changes due to seasonal factors. Consider the following equation for capturing seasoning effects:

$$y_{its} = \alpha_s + \beta_s D_{it} + f_s(t) + D_{it} g_s(t) + \epsilon_{its}, s \in \{0, 1\}$$

where $D_{it} = 1\{t \geq d_t\}$ and d_t is December 28. $f(t)_s$ and $g(t)_s$ capture the local linear trend of firm characteristics for businesses registered before and after d_t in year s, where $s = 1$ represents the actual policy announcement year. In addition to the continuity assumption required for standard RD, we need to assume the seasonal effect is constant over years such that $\beta_1 - \beta_0$ captures the causal effect of policy announcement on business formation.

Combining the above equation written for each of the treated and control groups into one regression, we obtain:

$$y_{its} = \alpha + \beta D_{it} + f_0(t) + D_{it} g_0(t) + S_i \times (\tau + \gamma D_{it} + f_1(t) + D_{it} g_1(t)) + \phi_w + \phi_{mj} + \phi_r + \epsilon_{ist},$$

where $S_i = 1$ for firms registered around the 2013 CL announcement. β captures the discontinuous changes in firm characteristics due to holiday effects. γ is the coefficient of interest, capturing the additional changes in the firm characteristics caused by policy announcements. We control for week-of-the-day, day-of-the-month, and the industry-month fixed effects in the regression.

Table 7 presents regression results for firm characteristic changes in response to the policy announcement. After controlling for holiday effects, the policy announcement appears to have no significant impacts on firm size and other characteristics, rejecting the hypothesis that a significant number of small firms chose to delay business registration

until the policy effective date.

Table 7: Effect of policy announcement on business formation

	ln(asset) (1)	**ln(revenue)** (2)	**profit margins** (3)
γ	0.10	-0.024	-0.022
	(0.09)	(0.17)	(0.022)
N(effective)	33,414	33,414	33,414
	loss-making prob.	**ln(paid-in capital)**	**ln(financial liability)**
γ	0.003	0.066	-0.08
	(0.021)	(0.17)	(0.30)
N(effective)	33,414	33,414	33,414
Days of week FE	Y	Y	Y
Days of month FE	Y	Y	Y
Industry FE	Y	Y	Y

Note: This table reports the Di-RD estimates of the effect of the 2013CL policy announcement on business formation. Estimates are obtained using a local linear RD estimator. The bandwidth is 63 days. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

5.5 Robustness and Placebo Tests

We test the robustness of the main results by examining different choices of smooth functions, bandwidths, and kernel functions. Panel A to Panel D in Table 8 show that the main results largely hold when using quadratic functions, triangular and epanechnikov kernel functions, and a consistent bandwidth of 21 days.[23] In the Appendix, Table C.9 and Table C.10 confirm the robustness of the heterogeneity test by firm size to alternative smooth functions, bandwidth, and kernel functions.

To further probe the robustness of our findings, Figure B.4 presents the results using local linear and quadratic smooth functions with varying bandwidths. The changes in assets, loss-making probability, paid-in capital, and financial liability demonstrate robustness across different bandwidths and smooth functions. However, changes in revenue and profit margins are somewhat sensitive to bandwidth and polynomial choices.

[23]We use 21 days as the bandwidth to avoid the Chinese New Year holiday that lasted from January 31 to February 6, 2014. Using firms registered during the holiday season may increase the mean squared error as it increases the estimation bias in the pre-period smooth function.

Specifically, changes in revenue become significantly negative with local linear regression when the bandwidth exceeds 60 days, contrasting with the insignificance observed with the quadratic regression function. We believe the sensitivity of revenue outcomes to bandwidth choice likely arises from estimation biases with larger bandwidth, stemming from the non-linear relation between the firm's annual revenue and firm age (registration date), as shown in Figure B.2. When the bandwidth exceeds 60 days, the linear smoothing function fails to capture revenue trends post-reform, consequently introducing a negative bias into the estimates. In contrast, the quadratic smooth function better captures the data pattern.

Figure B.4 (c) also shows that positive changes in profit margins become insignificant with bandwidth above 60 days. However, this may be explained by the pattern in panel b of Figure B.5: profit margin increases among small firms are tempered by a null effect among larger firms, resulting in changing estimates of the average policy effect. Figure B.5 more generally confirms that heterogeneous results by firm size are largely robust to using local linear smooth functions with varying bandwidths.

Additionally, Table C.11 presents regression results using the placebo policy date of March 1st, 2012 and 2013, alongside benchmark regression specifications and bandwidth selections. This analysis probes the potential impact of time-invariant seasonal patterns on the results. The lack of significance in the placebo tests suggests that the observed significant results in assets, paid-in capital, and financial liabilities are unlikely to be driven by seasonal variations. Figure B.6 supplements this analysis by presenting a placebo permutation test, plotting 216 placebo estimates. These estimates are derived from the baseline specification and reassigning the policy date to each week from March 2012 to October 2016 (excluding three months before and after the actual policy date). The maroon solid lines represent the baseline results, which are beyond the 1 and 99 percentile thresholds of the placebo distributions (dashed red lines) for assets, paid-in capital and financial liabilities, reinforcing the reliability of our baseline results.

Table 8: Effect of reform on firm characteristics: robustness

	assets	**revenue**	**profit margins**	**loss-making probablity**	**paid-in capital**	**financial liability**
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: 2nd Oder						
β	-0.32***	-0.003	0.023*	-0.023**	-2.55***	0.99***
	(0.047)	(0.049)	(0.013)	(0.01)	(0.23)	(0.17)
BW	86	86	89	81	73	127
N	38692	38692	40476	37073	33615	55702
Panel B: Consistent Bandwidth=21						
β	-0.22***	0.092	0.052***	-0.026*	-2.11***	1.18***
	(0.067)	(0.066)	(0.017)	(0.015)	(0.18)	(0.18)
N	11726	11726	11726	11726	11726	11726
Panel C: Retangular Kernel						
β	-0.38***	0.18***	0.013	0.011	-2.87***	1.03***
	(0.041)	(0.052)	(0.013)	(0.008)	(0.24)	(0.15)
BW	51	32	65	53	44	51
N	25978	16162	30562	27594	21807	25978
Panel D: Epanechnikov Kernel						
β	-0.37***	0.025	0.012	-0.013*	-2.84***	1.05***
	(0.039)	(0.043)	(0.011)	(0.008)	(0.21)	(0.14)
BW	50	40	69	50	48	62
N	25121	20254	32396	25121	24767	30105

Note: this table reports the estimated effect of the RC reform on firm characteristics. The running variable is the date of firm registration relative to March 1st, 2014. In panel A, C, and D, bandwidth are selected following Calonico et al(2014). Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

6 Reform Impact on Firm Entry and Investor Structure

6.1 Firm entry

We now examine whether the de facto removal of the RC requirement encouraged greater firm entry. Our main analysis employs the DiD approach. Our dataset identifies 51 organizational types for firms, allowing us to distinguish among state- or collectively-owned, foreign-owned, Hong Kong, Macau, and Taiwan-owned (HMT), and privately owned

firms. In addition, we can distinguish between entity types with unlimited liabilities—mainly partnerships and "solely-individually-owned enterprises" (*gerenduzi qiye*)–and limited liability companies. Figure B.1 shows that the daily firm entry patterns for LLCs and all other firm types track each other closely up until the policy effective date. However, although only corporate entities are affected directly by the RC reform, the reform may encourage unincorporated firms (referred to as "unlimited liability entities" or ULEs below) to incorporate. Therefore, we use state-owned, foreign-owned, and HMT-owned enterprises as the control group, as they are least likely to be affected by the restrictions of the previous RC regime.[24] An added benefit of this choice is that we can use ULEs as a second treatment group to test whether the reform led to substitution away from unincorporated entity forms.

The DiD regression specification is as follows:

$$y_{ijct} = \beta T_i \times D_t + \delta_{ijc} + \delta_{jt} + \delta_{ct} + \epsilon_{ijt},$$

where y_{ijpt} is the total number of firm entries by firm type i, industry j, prefecture c, and time t; T_i is an indicator for the treatment group; D_t is an indicator for the post-reform period, which is equal to one from the first quarter of 2014 forward; and β captures the effect of reform on firm entries. To account for potential differential trends by industry and region, δ_{jt} and δ_{ct} capture the month by industry and prefecture fixed effects. δ_{ijc} controls for time-invariant differences between treatment and control groups within each industry and city. The data period covers from March 2013 to March 2015 to include 12 months in the pre- and post-period.

Table 9 presents firm entry results for both LLCs and ULEs. Columns 1-3 show that the reform led to around 33-36% increase in LLC entry. This seems large at first glance, especially compared to the estimates in the previous literature on the effect of entry deregulation in other countries (ranging from 5% to 27%, see Bruhn (2011), Kaplan et al. (2011), De Andrade et al. (2013)). More comparable to our estimates is the finding of Barwick et al. (2022), which concludes that a business registration reform in Guangdong led to a 25% increase in firm entry.[25] Interestingly, our estimate is larger, despite the fact that Guang-

[24] Foreign- and HMT-owned firms in China were still sufficiently regulated during the period we study that they tended to be larger and made lumpier investments/dis-investments. It is also reasonable to assume that state-owned enterprises were little constrained by the RC requirements. The 2013 CL amendment did not affect certain regulated industries (e.g. banking and other financial services) where separate, higher RC requirements are imposed. In theory, privately-owned LLCs in these industries can serve as additional control firms. We stay with a control group comprising state-, foreign, and HMT-owned firms to preserve parallel trends.

[25] Barwick et al (2022) conjecture that their estimate is larger than studies from other countries because, in China, RC reform added to the effect of simplification of business registration .

Table 9: Effects of reform on firm entry

	LLC			ULE		
	(1)	(2)	(3)	(4)	(5)	(6)
$T_i \times D_t$	0.328***	0.345***	0.364***	0.043	0.019	0.01
	(0.045)	(0.029)	(0.033)	(0.059)	(0.047)	(0.052)
Industry-month FE	✓	✓		✓	✓	
City-month FE	✓	✓		✓	✓	
Industry-city FE	✓			✓		
Firm type-industry-city FE		✓	✓		✓	✓
Industry-city-time FE			✓			✓
N	19,785	19,619	8,080	9,621	9,438	4,028

Note: this table reports the estimated effect of the RC reform on firm entry. The dependent variable is the log-form of firm entries by quarter and industry. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

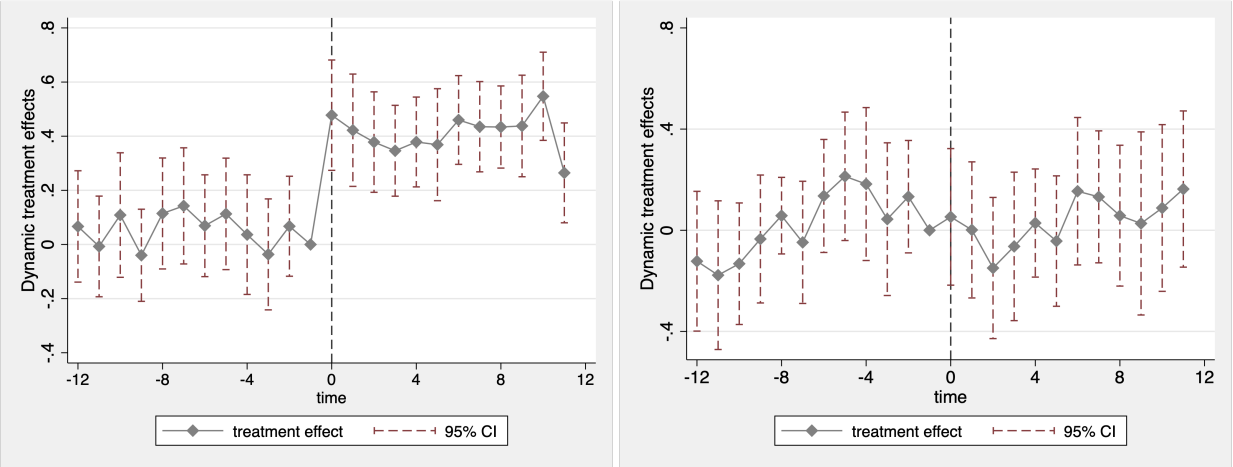
dong's reform both removed the RC requirement and simplified registration procedures. There are several possible explanations for this. One is that the Guangdong reform was not launched by a legislative change, whereas the 2013CL amendment was, which may have triggered stronger responses from potential entrants. Differences in research design may also have contributed to the difference in results: they use unreformed prefectures as controls, while we use unaffected firm types. Regional heterogeneity is also possible. Thus our large estimate may be seen as not inconsistent with Barwick et al. (2022) findings. Both studies point to the larger impact of China's reform than entry deregulation in other countries previously studied.

Columns 4-6 in Table 9 show that the reform did not have any significant impact on ULE entry, suggesting the increase in LLC entry did not result merely from substitution away from unincorporated entity forms. In our dataset, we do not observe individual proprietor businesses (*getihu*) that do not assume the entity form, and therefore cannot rule out the possibility that some of the new entrants we observe would have started businesses as individual proprietors. Even so, the corporate form may be superior for such entrants,[26] and the new incorporation option welfare enhancing.

A possible challenge to our identification is that the business dynamics of SOE and foreign firms might be subject to differential trends (e.g. they are not as responsive to the

[26] As discussed in Cui et al. (2021), the corporate form is potentially more advantageous than individual proprietorship from the perspective of Chinese income taxation. Being able to incorporate may thus further relax the entrepreneur's financial constraints.

Figure 9: Dynamic effects of RC reform on firm entries



(a) firm entry: LLCs (b) firm entry: ULEs

Note: panel (a) - (b) plot the estimated dynamic effects of the RC reform on the firm entries for LLCs and ULEs. 95% confidence intervals are plotted around the fitted line.

aggregate economy) from private LLCs, which threatens the parallel trend assumption. Figure 9 confirms that the parallel trend assumption largely holds between the treated and control groups in the pre-treatment periods, with small and noisy fluctuations in the pre-period. To test the robustness of the firm entry results to alternative assumptions on pre-trends, we implement the "honest approach" proposed by Rambachan and Roth (2023), shown in Appendix A1. Our analysis suggests the results are reasonably robust to differential pre-trends.

6.2 Firm exit

By lowering entry barriers, the RC reform allows entry of firms characterized by higher risks of failure than their pre-reform counterparts. Furthermore, by removing the minimum investment requirement for shareholders, it could also encourage excessive risk-taking and over-borrowing among these new businesses. Consequently, we might anticipate a higher rate of business closures among post-reform entrants. To examine the impact of the policy on firm exit rates, we employ the baseline RDiT specification. The dependent variable reflects a firm's binary operational status in 2015 (2016), derived from its presence in the financial statement dataset.

Table 10 displays RD results for firms' exit rates at ages one (2015) and two (2016).[27]

[27]The corresponding RD figures are presented in Figure B.7.

Table 10: Effect of reform on business formation: firm exit

	pr. exit: age 1			pr. exit: age 2		
	all	all	small	all	all	small
	(1)	(2)	(3)	(4)	(5)	(6)
β	0.003	0.003	0.006	0.014**	0.015***	0.001
	(0.004)	(0.004)	(0.012)	(0.006)	(0.006)	(0.012)
BW (*days*)	79	73	58	64	66	61
N(*effective*)	35794	33616	6540	30139	31098	6846
Day of week FE	Y		Y	Y		Y
Week of month FE	Y		Y	Y		Y
Day of month FE		Y			Y	
Industry FE	Y	Y	Y	Y	Y	Y

Note: this table reports the estimated effects of the RC reform on the firm exit probability. The running variable is the week of firm registration relative to March 1st, 2014. Estimates reported are obtained using a local linear RD estimator with a triangular kernel. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

Note that the exit rates in 2016 are cumulative of its first- and second-year exit rates. Columns 1-2 indicate that first-year exit rates for post-reform entrants are not significantly different from their pre-reform counterparts. In the second year, post-reform entrants exhibit an average increase in exit probability of 1.4 p.p.. We further investigate the exit rates specifically for small firms and find no significant changes in either year. This implies that the observed rise in overall exit rates is not due to shifts in exit patterns among small firms. Instead, the increase might be attributed to alterations in the composition of market entrants or to the risk-taking behaviors of infra-marginal firms.

6.3 Investor structure

This subsection investigates differences in ownership structure between firms in the pre- and post-reform groups. Examining ownership structure potentially helps detect financially constrained entrants in several ways. Such entrants may be more likely to be individual-owned. Entrepreneurs may also seek to overcome their financial constraints by bringing in fellow investors. The RC reform should obviate some entrepreneurs' need to seek equity financing from others, thereby reducing the presence of multi-shareholder firms.

The taxpayer registration dataset records the shareholdings of each shareholder with their shareholder type, including individuals, enterprises and other organizations. Table 11 provides summary statistics for the investor structures of firms formed within a half

Table 11: Investor structure

	N	investor		single investor		majority investor	
		mean	std.	indv.(%)	corp.(%)	indv.(%)	corp.(%)
pre-reform	64,531	2.08	2.17	28.47	3.22	84.98	6.14
post-reform	99,519	1.89	1.80	39.38	2.67	87.49	4.99

Note: this table summarizes the investor structure for firms registered within a half-year time of the policy date. Columns 2 and 3 present the average number and standard deviation for the number of investors. Columns 4 and 5 present the percentage of firms that are wholly owned by individuals and corporations, respectively. Columns 6-7 summarize the percentage of firms that are majority-owned by individuals or corporations.

year before and after the reform. Notably, the average number of investors (column 2) decreased by around 10% after the 2013 CL. There is an approximately 11 p.p. increase in the proportion of single-investor businesses, which is entirely driven by individual investors.

Table 12 further tests our predictions by estimating changes in the number of investors, the probability of being wholly owned by one individual, and the average paid-in capital per investor after the reform using RD. Focusing on the odd columns, the RC reform led to a 12% decrease in the number of investors, a 4.2 p.p. increase in the probability of a business being individual wholly-owned, and a 247 log point (approximately 93%) decline in the average PIC per investor. Together with the significant increase in total firm entry after the reform, one can conclude that the RC reform especially encouraged entry by one-individual-owned businesses, which were most likely to be constrained by the equity requirement under the previous regime.

Table 12: Effect of reform on investor structure.

	no. of investors		**individual-owned**		**average paid-in capital**	
	(1)	(2)	(3)	(4)	(5)	(6)
RD estimate	-0.12***	-0.12***	0.042***	0.051***	-2.47***	-2.71***
	(0.018)	(0.017)	(0.008)	(0.008)	(0.17)	(0.17)
BW (*days*)	83	146	55	65	40	45
N(*effective*)	35557	35557	28196	29749	19814	22228
Days of week FE	Y	Y	Y	Y	Y	Y
Weeks of month FE		Y		Y		Y
Days of month FE	Y		Y		Y	
Industry FE	Y	Y	Y	Y	Y	Y

Note: this table reports the estimated effects of the 2013 CL reform on the investor structure of newly registered firms. In column (1)-(2) and (5)-(6), dependent variables are in log form. In columns (3)-(4), the dependent variable is binary and equals one if the firm is fully owned by one individual. The running variable is the date of firm registration relative to March 1st, 2014. Estimates reported are obtained using a local linear RD estimator with bandwidth selection as per Calonico et al. (2014). The standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

7 Conclusion

In the last decade, in response to slowing productivity growth (as well as to burnish its international reputation for offering a business-friendly environment), the Chinese government adopted a series of policies to promote "mass entrepreneurship and mass innovation." Whether these policies will turn out to be as effective in stimulating productivity growth as the market liberalizations in the late 1990s (Brandt et al 2012, Jiang et al 2022) is an important question not only for China but for the world economy as a whole. In this paper, we use a large and unique confidential taxpayer dataset to study the most significant recent change to the regulation of business entry in China, the 2013 amendment of the Company Law. In contrast to entry de-regulations studied in the previous literature, the reform of the registered capital system brought about by 2013 CL not only reduced red tape but also relaxed wealth constraints on potential entrepreneurs and enhanced financial flexibility. Moreover, these latter changes allow specific predictions about firms' financing choices in response.

Using a regression discontinuity design, we confirm a number of theoretical predictions. Firms registered after the reform reported sharply lower equity capital contributions, reflecting two distinct changes: a lower average level of corporate assets to begin

with, and greater use of debt financing. Further, among the larger firms, there is evidence of an increase in external borrowing.

In the meantime, we find that on average, firms established post-reform enjoyed the same level of revenue, profitability, and loss-making probably as firms registered under the previous regulatory regime. This implies a significant improvement in capital efficiency. In addition, among the smallest firms, profitability actually increased, providing evidence that productive but wealth-constrained entrepreneurs entered the market after regulatory barriers are removed. We also find evidence that the reform induced greater market entry overall, especially among firms with single owners, although the magnitude of the increase is sensitive to the methods of identification.

Overall, therefore, we find that the de facto abolition of the RC system removed several sources of distortion in Chinese firms' financing choices, and enabled additional entry by very small but highly-productive firms possible. It is worth noting that much recent international commentary on China's economic policies focused on the regulation of large market incumbents among digital platforms and in the real property sector (The Economist, 2022). In contrast, government policies targeted at China's vast population of small firms and start-ups such as entry deregulation and tax cuts (Cui et al., 2021) have received far less attention. This neglect seems unjustified given that the question of whether new entrants or incumbents make greater contributions to productivity growth in an economy like China's remains unsettled. Our study helps to correct that neglect.

References

Almeida, H. and Campello, M. (2007). Financial Constraints, Asset Tangibility, and Corporate Investment. *The Review of Financial Studies*, 20(5):1429–1460.

Armour, J. (2006). Legal capital: An outdated concept? *European Business Organization Law Review.*, 7(1):5–27.

Barwick, P. J., Chen, L., Li, S., and Zhang, X. (2022). Entry Deregulation, Market Turnover, and Efficiency: China's Business Registration Reform.

Bazzi, S., Muendler, M.-A., Oliveira, R. F., and Rauch, J. E. (2023). Credit supply shocks and firm dynamics: Evidence from brazil. Technical report, National Bureau of Economic Research.

Benhassine, N., McKenzie, D., Pouliquen, V., and Santini, M. (2018). Does inducing informal firms to formalize make sense? Experimental evidence from Benin. *Journal of Public Economics*, 157:1–14.

Bigelli, M. and Sánchez-Vidal, J. (2012). Cash holdings in private firms. *Journal of Banking & Finance*, 36(1):26–35.

Brandt, L., Kambourov, G., and Storesletten, K. (2020). Barriers to entry and regional economic growth in china.

Brandt, L., Van Biesebroeck, J., and Zhang, Y. (2012). Creative accounting or creative destruction? Firm-level productivity growth in Chinese manufacturing. *Journal of Development Economics*, 97:339–351.

Branstetter, L., Lima, F., Taylor, L. J., and Venâncio, A. (2014). Do Entry Regulations Deter Entrepreneurship and Job Creation? Evidence from Recent Reforms in Portugal. *The Economic Journal*, 124(577):805–832.

Brav, O. (2009). Access to capital, capital structure, and the funding of the firm. *Journal of Finance*, 64(1):263–308.

Bruhn, M. (2011). License to Sell: The Effect of Business Registration Reform on Entrepreneurial Activity in Mexico. *Review of Economics and Statistics*, 93(1):382–386.

Bruhn, M. and McKenzie, D. (2014). Entry Regulation and the Formalization of Microenterprises in Developing Countries. *The World Bank Research Observer*, 29(2):186–201.

Calonico, S., Cattaneo, M. D., and Titiunik, R. (2014). Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs. *Econometrica*, 82(6):2295–2326.

Cerdeiro, D. and Ruane, C. (2022). China's declining business dynamism.

Cole, R. (2013). What Do We Know about the Capital Structure of Privately Held US Firms? Evidence from the Surveys of Small Business Finance. *Financial Management*, 42(4):777–813.

Colla, P., Ippolito, F., and Li, K. (2020). Debt structure. *Annual Review of Financial Economics*, 12:193–215.

Cui, W., Hicks, J., and Norton, M. (2022a). How well-targeted are payroll tax cuts as a response to COVID-19? evidence from China. *International Tax and Public Finance*, 29(5):1321–1347.

Cui, W., Hicks, J., and Xing, J. (2022b). Cash on the table? imperfect take-up of tax incentives and firm investment behavior. *Journal of Public Economics*, 208:104632.

Cui, W., Wei, M., Xie, W., and Xing, J. (2021). Corporate tax cuts for small firms: What do firms do? *Available at SSRN 3950973*.

De Andrade, G. H., Bruhn, M., and McKenzie, D. (2016). A helping hand or the long arm of the law? experimental evidence on what governments can do to formalize firms. *The World Bank Economic Review*, 30(1):24–54.

De Andrade, G. H., Bruhn, M., and McKenzie, D. J. (2013). A helping hand or the long arm of the law? experimental evidence on what governments can do to formalize firms. *Experimental Evidence on What Governments Can Do to Formalize Firms (May 1, 2013). World Bank Policy Research Working Paper*, (6435).

Djankov, S. (2009). The regulation of entry: A survey. *World Bank Research Observer*, 24(2):183–203.

Djankov, S., La Porta, R., Lopez-de Silanes, F., and Shleifer, A. (2002). The regulation of entry. *Quarterly Journal of Economics*, 117(1):1–37.

DLA Piper (2023). *DLA Piper Guide to Going Global*.

Economist, The (2022). Meet china's new tycoons. *The Economist, Aug. 5*.

Evans, D. S. and Jovanovic, B. (1989). An estimated model of entrepreneurial choice under liquidity constraints. *Journal of political economy*, 97(4):808–827.

Gao, H., Harford, J., and Li, K. (2013). Determinants of corporate cash policy: Insights from private firms. *Journal of Financial Economics*, 109(3):623–639.

Gelman, A. and Imbens, G. (2019). Why high-order polynomials should not be used in regression discontinuity designs. *Journal of Business & Economic Statistics*, 37(3):447–456.

Grembi, V., Nannicini, T., and Troiano, U. (2016). Do fiscal rules matter? *American Economic Journal: Applied Economics*, 8(3):1–30.

Hadlock, C. J. and Pierce, J. R. (2010). New Evidence on Measuring Financial Constraints: Moving Beyond the KZ Index. *The Review of Financial Studies*, 23(5):1909–1940.

Hansen, J. L. (2019). Editors' note: Companies without legal capital and the strange case of denmark. *European company and financial law review*, 16(6):677–686.

Hausman, C. and Rapson, D. S. (2018). Regression discontinuity in time: Considerations for empirical applications. *Annual Review of Resource Economics*, 10:533–552.

Hsu, Y.-C. and Shen, S. (2019). Testing treatment effect heterogeneity in regression discontinuity designs. *Journal of Econometrics*, 208(2):468–486.

Jiang, H., Zheng, Y., and Zhu, L. (2022). Entry barriers and growth: The role of endogenous market structure.

Kaplan, D. S., Piedra, E., and Seira, E. (2011). Entry regulation and business start-ups: Evidence from mexico. *Journal of Public Economics*, 95(11-12):1501–1515.

Klapper, L., Laeven, L., and Rajan, R. (2006). Entry regulation as a barrier to entrepreneurship. *Journal of Financial Economics*, 82(3):591–629.

Lopez-Martin, B. (2019). Informal Sector Misallocation. In *Macroeconomic Dynamics*, volume 23, pages 3065–3098. Cambridge University Press.

McCrary, J. (2008). Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of econometrics*, 142(2):698–714.

Rambachan, A. and Roth, J. (2023). A more credible approach to parallel trends. *Review of Economic Studies*, page rdad018.

Schön, W. (2004). The Future of Legal Capital. *European Business Organization Law Review*, 5(3):429–448.

Ulyssea, G. (2018). Firms, informality, and development: Theory and evidence from Brazil. *American Economic Review*, 108(8):2015–2047.

Ulyssea, G. (2020). Informality: Causes and Consequences for Development. *Annual Review of Economics*, 12(1):525–546.

Whited, T. M. and Wu, G. (2006). Financial Constraints Risk. *Review of Financial Studies*, 19(2):531–559.

Appendix A Assessing the Parallel Trend Assumption in the Firm Entry

Figure 9(a) in the main paper exhibits a slightly positive change for firm entry of LLCs two periods before the policy reform. We adopt the "honest approach" proposed by Rambachan and Roth (2023) to test the sensitivity of firm entry results shown in Table 9. This approach relaxes the parallel trend assumption by assuming possible differences in trends between the treatment and control groups. Following Rambachan and Roth (2023), we bound the worst-case post-treatment violation of parallel trends in terms of the worst-case violation in the pre-treatment period. Specifically,

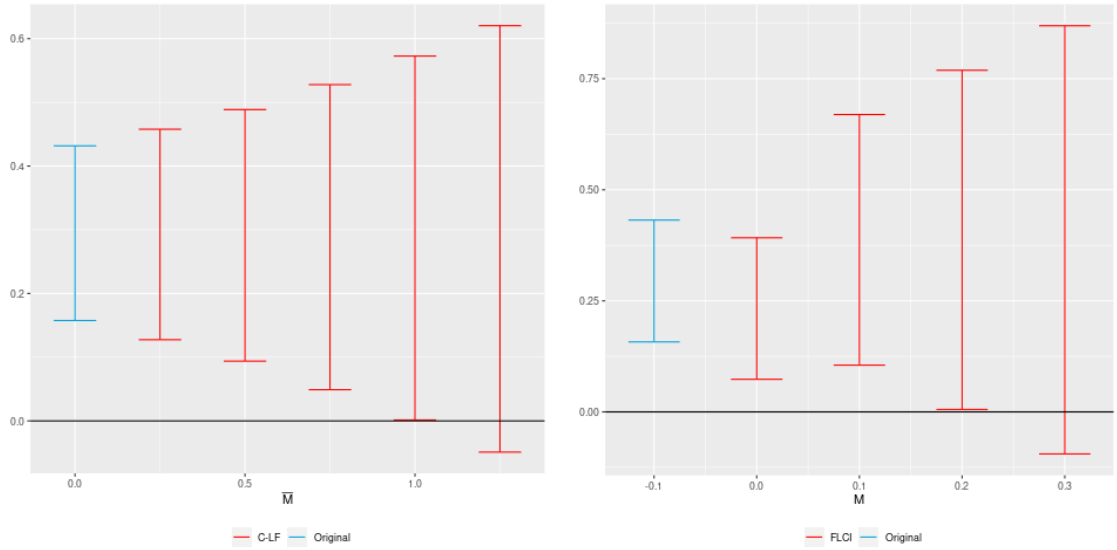
$$\Delta(\bar{M}) = \{\delta : |\delta_{t+1} - \delta_t| \leq \bar{M} \max_{s<0} |\delta_{s+1} - \delta_s|\},$$

where δ_t is the relative difference between the treatment and control group in period t.

Panel (a) of Figure A1 shows the sensitivity analysis that plots robust confidence interval for the treatment effect of RC reform on the firm entry using different values of $\bar{M}$. According to panel a, we can reject a null effect of the RC reform on firm entries unless $\bar{M} > 2$, i.e., assuming the post-treatment violation of parallel trend is less than or equal to the maximum pre-treatment violation of parallel trend, we could conclude that the reform has led to a statistically significant increase in the firm entries of LLCs.

Similarly, we also implement the sensitivity test using the smoothness restriction proposed in Rambachan and Roth (2023), which bounds the change in slope of differential trend between the treatment and control group by no more than M between consecutive periods. Panel b shows that we can reject the null hypothesis on firm entries if the differential trend changes by no more than 0.3 log points between periods.

Figure A1: Sensitivity analysis on firm entry

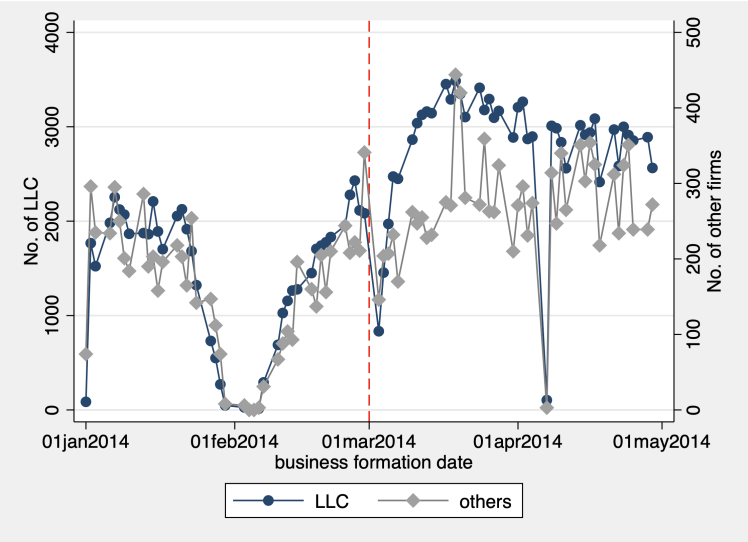


(a) relative magnitude (b) relative differential trends

Note: We implement Rambachana and Roth (2023) and calculate the confidence set for possible choices of different trends between treatment and control groups. Panel (a) plots various values of relative magnitude, which bounds the maximum post-treatment violation of parallel trends by $\bar{M}$ times the maximum pre-treatment violation of parallel trends. Panel (b) plots various values of relative change in the slope, which bounds the maximum deviation from a linear trend in the post-treatment period by $\bar{M}$ times the equivalent maximum in the pre-treatment period.

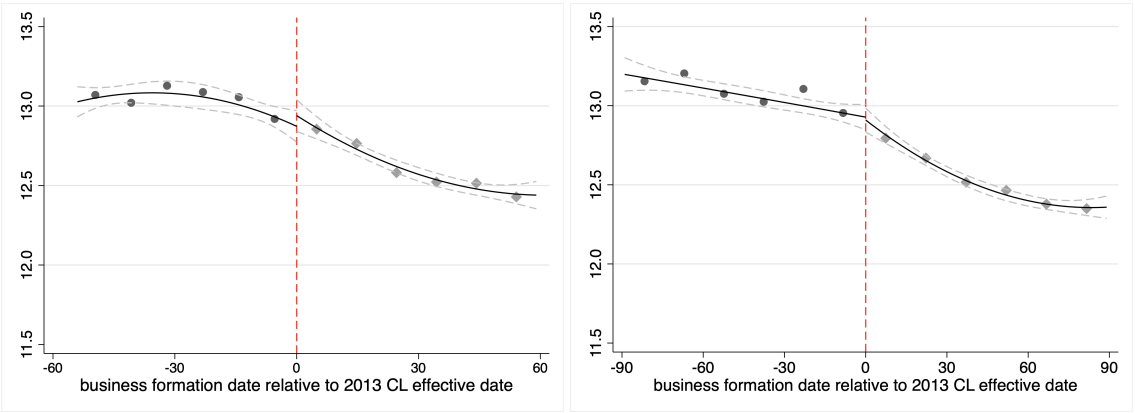
Appendix B Figures

Figure B.1: Daily firm registration around policy effective date



Note: This figure plots the daily number of business registrations for LLCs and all other types of business (including unlimited liability companies and partnerships) from January 1st to April 30th, 2014. The left and right y-axes correspond to the number of LLCs and other businesses, respectively. The dashed vertical line refers to the 2013CL effective date.

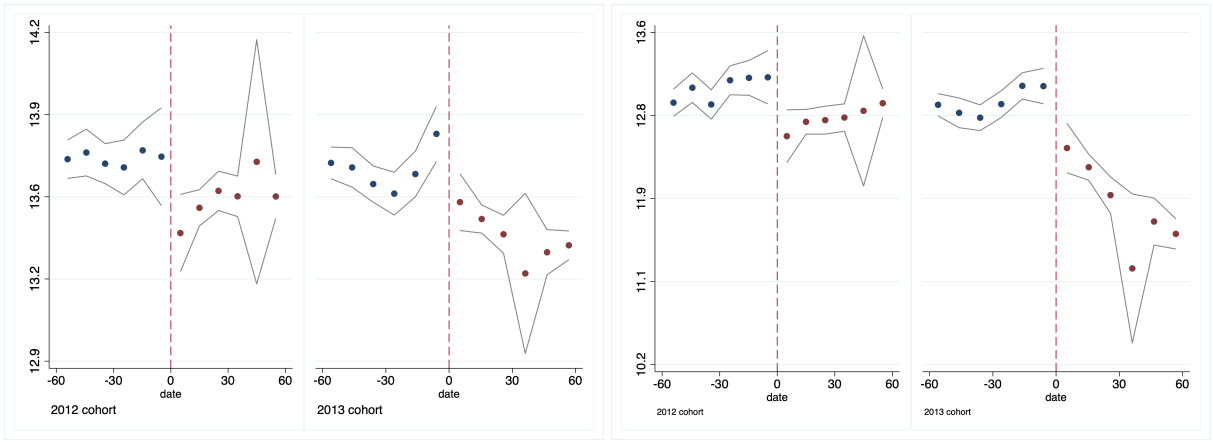
Figure B.2: The effect of policy announcement on firm revenue: short bandwidth.



(a) 60-day bandwidth: ln(revenue) (b) 90-day bandwidth: ln(revenue)

Note: panels (a) and (b) plot annual revenue for firms registered by business formation date in a 60- and 90-day bandwidth around the 2013 CL effective date, respectively. Fitted lines on both sides are separately estimated with a local quadratic regression. 95% confidence intervals are plotted around the fitted line.

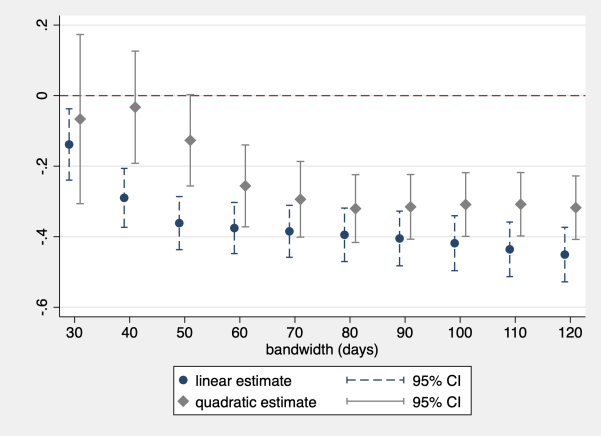
Figure B.3: The effect of policy announcement on firm characteristics: anticipation period.



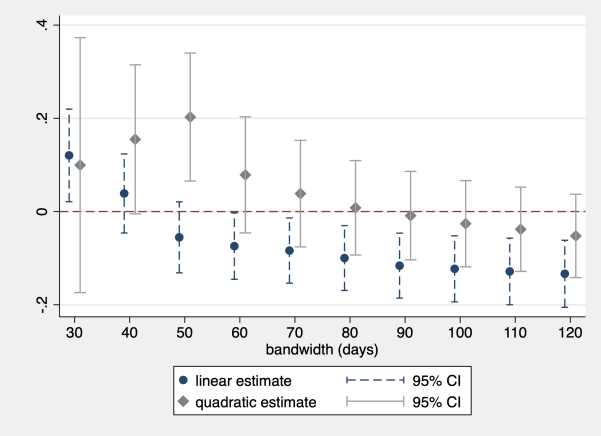
(a) ln(asset) (b) ln(paid-in capital)

Note: panel (a)-(b) presents the average asset and paid-in capital for firms registered in 2014 by business formation date in a half-year bandwidth around the 2013 CL announcement date. 95% confidence intervals are plotted around the scatter plot.

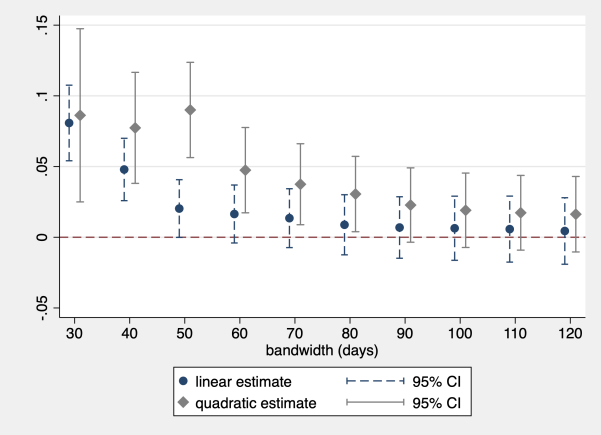
Figure B.4: Effect of reform on firm performance: multiple bandwidths



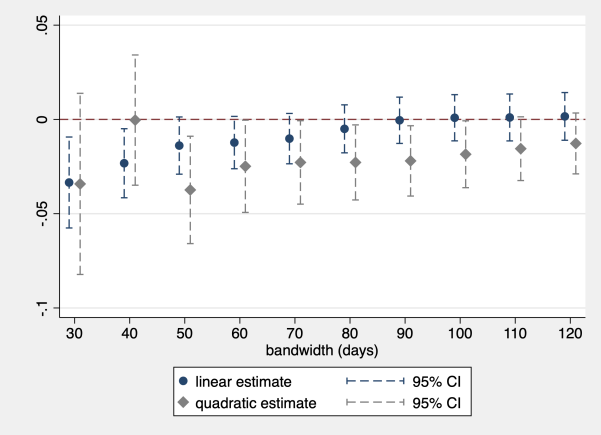
(a) ln(asset)



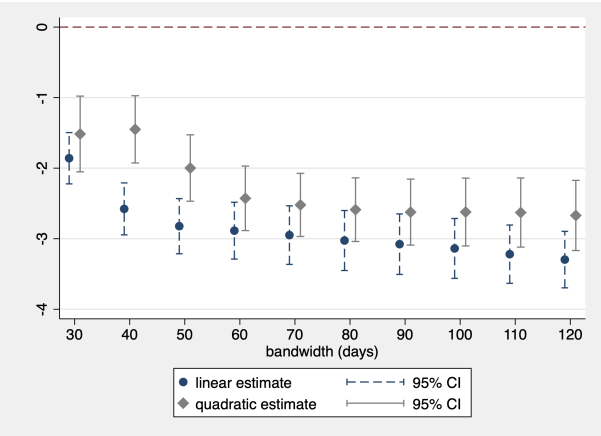
(b) ln(revenue)



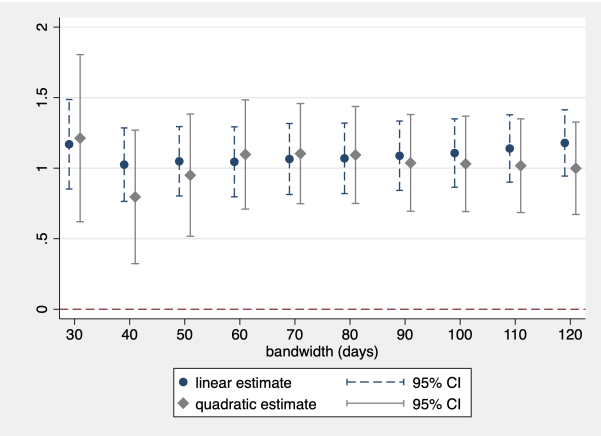
(c) profit margins



(d) loss-making prob.



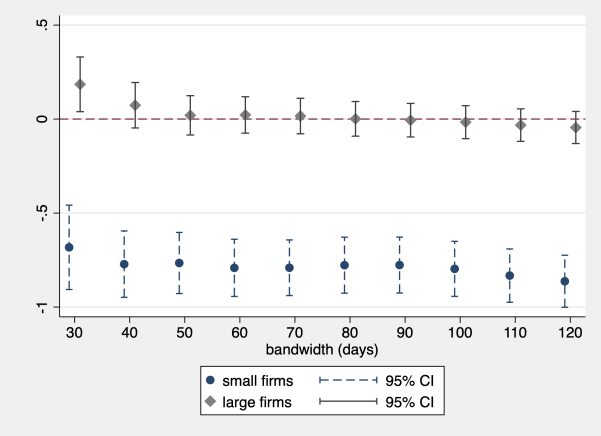
(e) ln(paid-in capital)



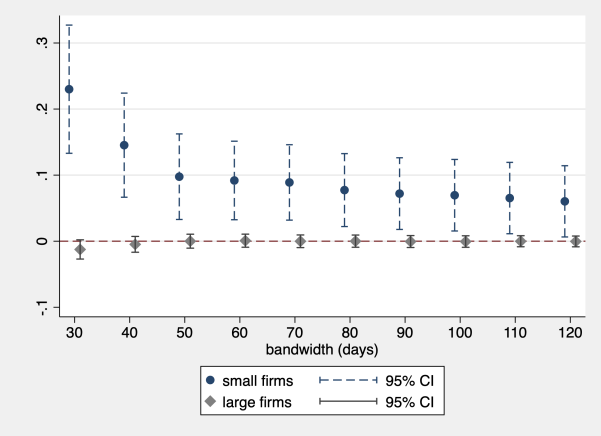
(f) ln(financial liability)

Note: panel (a)-(f) plots the estimated coefficients for assets, revenue, profit margins, loss-making probabilities, paid-in capital and financial liabilities with 95% confidence intervals using various bandwidths with local linear and quadratic regressions, respectively.

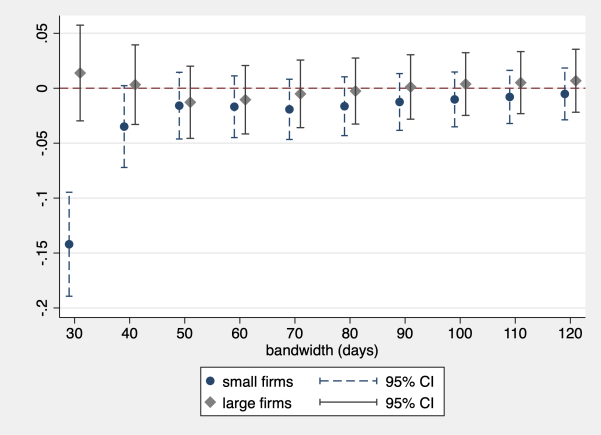
Figure B.5: Effect of reform on firm performance by firm size: multiple bandwidths



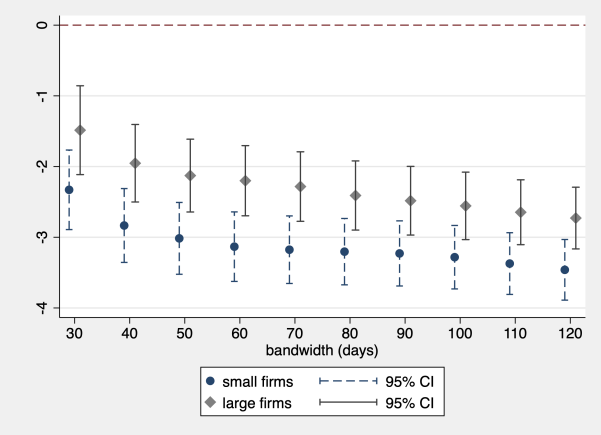
(a) ln(asset)



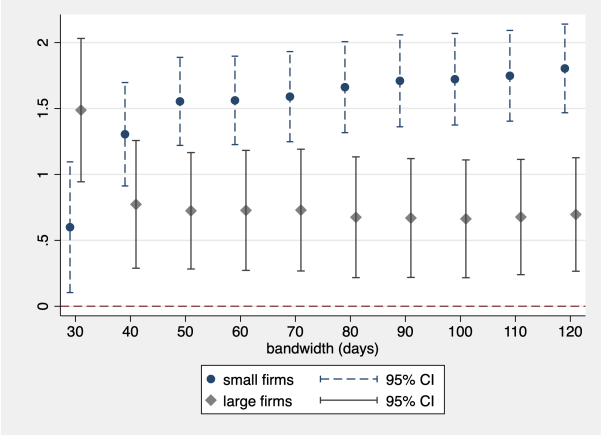
(b) profit margins



(c) loss-making probability



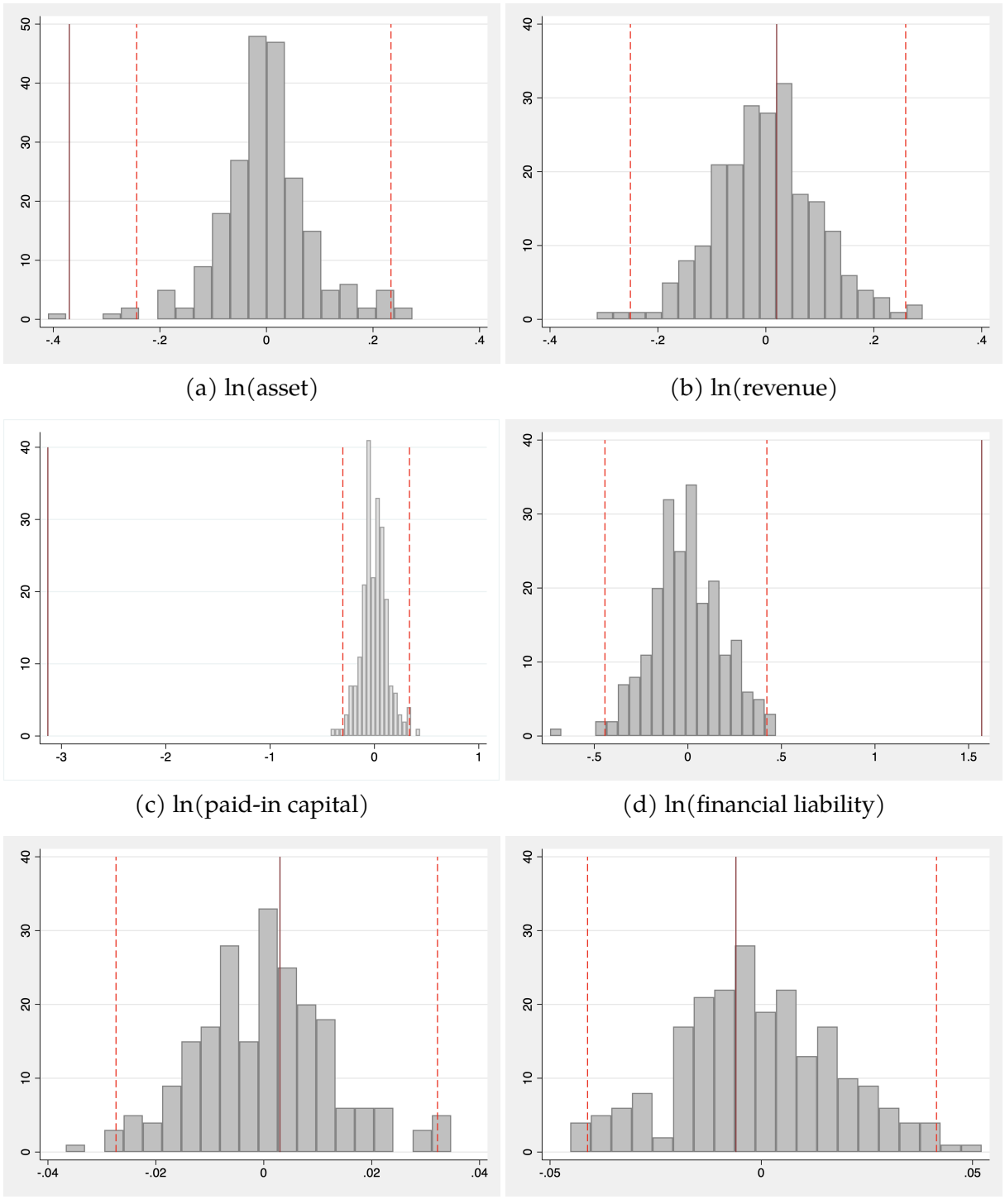
(d) ln(paid-in capital)



(e) ln(financial liability)

Note: panel (a)-(f) plots the estimated coefficients for assets, profit margins, loss-making probability, paid-in capital and financial liability with 95% confidence intervals using various bandwidths and local linear regressions for small and large firms, respectively.

Figure B.6: Effect of reform on firm performance: placebo dates.



(a) ln(asset)

(b) ln(revenue)

(c) ln(paid-in capital)

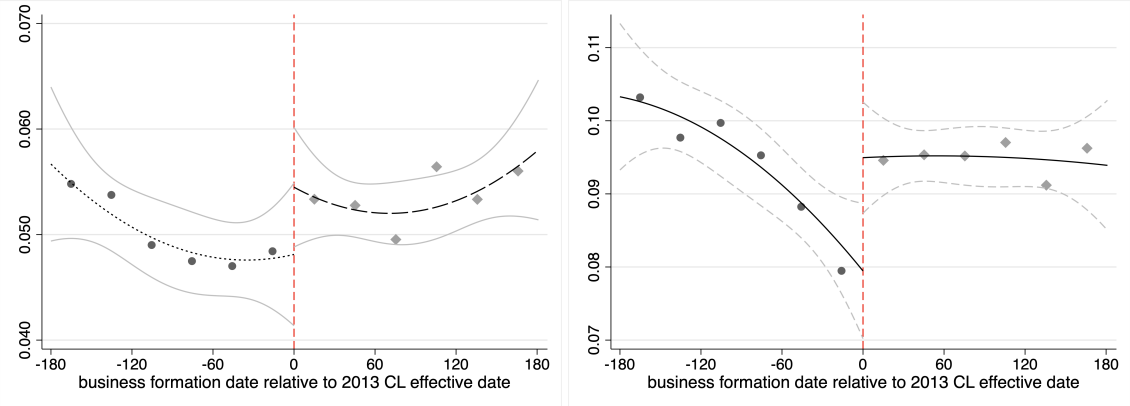
(d) ln(financial liability)

(e) profit margins

(f) loss-making probability

Note: panel (a) - (f) plot histograms of the coefficient estimates for assets, revenues, paid-in capital, financial liability, profit margins, and loss-making probability from 216 placebo regressions (one each week away from the actual policy date from March 2012 to October 2016, excluding from January to June 2014) and the coefficient estimate from the main result (shown as the maroon solid line). The dashed lines correspond to the 1 and 99 percentile thresholds of the distribution.

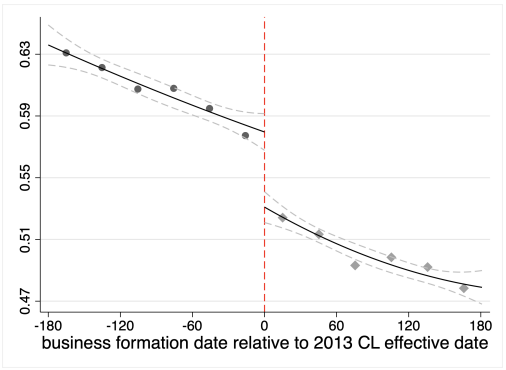
Figure B.7: The effect of reform on firm exit



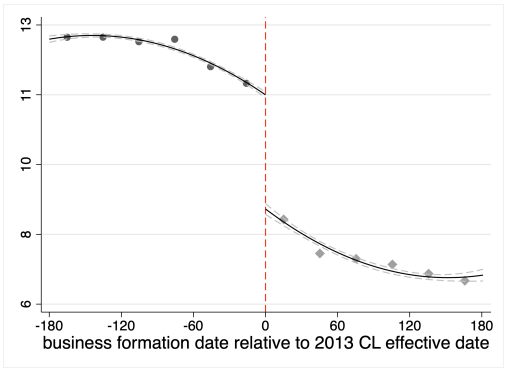
(a) exit probability: 2015 (b) exit probability: 2016

Note: this figure plots the firm exit probability in 2015 and 2016 by business formation date in the half-year bandwidth around the policy date. The fitted lines on both sides are separately estimated with a local quadratic regression. 95% confidence intervals are plotted around the scatter plot.

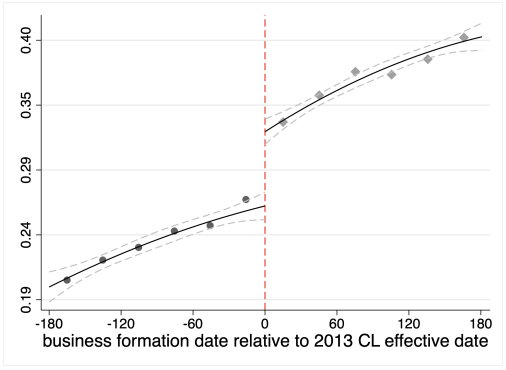
Figure B.8: The effect of reform on investor structure



(a) number of investors



(b) average paid-in capital



(c) individual-owned firms

Note: panels (a)-(c) present the average number of shareholders, paid-in capital per shareholder, and percentage of individual-owned firms by business formation date in the half-year bandwidth around policy date. The fitted lines on both sides are separately estimated with a local quadratic regression. 95% confidence intervals are plotted around the scatter plot.

Appendix C Tables

Table C.1: Summary Statistics of RC and PIC gaps

Panel A: Percentage of firms with RC and PIC gap					
	2013	2014	2015	2016	N
Sept, 2013 - Oct, 2013	20.60	17.46	16.36	16.17	15,149
Nov, 2013 - Dec, 2013	23.04	18.83	17.91	17.30	13,044
Jan, 2014 - Feb, 2014		24.90	23.80	22.08	15,074
Mar, 2014 - Apr, 2014		60.52	57.76	55.83	27,433
Panel B: Percentage of firms with zero PIC					
		2014	2015	2016	N
Sept, 2013 - Feb, 2014		6.24	6.36	6.82	47,534
Mar, 2014 - Aug, 2014		43.12	41.14	41.02	70,496
Panel C: Decomposing firms with zero PIC					
	2013	2014	2015	2016	N
Jan, 2013-Dec, 2013					
Zero paid-in capital(%)	4.92	3.33	3.17	3.45	41,963
Positive equity(%)	27.83	39.91	41.99	43.31	
Negative equity(%)	37.27	51.32	52.18	52.96	
Loss-making(%)	50.00	49.43	49.94	49.40	
March, 2014-Dec, 2014					
Zero paid-in capital(%)		48.99	43.35	41.12	60,159
Positive equity(%)		28.39	28.76	30.83	
Negative equity(%)		70.23	70.56	68.64	
Loss-making(%)		70.49	65.61	59.69	

Panel A displays the percentage of observations with positive gaps between declared RC and paid-in capital for firms registered during various time periods. It summarizes these statistics for four different time spans: two months before the news release, the period between the news release and policy announcement (the anticipation period), and two months after the reform. Panel B shows the percentage of observations each year from 2014 to 2016 with zero-valued paid-in capital for firms registered within a half-year around the policy effective date. Panel C reports the percentage of firms with zero paid-in capital among those registered in 2013 and after the reform in 2014. Within this subgroup, it further details the percentage of firms with positive and negative equity, as well as the percentage of firms operating at a loss.

Table C.2: Summary Statistics of RC, PIC, and Assets

Variables	**P10**th	**Median**	**P90**th	**Mean**	**Std. Dev.**	**N**
March,2013-March,2014						
ln(RC)	11.51	13.60	15.61	13.67	1.55	99,458
ln(paid-in capital)	10.31	13.12	15.42	12.55	3.47	102,636
ln(asset)	11.37	13.29	15.42	13.27	2.01	102,639
March,2014-December,2014						
ln(RC)	11.51	13.82	16.12	13.86	1.49	97,886
ln(paid-in capital)	0	10.31	14.51	7.09	6.61	100,593
ln(asset)	8.52	12.48	14.91	12.05	2.58	100,594
Jan,2015-Dec,2015						
ln(RC)	12.21	13.82	16.12	14.05	1.54	109,852
ln(paid-in capital)	0	0	14.15	5.62	6.53	113,440
ln(asset)	8.27	12.06	14.88	11.82	2.64	113,446
Jan,2016-Dec,2016						
ln(RC)	12.61	13.82	16.12	14.07	1.83	116,170
ln(paid-in capital)	0	0	13.82	4.41	6.20	119,118
ln(asset)	8.53	12.00	14.68	11.83	2.48	119,134

This table presents the summary statistics for the RC, PIC and total assets for firms registered one year before the effective date of 2013 CL, 9 months after the effective date of 2013 CL in 2014, in 2015, and in 2016. We add 1 to the observed values of RC and PIC before taking the log to include zero-valued observations.

Table C.3: Summary Statistics of Assets and Liabilities Decomposition

	Pre-reform group			Post-reform group		
	Mean	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**
Panel A: Asset Categories						
liquid asset/asset	0.924	0.174	27,450	0.926	0.182	47,957
cash/asset	0.420	0.378	27,450	0.439	0.386	47,957
account receivable/asset	0.211	0.309	27,450	0.231	1.133	47,957
fixed asset/asset	0.063	0.149	27,450	0.063	0.161	47,957
liquid asset only (%)	51.8%		27,450	62.1%		47,957
Panel B: Liability Categories						
short-term liability/liability	0.997	0.030	24,545	0.998	0.025	44,547
account payable/liability	0.367	0.473	24,545	0.293	0.429	44,547
financial liability/liability	0.468	0.468	24,545	0.602	0.453	44,457
pr(long-term liability>0)	0.3%		25,545	0.18%		44,547

Note: this table provides summary statistics of firm assets and liabilities in 2014 for firms registered within six months before and after March 1st, 2014.

Table C.4: Effect of reform on business formation: 2015-2016

	ln(assets)		**ln(revenue)**		**profit margin**	
	2015	2016	2015	2016	2015	2016
	(1)	(2)	(3)	(4)	(5)	(6)
β	-0.29***	-0.20***	-0.04	0.031	0.002	0.008
	(0.041)	(0.028)	(0.038)	(0.037)	(0.01)	(0.008)
BW(days)	57	56	65	46	99	89
N(effective)	27445	26691	29151	21755	41989	37779
	pr(loss-making)		**ln(paid-in capital)**		**ln(financial liability)**	
	2015	2016	2015	2016	2015	2016
	(1)	(2)	(3)	(4)	(5)	(6)
β	0.004	0.006	-2.54***	-2.45***	0.75***	0.71***
	(0.009)	(0.014)	(0.20)	(0.17)	(0.13)	(0.14)
BW(days)	92	84	56	58	92	82
N(effective)	39337	35395	27442	27119	39337	35050

Note: this table reports the estimated effects of the 2013 CL reform on the newly registered firms' characteristics during 2015-2016. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

Table C.5: Effect of reform on business formation: asset decomposition

	ln(liquid_assets)		**ln(fixed_assets)**		**ln(other_assets)**	
	(1)	(2)	(3)	(4)	(5)	(6)
β	-0.36***	-0.37***	-0.25**	-0.46***	-0.037*	-0.05*
	(0.041)	(0.043)	(0.095)	(0.082)	(0.021)	(0.022)
Bandwidth (days)	53	54	53	54	53	54
N(effective)	26776	27594	26776	27594	26776	27594
	ln(cash)		**ln(account receivable)**		**ln(inventory)**	
β	-0.36***	-0.37***	-0.22*	-0.15	-0.066	-0.15
	(0.064)	(0.062)	(0.13)	(0.12)	(0.10)	(0.11)
Bandwidth (days)	53	54	53	54	53	54
N(effective)	26776	27594	26776	27594	26776	27594
	cash-to-asset ratio					
β	0.006	0.011				
	(0.009)	(0.007)				
Bandwidth (days)	53	54				
N(effective)	26776	27594				
Days of week FE	Y		Y		Y	
Weeks of month FE	Y		Y		Y	
Days of month FE		Y		Y		Y
Industry FE	Y	Y	Y	Y	Y	Y

Note: this table reports the estimated effects of the RC reform on various categories of newly registered firms' assets. The dependent variables are in log-form after being added by one. The running variable is the date of firm registration relative to March 1st, 2014. Estimates reported are obtained using a local linear RD estimator with a triangular kernel. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

Table C.6: Effect of reform on business formation: costs

	ln(cost of goods sold)			**ln(total business costs)**		
	(1)	(2)	(3)	(4)	(5)	(6)
β	-0.078	0.024	-0.051	-0.063	0.056	-0.072
	(0.86)	(0.061)	(0.087)	(0.82)	(0.07)	(0.083)
Control mean	11.35	12.78	12.92	11.45	12.87	17038
Bandwidth (days)	81	40	43	81	40	43
N(effective)	36435	19427	19510	36436	19428	19511
Days of week FE		Y			Y	
Week of month FE		Y			Y	
Days of month FE			Y			Y
Industry FE		Y	Y		Y	Y

Note: this table reports the estimated effects of the RC reform on the costs of newly registered firms. Columns 1-3 present the changes in the costs of goods sold (COGS) and columns 4-6 show the change in total business costs, the sum of COGS and business expenses. The dependent variables are in log form after being added by one. The running variable is the date of firm registration relative to March 1st, 2014. Estimates reported are obtained using a local linear RD estimator with a triangular kernel. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

Table C.7: Effect of reform on financial characteristics: multi-shareholders

	ln(financial liability)		**ln(paid-in capital)**	
	(1)	(2)	(3)	(4)
β	1.26***	1.29***	-2.33***	-2.91***
	(0.27)	(0.28)	(0.33)	(0.36)
control mean	8.97	8.85	12.74	11.99
Band (days)	78	78	53	44
N(effective)	4594	4518	3552	2730
Days of week FE	Y		Y	
Weeks of month FE	Y		Y	
Days of month FE		Y		Y
Industry FE	Y	Y	Y	Y

Note: this table reports the estimated effects of the 2013 CL reform on the financial liabilities and paid-in capital for firms with more than two shareholders. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

Table C.8: Effect of reform on business formation: liability decomposition

Panel A: all firms				
	IHS(liability)		**IHS(account payable)**	
	(1)	(2)	(3)	(4)
β	0.76***	0.80***	0.081	0.076
	(0.10)	(0.11)	(0.15)	(0.14)
control mean	11.28	11.25	7.62	7.66
BW (days)	47	48	47	48
N(effective)	24377	24043	24377	24043
Panel B: large firms				
	IHS(liability)		**IHS(account payable)**	
	(1)	(2)	(3)	(4)
β	0.88***	1.05***	1.13***	1.46***
	(0.17)	(0.17)	(0.36)	(0.34)
control mean	13.99	14.11	10.47	10.91
BW(days)	37	38	37	38
N(effective)	4634	4650	4634	4650
Days of week FE	Y		Y	
Weeks of month FE	Y		Y	
Days of month FE		Y		Y
Industry FE	Y	Y	Y	Y

Note: this table reports the estimated effects of the 2013 CL reform on newly registered firms' liability categories. The dependent variables are subject to the inverse hyperbolic transformation. The running variable is the date of firm registration relative to March 1st, 2014. Estimates are obtained using a local linear RD estimator with a triangular kernel and bandwidth selection as per Calonico et al. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

Table C.9: Effect of reforms on small firms: robust

	assets	**profit margins**	**loss-making probablity**	**paid-in capital**	**financial liability**
	(1)	(2)	(3)	(4)	(5)
Panel A: 2nd Oder					
β	-0.83***	0.074**	-0.019	-2.85***	1.51***
	(0.11)	(0.038)	(0.024)	(0.33)	(0.26)
BW	72	93	63	73	89
N	7493	9385	6846	7627	9209
Panel B: Consistent Bandwidth=21					
β	-0.65***	0.15**	-0.078**	-2.41***	1.28***
	(0.15)	(0.063)	(0.033)	(0.33)	(0.28)
N	2535	2535	2535	2535	2535
Panel C: Triangular Kernel					
β	-0.84***	0.069**	-0.012	-3.31***	1.69***
	(0.078)	(0.028)	(0.016)	(0.24)	(0.18)
BW	57	85	51	57	61
N	6540	8668	5846	6540	6846
Panel D: Epanechnikov Kernel					
β	-0.79***	0.07**	-0.005	-3.32***	1.69***
	(0.084)	(0.029)	(0.015)	(0.26)	(0.17)
BW	51	76	54	54	57
N	5846	7973	6420	6420	6540

Note: This table reports the estimated effect of the RC reform on firm characteristics for small firms with different regression specifications. The running variable is the date of firm registration relative to March 1, 2014. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

Table C.10: Effect of reform on large firms: robust

	assets	**profit margins**	**loss-making probablity**	**paid-in capital**	**financial liability**
	(1)	(2)	(3)	(4)	(5)
Panel A: 2nd Oder					
β	0.082	0.005	-0.014	-2.06***	0.59*
	(0.071)	(0.007)	(0.023)	(0.31)	(0.35)
BW	73	86	117	68	126
N	8497	9730	13161	8118	14017
Panel B: Consistent Bandwidth=21					
β	0.095	-0.014*	-0.018	-1.69***	0.81**
	(0.09)	(0.008)	(0.024)	(0.41)	(0.36)
N	3184	3184	3184	3184	3184
Panel C: Triangular Kernel					
β	0.024	0.000	-0.001	-2.39***	0.66***
	(0.05)	(0.005)	(0.015)	(0.27)	(0.23)
BW	62	71	96	41	96
N	7663	8238	10847	5887	10847
Panel D: Epanechnikov Kernel					
β	0.02	0.001	-0.001	-2.39***	0.65***
	(0.05)	(0.005)	(0.016)	(0.28)	(0.24)
BW	59	64	90	41	96
N	7592	7671	10248	5367	10847

Note: This table reports the estimated effect of the RC reform on firm characteristics for large firms using different regression specifications. The running variable is the date of firm registration relative to March 1st, 2014. Standard errors clustered by industry-month are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.

Table C.11: Effect of reform on business formation: placebo test

Panel A: firm size				
	ln(assets)		**ln(revenue)**	
	2012	2013	2012	2013
	(1)	(2)	(5)	(6)
β	0.012	-0.078	0.069	-0.04
	(0.035)	(0.05)	(0.042)	(0.053)
BW(days)	53	53	40	40
N(effective)	20171	19812	14956	13965
Panel B: firm performance				
	profit margins		**pr(loss-making)**	
	2012	2013	2012	2013
β	-0.027**	-0.002	-0.018	-0.004
	(0.014)	(0.011)	(0.019)	(0.015)
BW(days)	78	78	45	45
N(effective)	22702	25338	16767	15976
Panel C: financial characteristics				
	ln(paid-in capital)		**ln(financial liability)**	
	2012	2013	2012	2013
β	0.026	-0.11	0.014	-0.11
	(0.062)	(0.10)	(0.052)	(0.096)
BW(days)	57	57	66	66
N(effective)	22123	21717	22702	22214
day-of-the-week FE	Y	Y	Y	Y
day-of-the-month FE	Y	Y	Y	Y
industry FE	Y	Y	Y	Y

Note: This table reports the estimated effect of the placebo RC reform on firm characteristics. The running variable is the date of firm registration relative to March 1st in the years 2012 and 2013. Estimates reported are obtained using a local linear RD estimator with a triangular kernel. Bandwidth is set to be the same as benchmark regressions, as shown in Table 3, Table 5 and Table 6 with two exceptions. Standard errors, clustered by industry-month, are in parentheses. * p <0.1, ** p <0.05, *** p <0.01.