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SHARE PLEDGING IN CHINA: FUNDING LISTED FIRMS OR FUNDING ENTREPRENEURSHIP?

Zhiguo He
Bibo Liu
Feifei Zhu

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ABSTRACT

This paper studies the connection between share pledging and entrepreneurial activities in China, challenging the common wisdom that share pledging funds circle back to the listed firms. Share pledging funds are at the discretion of the shareholders who pledge their publicly traded shares, and survey evidence shows that a majority of the largest shareholders (67.3%) used pledging funds outside the listed firms. By linking firm registration data with share pledging data, we show a positive relation between shareholders' pledging transactions and entrepreneurial activities. Utilizing the launch of the exchange market in 2013 as a quasi-natural experiment that favors share pledging by natural person shareholders against that by legal entity shareholders, our difference-in-differences (DiD) analysis shows natural person shareholders increased their entrepreneurial activities significantly in response to the policy shock, relative to legal entity shareholders. In addition to various robustness checks, we also show that shareholders with better access to share pledging invest more heavily in industries with above-median growth potential.

Zhiguo He
University of Chicago
Booth School of Business
5807 S. Woodlawn Avenue
Chicago, IL 60637
and NBER
zhiguo.he@chicagobooth.edu

Bibo Liu
Tsinghua University
43 Chengfu Rd.
Haidian District
Beijing, China
liubb@pbcsf.tsinghua.edu.cn

Feifei Zhu
School of Finance
Central University of Finance
and Economics
feifei.zhu@cufe.edu.cn

1 Introduction

The financial system, which broadly consists of indirect financing (e.g., the traditional banking system) and direct financing (stock and/or bond markets) schemes, can affect economic growth via a variety of channels, including evaluating prospective entrepreneurs, financing productive projects, diversifying risks, and encouraging innovation (King and Levine, 1993b; Rajan and Zingales, 1998). Our paper focuses on share pledging in which shareholders obtain loans with their shares as collateral and use the funds to finance various activities. As a unique financing vehicle at the intersection of the banking system and the stock market, share pledging is a common practice across global financial markets (Dou et al., 2019).

We study the role of share pledging in promoting entrepreneurial activities in the context of China. Thanks to the relentless market reform, the Chinese economy in the past several decades has witnessed an upsurge of entrepreneurship in the private sector. However, the tremendous growth of the private sector is unlikely to be financed by the banking system, which is largely owned by the state (Brandt and Li, 2003; Song et al., 2011). Our study emphasizes that China's share pledging market, with an enormous size relative to those in other markets, can serve as an important financing vehicle for entrepreneurship.

Our research challenges the common wisdom that share pledging funds circle back to the listed firms (e.g., Meng et al. (2019); Pang and Wang (2020)). Share pledging funds are at the discretion of the shareholders who pledge their shares (of the listed firms), and these funds therefore could be used to finance privately owned enterprises and entrepreneurs. Since China's economic growth is largely driven by non-listed, small- and medium-sized firms rather than listed firms (Allen et al., 2005),[1] we believe it is of first-order relevance to identify the driving forces behind China's entrepreneurship. To our knowledge, our paper is the first in the literature to study share pledging in China from this perspective.

China's share pledging system itself is worthy of investigation thanks to its own significance. As explained in Section 2.1.1, the system was established in mid-1990s, and has been well received by shareholders since then. The volume of newly pledged shares grew at annual rate of 18.6% between 2007 and 2020. At the market's peak in 2017, more than 95% of the A-share listed firms

[1]The Chinese stock market is relatively small compared to its U.S. counterpart. As of the end of 2020, the ratio of stock market capitalization to GDP is about 85% in China, while this number is 267% in the United States.

had at least one shareholder pledged, with the total value of pledged shares amounting to 6.15 trillion RMB (more than 10% of the total market capitalization). Before 2013, share pledging was solely organized in the over-the-counter (OTC) market, where commercial banks and trust firms are major lenders. In 2013, share pledging was introduced to the Shanghai and Shenzhen stock exchanges, with securities firms being the major lenders. This initiative, which we will use as a quasi-natural experiment, greatly expedited the development of share pledging: after this policy shock, the annual transaction volume between 2013 and 2020 reached 204 billion shares (1,057 billion RMB), compared to 39 billion shares (192 billion RMB) per annum during the period of 2007 and 2012.

In order to shape further discussion, our first effort analyzes how shareholders' pledging funds are used, focusing on whether they have been used outside or inside the listed firms. We start by inferring their usages based on public disclosures. In sharp contrast to common belief, during our sample period of 2007–2019, only funds from 7.8% of share pledging transactions are used for the listed firms,[2] while the remaining 92.2% are used to finance shareholders' other activities.

We further break down how pledging funds are used outside the listed firms by taking advantage of a joint survey by the PBC School of Finance at Tsinghua University (hereafter, Tsinghua PBCSF) and the China Securities Regulatory Commission (the regulatory body of the securities market in China; hereafter, CSRC) in 2019. Given the official status of the CSRC, the response rate to our survey is close to perfect (99.5%). In the survey, 60.1% of the responding firms reported that their largest shareholders had used share pledging in the past. Within those firms with pledging shareholders, 36.1% reported that their shareholders decided to support their listed firms with the proceeds. However, a larger fraction of them (67.3%) used the pledging funds outside the listed firms. Among them, their largest shareholders could repay personal debts (25.3%), spend for personal consumption (13.6%), and/or make financial investments (5.2%); but, most relevant to our study, 33.0% of them invested the funds outside the listed firms and established/invested in new firms.[3] This last point is the direct evidence that share pledging is not only a financing tool to support the listed firms, but also a potential source of financing for entrepreneurial activities.

[2]Our sample consists of more than 60,000 pledging transactions. Within the 7.8% that have been used inside the listed firms, 1.8% is for guarantees, 3.5% for purchasing seasoned equity offering (SEO) shares, and 2.7% for loans.

[3]As the pledging shareholders may use the funds for multiple purposes and we include a multiple-choice question in the survey; the fractions of shareholders that repay debt, spend for consumption, make financial investments, and establish new firms do not necessarily add up to 100%.

Our second effort is to link shareholders' pledging transactions to their entrepreneurial activities in a regression-based framework. Specifically, we test whether share pledging increases the odds that a shareholder creates new firms or invests in existing firms other than the listed firm she already holds. For listed firms' major shareholders, we infer their entrepreneurial activities each year by counting the number of firms they hold with the firm registration data compiled by the State Administration for Industry and Commerce (SAIC).[4] In our context, we define entrepreneurial activities as either the creation of firms or the first equity investments in existing firms,[5] and then merge entrepreneurial activity data with share pledging transaction data by shareholder and year to form our final sample.

In the baseline analysis, we regress the measures of entrepreneurial activities (i.e., the number of add-on firms a shareholder newly adds in each year, which is then decomposed to the number of new firms created by the shareholder, and the number of existing firms in which the shareholder makes her first investment) on a dummy variable indicating whether the shareholder pledges new shares during that year (see Section 2.3.1 and 2.3.3 for calculations of these measures). Regression results show that the number of add-on firms newly held by a pledging shareholder significantly exceeds that of a non-pledging shareholder, and most of her new investment is in newly created firms rather than in existing firms. These results are consistent with our hypothesis that there is a positive relation between shareholders' pledging transactions and entrepreneurial activities.

We then utilize the launch of the exchange market in 2013 as a quasi-natural experiment, and perform a difference-in-differences (DiD) analysis to address potential endogeneity concerns. We posit that the launch generates significantly larger supply shocks on share pledging to natural person shareholders than to legal entity shareholders, who are ultimately owned by natural persons. In our context, a natural person shareholder refers to an individual shareholder who has legal rights and responsibilities, and a legal entity shareholder refers to an company or organization that holds a listed firm's shares.[6] Before 2013, most share pledging loans were granted to legal

[4]Recently, the SAIC firm registration data has been used to study several important topics in China, including the evolution of state ownership (Allen et al., 2020a; Bai et al., 2021a), firm growth (Allen et al., 2020b), talent and firm creation (Bai et al., 2021b), and interregional investments (Shi et al., 2021).

[5]We take a stand that "entrepreneurial" activities are associated with investments that are "new" to the shareholders themselves. From this perspective, our entrepreneurial" activities excludes shareholders' "follow-on" equity investments into firms that they already own. Section 4.3.7 shows that share pledging plays a much more significant role in driving the shareholders' "entrepreneurial" activities compared to their "follow-on" investments in existing firms; see the literature review where we compare our paper to Guo et al. (2020) who study the latter mechanism.

[6]Typical legal entity shareholders in the Chinese stock market include companies, financial managers (e.g., mutual

entity shareholders; natural person shareholders were treated as retail customers by commercial banks, and granted only small credit lines in the OTC market. In contrast, since 2013, loan supply to natural person shareholders—now by securities firms, as opposed to commercial banks—grew significantly in the exchange market; this is because i) securities firms' lending decisions depend on the quality of collateral rather than the shareholders' identities; ii) securities firms take share pledging as a strategic opportunity and are keen on promoting it among natural person shareholders; and iii) securities firms make the pledging procedures more friendly to natural person shareholders. Therefore, relative to legal entity shareholders, natural person shareholders are more exposed to the positive supply shock caused by the launch of the exchange market.

We assign natural person and legal entity shareholders to the treatment and control groups, respectively. As a standard pre-trend analysis, we show that in the three years leading up to the 2013 reform, both pledging probabilities of natural person (the treated group) and legal entity (the control group) shareholders grew at a similar pace. However, after the reform shock, share pledging by natural person shareholders increased much faster and caught up with the level of legal entity shareholders in one year. The entrepreneurial activities by the natural person and legal entity shareholders show similar patterns. A formal DiD analysis suggests that after the launch of the exchange market, the increase in the number of add-on firms held by a natural person shareholder exceeds that of a legal entity shareholder by 113% of the national average, suggesting a causal relation between share pledging and entrepreneurial activities. This pattern is driven by treated shareholders' creation of new firms: the increase in the number of new firms created by a treated natural person shareholder exceeds that of a legal entity shareholder by 144% of the national average, while the relative increase in existing firms is insignificant.

To further strengthen our analysis, we also run a variety of robustness checks and discuss the implications of our results. First, we consider an alternative entrepreneurship measure by subtracting the number of exiting firms from the number of new firms held by a shareholder, which delivers a similar result, albeit with a smaller magnitude. Second, we re-estimate our DiD model at the shareholder-industry-year level and obtain consistent results. Third, we use paid-in capital, instead of the number of add-on firms, as the proxy for entrepreneurial activities. Our findings

funds), and non-profit organizations (e.g., university endowment funds). Government agencies (e.g, the State-owned Assets Supervision and Administration Commission (SASAC)) are treated as state shareholders in our context.

on shareholders' capital allocation are consistent with those on firm numbers. Fourth, to evaluate the contribution of share pledging to economic growth and the associated investment efficiency, we examine the quality of shareholders' entrepreneurial activities. We find shareholders with better access to share pledging invest more heavily in industries with above-median growth potential, and their new equity investments seem to be efficient. Fifth, we discuss the influence of possible confounding policy events, and conclude that our DiD results are unlikely to be driven by other shocks. Finally, in the analysis we control for the impacts of unobservable local economic shocks in regions where the add-on firms are created, and obtain roubst emprical results.

Relation to literature

The first strand of literature related to our work is the interaction between finance and entrepreneurship. Entrepreneurship plays an important role in job creation, economic growth, and innovation (King and Levine, 1993a,b; Adelino et al., 2017). Financial constraints are among the most important impediments to entrepreneurship (Blanchflower and Oswald, 1998). Financially constrained startups have significantly lower survival rates (Andersen and Nielsen, 2012). However, this constraint can be relaxed to some extent with alternative financial tools. For instance, increased housing wealth can alleviate entrepreneurs' credit constraints by enabling homeowners to extract equity from their property and invest it in new businesses (e.g., Harding and Rosenthal (2017); Schmalz et al. (2017)).

The second strand of literature related to our paper concerns the causes and consequences of share pledging, with a focus on the influences on listed firms. As for causes, Guo et al. (2020) find that shareholders pledge shares to reduce the financial constraints of their non-listed holdings. Larcker and Tayan (2010) suggest that pledging is an effective way for executives to diversify their risk exposures on a single financial asset (i.e., ownership in the listed firm). As for consequences, pledging shareholders that fear losing the control rights of the listed firms are likely to alter their decisions, through share repurchases (Chan et al., 2018), earnings management (DeJong et al., 2020), corporate innovation (Pang and Wang, 2020), and mergers and acquisitions (Zhu et al., 2021). Share pledging is also believed to destroy firm value in most studies, because of large shareholders' expropriation (Yeh et al., 2003; Kao et al., 2004), increased tail risks of listed firms (Dou et al., 2019; Anderson and Puleo, 2020), and reduced corporate risk-taking (Dou et al., 2019;Meng et al.,

2019). One exception is Pan and Qian (2019) who document a positive shareholder wealth effect in China.

Particularly, the recent study by Guo et al. (2020) suggests that privately owned firms' financial constraints drive their shareholders to pledge shares of the listed firms they hold. Though both papers point to large shareholders pledging their shares of listed firms to support activities outside their listed firms, there is an important difference. Our study suggests a "new firm" story in which shareholders finance newly created firms, while Guo et al. (2020) implicitly suggests an "old firm" story that shareholders finance other privately owned existing firms. We highlight this difference because entrepreneurial activities, i.e., "new firms" drive economic growth. In our context, shareholders only use a small portion of the pledging funds in firms they already hold. Instead, most funds go to firm creation. Empirically, our "new firm" story dominates the "old firm" story, which only receives mixed support from the data.

The third strand of related literature is on the development of China's financial markets. China's stock market, ranking second by size in the world, has quickly gained global prominence (Hu and Wang, 2021). It has become as informative about future corporate profits as that in the United States, which contributes to the increased investment efficiency of privately owned firms (Carpenter et al., 2021). The bond market has also been growing quickly in recent years, dominated by the issuance and trading of government bonds and corporate bonds issued by large SOEs and other large and highly rated firms (Allen et al., 2017). In particular, local governments with rollover pressure resorted to nonbank financing in the post-stimulus period after 2012, expediting the development of the municipal corporate bond market (Chen et al., 2020). The markets for short-term debts, e.g, commercial papers, also grew substantially (Huang et al., 2021). Both the stock and bond markets channel household savings toward the real sector, which is relevant to China's economic growth (Amstad and He, 2020; Carpenter et al., 2021). As a unique financing vehicle, our paper studies share pledging loans, which form an important financial channel that connects both the banking system and the stock market.

2 Institutional Background and Data

This section provides institutional background about share pledging in China and explains the data sources that we use in this paper.

2.1 The Share Pledging Market

Share pledging is a practice whereby corporate shareholders use their shares as collateral for loans from banks, trust firms, securities firms, or other parties. Shareholders can use the funds in a flexible way, including but not limited to making investments, paying off debts, and/or spending for other personal uses such as home remodeling, college tuition, or large purchases (Larcker and Tayan, 2010). Survey evidence indicates that share pledging is a prevalent phenomenon in listed firms across the globe. Around 20% of the U.S. listed firms allow insiders (directors and executives) to pledge their shares (Larcker and Tayan, 2010); and indeed, 17.9% of insiders at S&P 1500 firms pledged their shares by 2012 (Singh, 2018), and the number for Russel 3000 firms was 15%.[7] In the Taiwanese market, 50% of insiders at listed firms pledged 3.15% of their firms' total shares outstanding during the period from 2003 to 2013 (Dou et al., 2019). In India, the value of pledged shares by the shareholders of listed firms amounted to $38.08 billion by September 2020, accounting for 1.86% of the total market capitalization.[8]

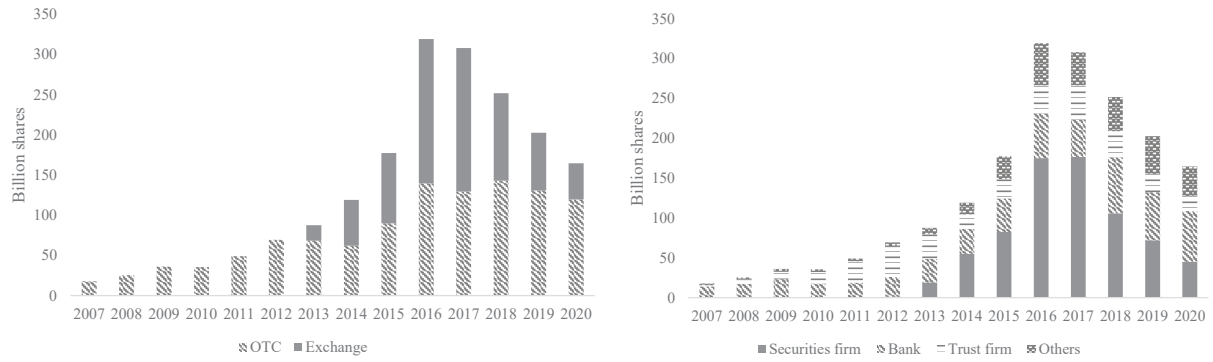
We now provide an overview of the evolution of Chinese share pledging market in this section, with an emphasis on the difference between the OTC and exchange markets.

2.1.1 The Chinese Share Pledging Market

The rise of the share pledging market. China's share pledging system was officially established by the 1995 Guarantee Law. The first transaction was finished in 1997: Jiangsu Yueda Group pledged 57 million shares of Jiangsu Yueda Investment Co. LTD., its subsidiary listed on the Shanghai Stock Exchange, to Zhejiang Industrial Bank for loans. Before 2013, share pledging—including the Yueda transaction—was organized in the OTC market, and the size of the market was relatively small. (We will explain the OTC share pledging market shortly in Section 2.1.2.) Figure

[7] Source: https://corpgov.law.harvard.edu/2012/11/07/iss-proposes-2013-voting-policy-updates/#3.

[8] Source: https://economictimes.indiatimes.com/markets/stocks/news/share-pledging-by-promoters-rises-in-aug-on-cash-needs/articleshow/78025860.cms.



Panel A: *OTC and exchange market* ***Panel B:*** *Different types of lenders*

Figure 1: **Shares pledged in the Chinese market, 2007–2020.** This figure plots the number of listed firms' shares newly pledged by major shareholders who hold 5% of the total shares or more in each year from 2007 to 2020. The pledging information is disclosed by these shareholders and recorded in the CSMAR database.

1 shows that commercial banks and trust firms were the major lenders in this market, providing 90% of the share pledge loans during the period from 2007 to 2012.

In 2013, as a major financial innovation encouraged by the CSRC, the Shanghai Stock Exchange, the Shenzhen Stock Exchange, and the China Securities Depository and Clearing Corporation Limited (hereafter CSDC) jointly launched a centralized pledging system in the two stock exchanges. In the exchange market, securities firms became the dominant lender. As a result, the market size soared: the average annual transaction volume from 2013 to 2020 reached 204 billion shares, rising from 39 billion during the period from 2007 to 2012 (see Figure 1). At the end of 2017, which is the peak of the share pledging market, more than 95% of the A-share listed firms had at least one shareholder pledged, with the total value of pledged shares reaching 6.15 trillion RMB (more than 10% of the total market capitalization).

Tightening regulations and recent developments. The risk associated with share pledging drew increasing attention from the regulators and investors as it grew into a huge market. In the 2015 A-share market crash, many pledging shareholders received margin calls due to large drops in share prices and collateral values (see, e.g., Bian et al. (2021)). Many of them were unable to fulfill the margin requirements and were forced to sell their shares. This in turn caused even larger price drops for the pledged shares and other shares they held, resulting in panics in the market. Since

then, the seemingly oversized share pledging market was believed to be a new source of systemic risk in the Chinese financial system.

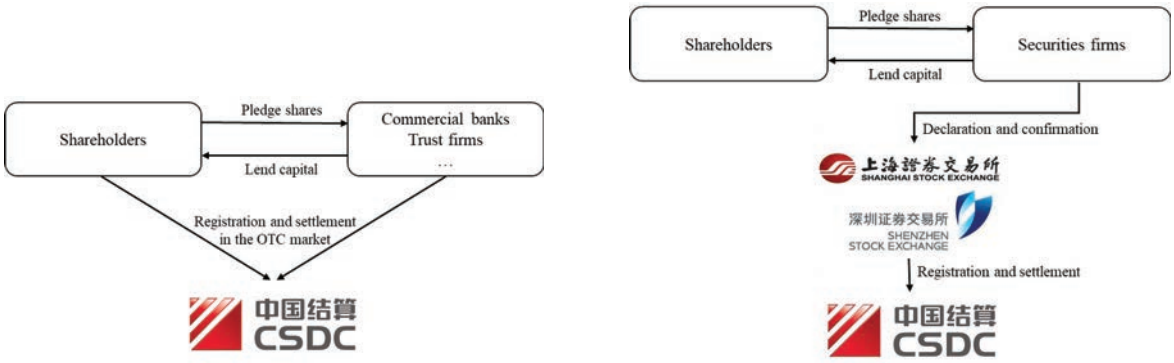
In late 2017, the authorities started to tighten regulations on share pledging,[9] and the Chinese share pledging market shrank gradually. As shown in Figure 1, the annual growth rate of pledging volume was −18.9% between 2018 and 2020. At the end of 2020, 63.6% (2,632) of listed firms in the Chinese A-share market had at least one shareholder pledged, and the total pledged shares accounted for 6.83% of the total shares outstanding. The market size in 2020 was significantly smaller than that in 2017, but still much larger than those in other markets.

2.1.2 The OTC and Exchange Markets

Share pledging in the OTC market. As mentioned above, in China share pledging transactions only occurred in the OTC market before 2013. Panel A in Figure 2 depicts the procedure for a typical share pledging transaction conducted over the counter. Shareholders of listed firms pledge their shares as collateral to financial institutions including commercial banks and trust firms to raise funds. The terms of pledging transactions are negotiated between shareholders and lenders; then both parties go to the CSDC to register the transaction and make settlements. There is no restriction on the maturity of the loan, but it is typically less than 10 years. The interest rate of pledging loans ranges from 8% to 15%, which is higher than that of bank loans ranging from 5% to 10%. In addition, when forced sales are triggered due to market fluctuations, the sale of collateral is costly to lenders, as lenders are not allowed to sell the collateral (pledged shares) in the secondary market directly. Instead, lenders have to go to the courthouse to complete the ownership transfer first, which is a long and complicated process. By the end of 2020, the sale of collateral is still an exhausting procedure in the OTC market.

Share pledging in the OTC market is also a time-consuming process. It may well last for more than one month, because i) the search for an interested lender may take a while in a decentralized market; ii) the lender has to perform necessary due diligence to collect enough information about the borrower and the collateral; and iii) it also takes time to complete the internal approval process

[9] For instance, the new guidelines issued by the exchanges mandated i) share pledging funds were only allowed to be used in the real sector, and investments in obsolete industries and the stock market were prohibited; ii) the transaction value had to be larger than 5 million RMB; iii) a single securities firm could only accept up to 30% of a listed firm's shares as collateral; and iv) for a listed firm, the total number of shares pledged could not exceed 50% of its total shares.



Panel A: OTC market *Panel B: Exchange market*

Figure 2: **Shares pledging procedures in the OTC and exchange market.**

within the lending financial institutions.

Share pledging in the exchange market. On May 24, 2013, the Shanghai Stock Exchange, the Shenzhen Stock Exchange, and the CSDC jointly announced an initiative on share pledging, "*The Guidance on Stock Pledge Repurchase Transactions, Registration and Settlement*," marking the establishment of a standardized and centralized share pledging system in China. Panel B in Figure 2 depicts the procedure of a typical pledging transaction in the exchange market. Securities firms are the dominant lender relying on their own capital or capital raised from the financial market. To some extent, they act as "market makers" for share pledging transactions. Shareholders can easily approach multiple securities firms and discuss borrowing needs and loan terms. Lenders compete on interest rates, loan-to-value ratios (the value of a loan divided by the market capitalization of pledged shares), and other services. Once an agreement is reached, the securities firm passes the transaction information to the exchanges via an electronic system, and then the exchanges collectively handle the registration and settlement at the CSDC. Under this system, a pledging transaction can be completed within one or two days.

On the demand side, though less flexible on the collateral and borrowing terms, the exchange market is more accessible and attractive to shareholders of listed firms. First of all, securities firms are better connected with shareholders they served in the business of investment banking or brokerage. When these shareholders have pledging needs, naturally they will go to their securities firms. Besides, competition among securities firms not only lowers the borrowing cost (1%–3%

below the rate in the OTC market) but also simplifies the procedure greatly, not to mention the fact that there is a looser restriction on fund usage in the exchange market.[10] On the supply side, securities firms are also well motivated to compete for the new business, with a relatively low risk for at least three reasons: i) collaterals are restricted to securities traded on the stock exchanges (e.g., stocks, mutual fund shares, and bonds); and ii) loan maturity is restricted to less than 3 years; and iii) the value of collaterals is marked to market on a daily basis. When the market drops dramatically, the sale of collateral does not need the shareholders' consent and the procedure is easy.

We conclude this section by highlighting two facts. First, this 2013 initiative in the exchange market generated larger supply shocks to natural person shareholders than to legal entity shareholders, by which these two types of shareholders are provided with more equal access to pledging loans (see Section 4.2.1 for details). Second, despite the fast growth of the exchange market in recent years, the OTC market is still a well-functioning and active marketplace for share pledging, with 58.16% of pledging transactions conducted in the OTC market during 2020.

2.2 The Growth of Private Sector and Entrepreneurship

The share pledging market in China has experienced significant growth in the past two decades but perhaps pales in comparison to the tremendous upsurge of Chinese privately owned enterprises and entrepreneurs.[11] As China's economic transition lifted constraints on the private sector and provided an increasingly open business environment, a growing number of entrepreneurs seized the opportunity to establish their own businesses. For example, in the 1990s, internet entrepreneurs started to emerge, and created today's giants like Alibaba, Tencent, and Baidu. Many entrepreneurs also appeared in other industries: energy, healthcare, financial service, consumer, retail, among others (Tse, 2016). Recently, entrepreneurship has gained an even larger weight in China's economic policies (He et al., 2019).

[10] For example, shareholders were allowed to use the proceeds for equity investment (i.e., buying publicly traded stocks and equities of non-listed firms) in the exchange market before 2017, a practice that was prohibited by bank lenders in the OTC market. After 2017, the CSDC tightened its regulations and banned the potential usage of pledged funds for equity investment.

[11] By the end of 2017, privately owned enterprises contributed more than 50% of tax revenue, 60% of GDP, 70% of technological innovation, 80% of urban employment, and 90% of new jobs and firms to the Chinese economy. Source: President Xi Jinping's speech at the Privately Owned Enterprises Symposium on November 1st, 2018. Available at: http://www.xinhuanet.com/politics/2018-11/01/c_1123649488.htm.

It is reasonable to conjecture that major shareholders of Chinese listed companies, thanks to their proven business acumen and strong social connections, are among the main leaders of entrepreneurship in China. Our paper aims to connect their share pledging activities to the rising enterprise creations in the economy. In fact, in the firm registration data that we discuss in detail in Section 2.3.3, we find that listed firms' major shareholders are more likely to engage in entrepreneurial activities. An average major shareholder of a listed firm holds 0.48 new firms between 2010 and 2018. In contrast, other shareholders add only 0.07 new firms on average in the same period.

In our study, we consider two types of entrepreneurial activities by listed firms' shareholders: creating new firms and investing in existing firms. Conceptually, we term the firms newly created by shareholders as "new firms," and term the existing firms in which shareholders make their first investment as "existing firms." We call the sum of these two types of firms as "add-on firms," which are the firms that shareholders newly hold. We use the number of add-on firms, new firms, and existing firms to measure entrepreneurial activities throughout the paper (see Section 2.3.3 for variable construction). By definition, the number of new firms and the number of existing firms add up to the number of add-on firms.

2.3 Data, Sample, and Key Variables

This paper uses three categories of data. The first two are about share pledging transactions and the usage of the funds, and the third is on shareholders' entrepreneurial activities. When describing the usages of share pledging funds (Section 3), we rely on data on pledging transactions and fund usages. When performing the regression analysis on the relation between share pledging and entrepreneurship (Section 4), we combine data on pledging transactions and data on entrepreneurial activities.

2.3.1 Data on share pledging

We collect data on share pledging transactions from the China Stock Market and Accounting Research (CSMAR) database. According to information disclosure regulations in the Chinese stock market, corporate insiders (directors, supervisors, and executives), major shareholders holding 5% of the shares or more, and ultimate controllers are required to report their share pledging

information. We collect such pledging information by each major shareholder who holds 5% of the shares or more, including shareholder name, transaction dates, number of shares pledged, and purposes.

With the transaction data, we construct the key independent variable of interest for our empirical analysis in Section 4, $PledgingDummy_{it}$, which is a dummy variable that equals one if shareholder i newly pledges shares in year t, and zero otherwise. Detailed definitions of variables are provided in Appendix A.

2.3.2 Data on fund usages

We use two methods to determine how pledging shareholders use their share pledging funds.

Fund usages based on firm disclosure. Our first method is based on listed firms' public disclosure. In our context, we classify the usages of share pledging funds as i) guarantees to the listed firm, i.e., shareholders pledge shares as collateral for loans (made by a third party) to the listed firm; ii) equity investments through seasoned equity offerings in the listed firm; iii) direct loans to the listed firm, and iv) other usages outside the listed firm. For each pledging transaction recorded in the CSMAR database, we identify its usages by taking the following steps.

First, we collect the fund usages directly provided by CSMAR. As the data provider, CSMAR identifies these usages by manually reading transaction announcements, with three categories: financing the listed firms, financing the third parties, and used by the shareholder. However, the method employed by CSMAR suffers a serious misclassification issue.[12] For instance, transactions whose purposes are not reported in the announcements are simply assigned with the category of "used by the shareholder;" and the category of "financing the listed firms" includes loan guarantees only but not direct loans or equity investments made to the listed firms.

We therefore take the second step to correct this misclassification, by combining the share pledging data with other data on related-party transactions. The related-party transactions between major shareholders and their listed firms include: loan guarantees and direct loans made to the listed firms (data retrieved from the RESSET database); and equity investments through seasoned equity offerings in the listed firms (data retrieved from the CSMAR database). For each

[12] We confirm this data issue with the data vendor CSMAR.

pledging transaction, we classify its usages by checking whether the shareholder provides direct loans and equity investments to the listed firm within a year after the pledging. For example, if we observe a shareholder pledges shares to a securities firm, and three months later she makes loans to the listed firm, we classify the purpose of this pledging transaction as "loans to the firm." We also use the RESSET guarantee data to cross-check the "financing the listed firms" usage reported by CSMAR.

As the final step, we combine the above two steps to upgrade the usages provided by CSMAR. Our procedure significantly supplements the CSMAR data: from 2007 to 2019, the fraction of transactions used to finance the listed firms (loan guarantees, seasoned equity offerings, and direct loans) increases by 7.2%, from 3.6% (disclosed by the CSMAR database) to 10.8% (our final classification).

Fund usages based on a survey. Our second method takes advantage of a formal survey conducted by regulators. At the end of 2019, Tsinghua PBCSF and the CSRC jointly surveyed the Chinese listed firms on share pledging. Every listed firm in the Chinese stock market was invited by the CSRC to respond to the survey, which was designed by researchers from both the school and the CSRC, and then distributed by the regulator. Firms were asked about whether the firm's largest shareholder had ever pledged her shares in the past; and if yes, the usages of the pledging proceeds. For the second question, respondents were allowed to make multiple choices from a) establish/invest in new firms; b) finance the listed firm; c) purchase the firms' shares in private placements; d) purchase shares from incentive plans; e) repay personal debts; f) finance other related parties (not the listed firm); g) finance personal consumption; h) make other financial investments; and i) unknown or other usages.

2.3.3 Data on entrepreneurial activities

Our paper links the pledging transactions by listed firms' shareholders' to their entrepreneurial activities. For each major shareholder, we retrieve all firms (except the listed firm) she holds from the firm registration data compiled by the SAIC, which covers the universe of Chinese firms.[13]

[13]The data is provided by Quantum Data, a Beijing-based data vendor. The same data source has been used in Bai et al. (2021b).

Specifically, in each year we count the new equity investments the shareholder makes around a pledging transaction and infer her entrepreneurial activities in terms of creating new firms and/or investing in existing firms. For a firm newly held by the shareholder at the end of the year, if it existed before, we assume she newly invests in this existing firm during that year. Otherwise, if the newly held firm is established in the year, we assume the shareholder creates this new startup.

Following this procedure, we construct three measures for entrepreneurial activities. In our regression analysis, we define $\#FirmAdded_{it}$ to be the number of add-on firms that shareholder i newly adds; $\#New_{it}$ to be the number of new firms created by the shareholder; and $\#Existing_{it}$ to be the number of existing firms the shareholder makes her first investment in, all at year t (see Section 2.2 for definitions of add-on, new, and existing firms in our study). By definition, $\#New_{it}$ and $\#Existing_{it}$ add up to $\#FirmAdded_{it}$. Similarly, we retrieve the data on shareholders' paid-in capital for each firm from the SAIC firm registration data and calculate the capital shareholders use in their entrepreneurial activities in Section 4.3.3.

2.3.4 Other data

Besides the data mentioned above, we also collect data from other sources to construct a vector of control variables in our regression analysis. Shareholder characteristics control variables include i) the natural logarithm of the shareholder's financial wealth ($LnFinWealth$); ii) the shareholder's wealth growth potential, proxied by the value-weighted average of Tobin's Q of listed firms she holds ($FinWealthGwt$); iii) the financial constraints of firms held by the shareholder, proxied by the value-weighted average of the cash dividend–paying dummy ($DivDum$); and iv) the number of firms she holds in the previous year ($Lag\#Firms$). We construct $LnFinWealth$, $FinWealthGwt$ and $DivDum$ with information from the CSMAR database and $Lag\#Firms$ from the SAIC firm registration data.

For local economy conditions at the prefecture level, we take the city that the shareholder resides in,[14] and include i) GDP per capita of the city ($GDPPerCapita$); ii) the average salary of the city ($AvgSalary$); and iii) the natural logarithm of the number of commercial bank branches ($LnBankBranch$). Among them, $GDPPerCapita$ and $AvgSalary$ are constructed based on the

[14]For a legal entity shareholder, we use the entity's registered address to determine its residence. For a natural person shareholder, we use her listed firm's registered address to infer her residence. If she owns shares in multiple listed firms, we use the information of the listed firm with the longest history.

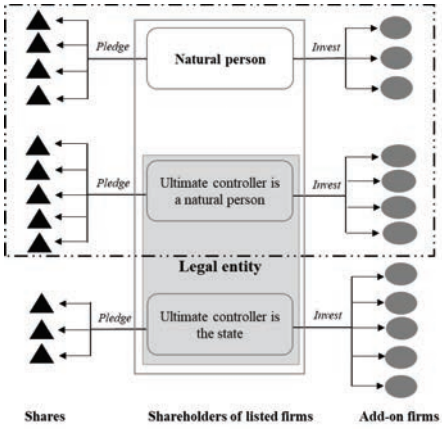


Figure 3: **Sample construction based on ultimate ownership of shareholders of listed firms.** The left (triangles) depicts shares pledged by listed firms' shareholders; the middle (boxes) depicts shareholders of listed firms; and the right (ellipses) depicts the add-on firms invested in by shareholders who are engaging in entrepreneurial activities. Shareholders in the listed companies could be either legal entities or natural persons, and legal entities could be ultimately controlled by a natural person or the state. As shown in the dotted box (the top two blocks), our sample of listed firms' shareholders includes natural person shareholders or legal entity shareholders that are ultimately controlled by natural persons (i.e., excluding shareholders who are ultimately controlled by the state, the bottom block).

CEIC database, and *LnBankBranch* is constructed with data from the China Banking and Insurance Regulatory Commission (hereafter CBIRC). Appendix A provides detailed definitions of these variables.

2.3.5 Sample and summary statistics

We attempt to link shareholders' pledging transactions to their entrepreneurial activities empirically in Section 4, and Figure 3 illustrates our methodology. To construct the research sample, we merge the entrepreneurial activities data described in Section 2.3.3 to share pledging transaction data described in Section 2.3.1, by shareholder and year.

Our sample period ranges from 2010 to 2018,[15] and we apply the following filters in sample construction as shown in Figure 3. For each non-financial listed firm, we identify major shareholders who hold 5% of the shares or more. More importantly, since our study focuses on how China's stock market promotes the growth of its private sector, we require "shareholders" of listed firms to be either directly or ultimately controlled by a natural person rather than the state. This filter

[15]The firm registration data we obtain ends in 2018. We use the data starting in 2010 to minimize the impact of 2007/09 global financial crisis.

also alleviates many potential confounding factors, as it is well-known that investment decisions by state-owned enterprises (SOEs) are affected by many other non-market forces.

More specifically, there are three types of shareholders in China: natural person, legal entity, and state. We have characterized natural person and legal entity shareholders on page 4. Our sample first excludes state shareholders, which include central/local governments and their subsidiaries (including the SASAC), government-sponsored institutions, firms fully owned or controlled by the government, and firms under collective ownership. However, some legal entity shareholders could be ultimately controlled by the state. We therefore use the SAIC firm registration data to identify the ultimate controller of these legal entity shareholders; for detailed identification procedures, see Appendix B. We then exclude legal entity shareholders who are ultimately controlled by the state.

Our final sample contains 1,473 natural person shareholders and 1,845 legal entity shareholders ultimately held by natural persons, and includes 14,121 shareholder-year observations. Table 1 Panel A reports statistics on share pledging transactions and other shareholder and firm characteristics. In each year, the probability that an average shareholder newly pledges her shares is 44%. She pledges 5.21% of her listed firm's total shares and receives a loan of 186.38 million RMB. The average shareholder has equity holdings in 4.83 listed firms, with a total market value of 1.94 billion RMB. These listed firms have an average market capitalization of 8.12 billion RMB with 387.11 million total shares, among which 79% had paid cash dividends to their shareholders between 2010 and 2018.

Table 1 Panel B reports the summary statistics on entrepreneurial activities by listed firms' major shareholders. An average shareholder newly invests in 0.48 firms in each year by creating 0.39 new firms and making equity investments in 0.09 existing firms. These investments amount to 30.06 million RMB: 21.03 million is used as paid-in capital to create new firms; 2.49 million is used to finance existing firms the shareholder had not held before; and the remaining 0.98 million is used to increase the ownership in existing firms she already holds.

To put these numbers in perspective, we calculate the corresponding national average, i.e., the average level of entrepreneurial activities by incumbent shareholders in the entire SAIC database, which covers the universe of Chinese firms. That is to say, we scale listed firms' shareholders' entrepreneurial activities by the average level of entrepreneurial activities in the economy. We refer to this average, $\overline{\#FirmAdded}_t$, as "national average" in the following discussion. We find that, in

terms of number of firms, the listed companies' shareholders invest about 3.5 times of the national average. Dollar wise, the difference is even more striking: these listed companies' shareholders invest about 215 times of the national average. These numbers suggest that shareholders in listed firms are a group of sophisticated entrepreneurs who are actively seeking and investing in new business opportunities.

3 Usages of Share Pledging Funds

Due to the issue of data availability, the usages of proceeds from pledging is an underresearched area in the literature. In China, it is commonly believed that share pledging is used as an indirect financing channel for listed firms (e.g., Meng et al. (2019); Pang and Wang (2020)).[16] The implicit assumption is that at least a portion of the proceeds flows back to the listed firms via borrowings, equity investments, or other related-party transactions.

In this section, we attempt to open the black box and study how Chinese shareholders use the funds from their share pledging. To our knowledge, our paper is the first in this literature to study this question. We rely on two data sources: public disclosures on share pledging transactions and a recent survey covering all Chinese listed firms. We deem the basic data pattern of share pledging usage, though largely descriptive, to be important in shaping any informative discussion on this topic. The main take-away is that, in the Chinese stock market, the majority of shareholders pledge shares for purposes other than financing the listed firms.

3.1 What Do Firms' Disclosures Say?

Following the procedure described in the first half of Section 2.3.2, we determine the usage of proceeds from each pledging transaction by major shareholders that hold 5% shares or more from 2007 to 2019, based on the public disclosure by listed firms.

We report the key results in Table 2. Panel A presents the number of listed firms sorted by different usages. In 2019, 1676 (44.6%) of the A-share listed firms reported new share pledging transactions. During the period from 2007 to 2019, on average 14.2% of the listed firms had

[16] Meng et al. (2019) suggest that share pledging is a financing channel for firms heavily dependent on external financing. Pang and Wang (2020) argue that compared to traditional external financing, share pledging is an easier, faster, and less costly financing channel for listed firms.

shareholders pledging their shares and using the proceeds to finance the listed firms. Among them, 6.2% had shareholders providing guarantees; 5.1% had shareholders purchasing seasoned equity offerings; and another 3.9% had shareholders lending to the firms directly.[17] Meanwhile, the majority of listed firms (85.8%) did not benefit directly from their shareholders' share pledging—the funds were used for other purposes outside the firms. The fraction of firms in which the shareholders using the proceeds outside the firms grew from 82.8% in 2007 to 93.0% in 2019.

Panel B summarizes the number of transactions by different usages. From 2007 to 2019, more than 60,000 pledging transactions had been made by major shareholders of listed firms. Funds from 7.8% of the transactions were used for the listed firms: 1.8% were used for providing guarantees to the listed firms; 3.5% were used for purchasing SEO shares; and 2.7% were used for providing loans. The remaining 92.2% of transactions were used by the shareholders to finance their other activities outside the listed firms.

Panel C reports summary statistics on the funds from share pledging by usages. In calculating the pledging funds, we assume that the loan-to-value ratio for pledging transactions in the main-board, SME board, and ChiNext board were 50%, 40%, and 30%, respectively. The funds amounted to 8,578.5 billion RMB during the period. Of the pledging funds, 10.1% were used within the listed firms; 2.1% were used for guarantees; 4.8% were used for seasoned equity offerings; and 3.5% were used for loans. The remaining 89.9% were used for shareholders' other purposes.

Note that our method naturally overestimates usage outside the listed firms, as we classify missing purposes as outside (See 2.3.2 for details). In addition, the procedure only detects transactions by large and influential shareholders disclosed by the listed firms, and we are unable to count the funds directed to the listed firms through third parties. For example, the shareholder can give the pledging funds to another firm, then the firm lends to the listed firm. Thus, we may underestimate the amount of pledging funds used within the listed firms to some extent. However, undoubtedly a significant part of the proceeds is used to finance shareholders' other activities outside the listed firms. We next strengthen this argument with survey evidence.

[17] As the funds from a pledging transaction could be used for guarantees, seasoned equity offerings, and loans simultaneously, the sum of these three usages in Panel A, B, and C may exceed the subtotal of "Used within listed firms."

3.2 Direct Survey Evidence

3.2.1 The survey

At the end of 2019, Tsinghua PBCSF and the CSRC jointly surveyed the Chinese listed firms on their largest shareholders' share pledging activities, which collects information on the usages of share pledging funds. We have described the survey questions in the second half of Section 2.3.2. The CSRC distributed the questionnaire to all of the 3,760 firms listed on the Shanghai and Shenzhen stock exchanges through its electronic survey system on November 25, 2019. The survey responses were provided by top executives including chairman of the board, director, CEO, CFO, and board secretary,[18] who were sufficiently informed about the largest shareholder's activities and the firm's status. By November 29, the CSRC collected responses from 3,741 firms, representing a response rate of 99.49%. The response rate was significantly higher than those in previous survey studies among corporate executives such as Graham and Harvey (2001) because share pledging was a common concern among listed firms and the regulator was quite influential in China.

The survey responses are also reliable. Though the questionnaire was distributed to the firms by the regulator, it is unclear whether respondents would like to provide biased information to cater to the CSRC's needs or to avoid unnecessary troubles. First, as explained in Section 2.3.2, the survey is carefully designed with straightforward and academic-oriented questions. There were no "correct" answers to them and these answers were unlikely to be used to judge a firm's behavior. Second, in the survey, we formally declared that the responses and other relevant information were only used in policy and academic research in a large sample. In fact, we strictly complied to the same policies in the previous rounds of surveys, which is helpful for building trust between the survey and the respondents.[19]

3.2.2 A breakdown of fund usages outside listed firms

The survey results confirm that share pledging is quite common among Chinese listed firms. At the end of 2019, 60.1% (2,217) out of the 3,741 responding firms reported that their largest shareholders had used share pledging in the past. Figure 4 depicts the usages of share pledging funds. We

[18] The board secretary in Chinese listed firms is one of the top executives. She handles affairs about the board and shareholder meetings and communicates with the regulators. She is also responsible for functions about the capital market, including information disclosure, investor relations, and financing.

[19] For more details regarding the Tsinghua PBCSF-CSRC survey, see Goldstein et al. (2021).

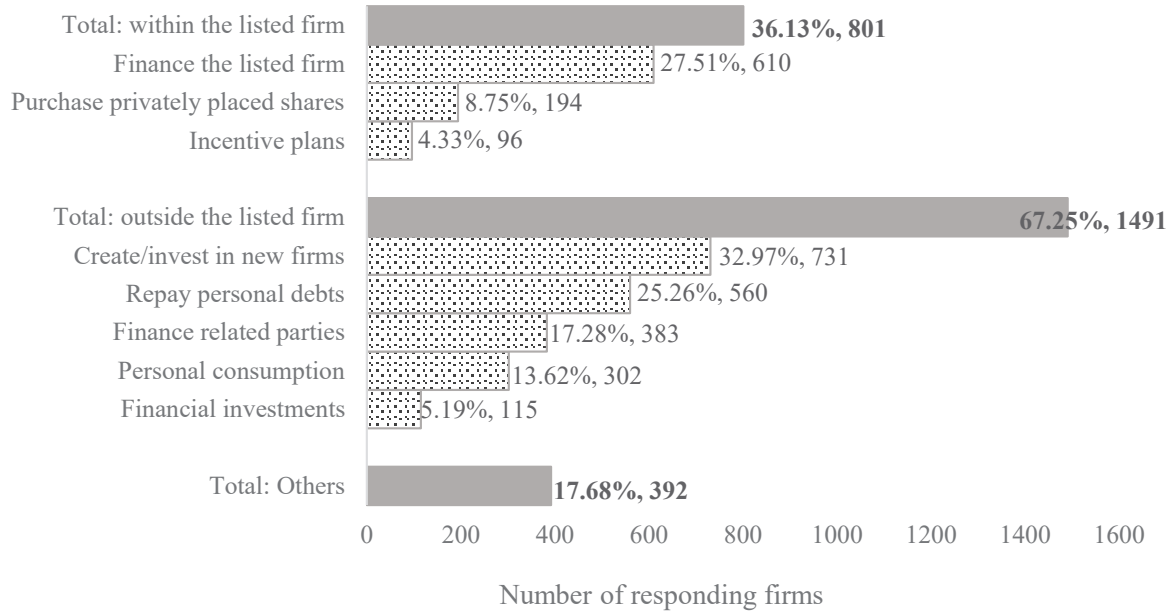
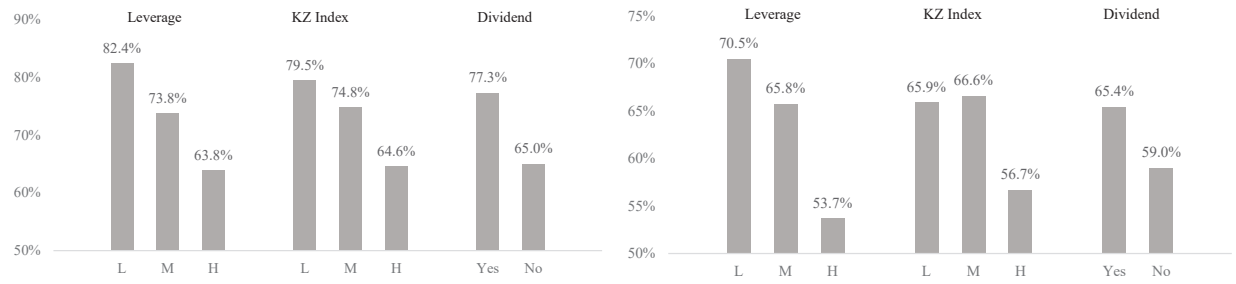


Figure 4: **Survey results on usages of share pledging funds.** This figure plots the frequencies of usages of share pledging proceed based on the Tsinghua PBCSF-CSRC 2019 survey. The item "total: within the listed firm" is the union of "finance the listed firm," "purchase privately placed shares," and "incentive plans." The item "total: outside the listed firm" is the union of "financial investments," "personal consumption, "finance related parties," "repay personal debts," and "create/invest in new firms."

find that in a large number (36.1%, 801) of firms that reported share pledging by their largest shareholders, shareholders decided to support their own listed firms with the funds, via various means. More specifically, shareholders in 8.8% (194) of the firms purchased privately placed shares and 4.3% (96) participated in incentive plans; the majority of them (27.5%, 610), though, used other channels such as providing loans and guarantees directly or indirectly.

We observe evidence lending direct support to our paper in that a greater fraction (67.3%, 1491) of firms report that their largest shareholders used the share pledging proceeds outside the listed firms. This percentage is smaller than 85.8%, which is the estimate based on public firm disclosures in Section 3.1. This might be due to three reasons. First, in our survey respondents might overreport usages within listed firms to the CSRC for a better image of supporting listed firms; however, this can only lead to an underestimation of usages outside the firms. Second, the survey only covers the largest shareholders, while the public firm disclosures count share pledging by major shareholders that hold 5% shares or more. Last, the survey counts share pledging transactions from 1997 to 2019, but the disclosure method covers a sample period from 2007 to 2019.



Panel A: *Firm disclosure* ***Panel B:*** *2019 Survey*

Figure 5: **Listed firms' financial constraints and frequencies of fund usages outside the firms.** This figure plots the probability of share pledging funds' usages outside the listed firms in groups of firms with different levels of financial constraints. The sample for Panel A is 2727 listed firms for which we are able to retrieve share pledging information from their public disclosures, and the sample for Panel B is 2217 listed firms reporting their shares were ever pledged by 2019 in the Tsinghua PBCSF-CSRC 2019 survey.

The survey also asked how these shareholders used their share pledging funds outside their listed firms. Figure 4 shows that the shareholders of 25.3% (560) firms took the funds for personal debt repayment, 13.6% (302) for personal consumption, and 5.2% (115) for financial investments. Of particular note, 33.0% (731) of the responding firms reported that their largest shareholders invested the funds in existing firms other than the listed firm and/or to create new firms. This implies that, in contrast to the conventional wisdom, share pledging is not only a financing tool used by shareholders to support the listed firms, but also a potential financing source of entrepreneurial activities. We test this conjecture formally in Section 4.

3.3 Financial Constraints and Fund Usages

The previous literature on share pledging has emphasized the role of financial constraints faced by listed firms. In unreported analyses, we find that listed firms short of financial resources are more likely to use share pledging, which is consistent with Cheng et al. (2021) and Pan and Qian (2019) who implicitly view share pledging as an alternative financing source for listed firms.

This paper takes a different perspective, and our newly collected data allows us to ask the following question: Conditional on pledging transactions being conducted, how do the financial constraints faced by listed firms affect the shareholders' allocation of pledging funds within and outside the listed firms? We expect that shareholders are more likely to use the funds outside the listed firms if these firms are less financially constrained and rich in capital.

We use three measures to proxy for a listed firm's financial constraint, including firm leverage defined as debt divided by total assets, the KZ index proposed by Kaplan and Zingales (1997), and a cash dividend dummy that equals one if a firm pays cash dividend in 2018 and zero otherwise. We divide listed firms with share pledging into three equally sized groups (Low, Medium, and High) by leverage or the KZ index, and divide the firms into two groups (Yes and No) by the cash dividend dummy. We then calculate the frequencies of firms reporting pledging shareholders using the funds outside the listed firms in each group.

Panel A of Figure 5 plots the probability of using the funds outside the listed firms based on the firms' public disclosure. Consistent with our prior, shareholders of firms with low leverage are more likely, with a frequency of 82.4%, to use the pledging funds outside the listed firms, than the group with low leverage (63.8%). The difference is significant at the 1% level. A similar pattern holds for the KZ index and cash dividend dummy. We observe similar patterns using the survey data, as shown in Panel B.

4 Share Pledging and Entrepreneurship

We have shown that shareholders in the Chinese stock market actively use their share pledging funds for purposes outside their own listed firms, and in particular that they invest in other businesses. That is, share pledging is potentially a financing source for entrepreneurship. In this section, we explore the impact of share pledging on shareholders' entrepreneurial activities in detail. Specifically, we attempt to link share pledging to entrepreneurial activities with a regression framework. The data and variables used in the regression analysis are described in Section 2.3.

4.1 Baseline Results

We run the following regression to examine the effects of share pledging on major shareholders' entrepreneurial activities in terms of creating new firms and investing in existing firms:

$$Y_{it} = \alpha + \beta \cdot PledgingDummy_{it} + \boldsymbol{\gamma} \cdot Controls_{it} + \delta_i + \delta_t + \varepsilon_{it}. \tag{1}$$

where the dependent variable Y_{it} includes $\#FirmAdded_{it}$, the number of add-on firms shareholder i newly adds; $\#New_{it}$, the number of new firms created by the shareholder; and $\#Existing_{it}$, the

number of existing firms the shareholder makes her first investment in, all at year t. To address the potential concern of a spurious relation due to the aggregate macroeconomic trends, we scale these three entrepreneurship variables by the average of $\#FirmAdded$ in the population of shareholders at year t, i.e., $\overline{\#FirmAdded}_t$ (the "national average"). The key independent variable of interest, $PledgingDummy_{it}$, is a dummy variable that equals one if shareholder i newly pledges shares in year t, and zero otherwise (see Section 2.3.1 and Section 2.3.3 for data sources and variable construction). The vector of control variables, $Controls_{it}$, contains shareholder and local economy variables and is described in Section 2.3.4. Detailed definitions of variables are also provided in Appendix A. We also include shareholder fixed effects δ_i and year fixed effects δ_t, and cluster standard errors at the shareholder level as shareholders' entrepreneurial activities are likely to be auto-correlated over time.

Table 3 Panel A reports the OLS regression results. Columns (1) to (3) show results with the entrepreneurial activity variables scaled by the national average, with all coefficients on $PledgingDummy$ being positive and significant at the 1% level. The economic magnitude is also sizable. Column (1) suggests that each year, the number of add-on firms newly held by a pledging shareholder exceeds that of a non-pledging shareholder by 70% of the national average. Columns (2) and (3) suggests that she spends most pledging funds for creating new firms (48% of the national average) rather than investing in existing firms (21% of the national average). Columns (4) to (6) report results with the raw numbers of add-on firms newly held by the pledging shareholder as the dependent variables; the findings are similar qualitatively.

The regression results on control variables are also consistent with our prior. For example, columns (1) to (3) suggest wealthy shareholders engage in entrepreneurial activities in a more intensive way, particularly in terms of creating new firms. If a shareholder already holds a large number of firms, she is less interested in creating new firms—perhaps due to extra effort in managing startups. We also find that entrepreneurial activities are more prevalent in high-salary cities where shareholders reside.

Table 3 Panel B reports the estimation results when we take the independent variable in Eq. (1) to be $PledgingRatio$, which is a continuous variable defined as the percentage of shares newly pledged by a shareholder in a year out of the total shares. The main findings stay qualitatively unchanged with this alternative proxy.

4.2 Identification: A Quasi-Natural Experiment

Our baseline results show a positive relation between shareholders' pledging and entrepreneurial activities. The standard endogeneity concern remains regarding this positive relation. For instance, shareholders with more investment opportunities may seek financing by share pledging (reverse causality); and more risk-averse shareholders are less likely to engage in share pledging and entrepreneurial activities simultaneously (omitted variables). To at least partially address the endogeneity issue, we take advantage of the launch of the exchange market as a quasi-natural experiment and perform the difference-in-differences (DiD) analysis.

4.2.1 Share pledging reform in 2013: Exchange market vs. OTC

As explained in Section 2.1.1, China's share pledging system was restricted to the OTC market before 2013, with major lenders being commercial banks and trust firms. In May 2013, the CSDC and the two stock exchanges (Shanghai and Shenzhen) launched a new centralized share pledging system, with securities firms acting as major lenders. This initiative increased the supply of credit and reduced borrowing costs (both the loan approval time and interest rate), significantly improving the shareholders' access to share pledging.

We posit that the launch of the exchange market constitutes a quasi-natural experiment, which generates unequal supply shocks to natural person shareholders and legal entity shareholders. More specifically, the credit supply shock caused by the share pledging reform in 2013 was significantly greater for natural person shareholders than for legal entity shareholders.

Before the launch of the exchange market share pledging system in 2013, natural person shareholders were not treated equally as legal entity shareholders by commercial banks in the OTC market. Following the regulations of the People's Bank of China and the CBIRC, commercial banks manage share pledging loans under the same set of rules as typical industrial loans. Under their system designed to collect and process information from firms that follow formal accounting rules, these banks find it difficult to obtain enough information on individuals' (i.e., natural persons') financials and monitor the usages of loans. In practice, banks treat natural person shareholders as retail customers in most cases, and grant only small credit lines to them.[20] This explains

[20]It is possible for natural persons to set up legal entities that represent them as shareholders in the listed firms. However, this is also a costly solution in practice for the following reasons: i) in general, it is more convenient for

why most share pledging loans were granted to legal entity shareholders in the OTC market before 2013. For example, between 2010 and 2012, 88.1% of the pledged shares were from legal entity shareholders in the OTC market, who received 86.7% of the pledging loans.

The exchange market reform in 2013 significantly expanded the supply of credit to natural person shareholders. First, securities firms in the exchange market are not subject to central bank's regulations. Their lending decisions depend on the quality of collateral (i.e., the value of shares pledged by the shareholders) rather than shareholders' identities (i.e., a natural person or a legal entity), implying that securities firms are willing to make large collateralized loans to qualified natural person shareholders. Second, securities firms take share pledging as a strategic opportunity to compete for businesses. They are keen to promote the new financing tool among natural person shareholders. Third, securities firms make the pledging procedures more friendly to natural person shareholders; the new lenders—securities firms—are even willing to waive certain documents, such as audited financial statements, that natural persons often find difficult to provide. In sum, the launch of the exchange market levels the playing field between natural person and legal entity shareholders, opening the door for natural person shareholders to tap share pledging loans (provided by securities firms) as a relatively cheap and convenient financing tool.

To sum up, relative to their legal entity counterpart, nature person shareholders are more exposed to the positive supply shock caused by the launch of the exchange market in 2013. Statistically, compared to total shares newly pledged during the three years before the launch, shares pledged by natural person shareholders grew by 745% during the three years after the launch. In the meantime, shares pledged by legal entity shareholders only grew by 233%.

4.2.2 Empirical analysis based on DiD method

We exploit the quasi-natural experiment in 2013 to perform a DiD analysis, as an attempt to establish the casual link from share pledging to entrepreneurial activities.

natural persons to make equity investments and other major decisions as shareholders. Natural persons' tax burdens are lower when selling stocks relative to legal entities. That is, a shareholder's representation in the listed firm is a strategic decision, and it is unlikely for her to determine it upon IPO due to only the benefits on share pledging; and ii) for the existing natural person shareholders, the transfer of shares to a new legal entity has to go through certain legal and financial procedures, and often incurs large income taxes. This may also send the wrong signals to the market and cause adverse price movements.

Empirical design. Based on the discussion above, we assign natural person shareholders to the treated group as they benefit more from the supply shock and more likely to pledge shares in the exchange market. We assign legal entity shareholders to the control group as they have been better served in the OTC market, and the exchange market has a relatively smaller impact on financing them. The final sample, which covers the period of 2010 to 2018, includes 9,404 shareholder-year observations with 536 natural person shareholders and 754 legal entity shareholders ultimately controlled by natural persons.

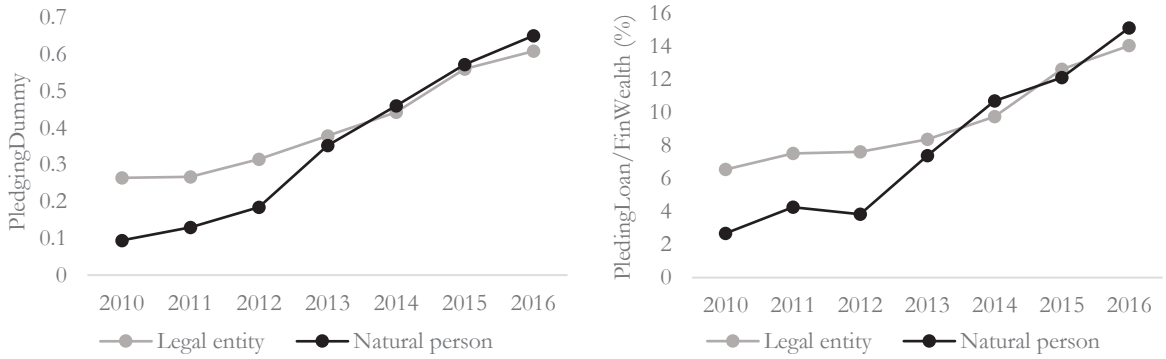
We estimate the following equation to perform the DiD analysis:

$$Y_{it} = \alpha + \beta \cdot Treat_i \times After_t + \boldsymbol{\gamma} \cdot Controls_{it} + \delta_i + \delta_t + \varepsilon_{it}, \tag{2}$$

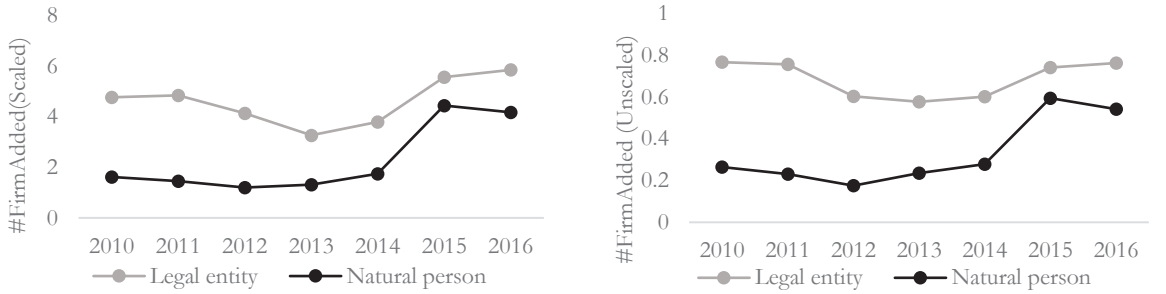
where $Treat_i$ is a dummy variable that equals one if a shareholder is a natural person and belongs to the treated group, and zero otherwise and $After_t$ is a dummy variable that equals one if the year is 2013 or after, and zero otherwise. The interaction term $Treat_i \times After_t$ is our key variable of interest. We also include the same set of controls as in equation (1). Shareholder and year fixed effects are included. Definitions of variables are provided in Appendix A.

Parallel trends assumption. We first provide evidence for the parallel trends assumption in Figure 6. The first plot in Panel A shows the evolution of probabilities of share pledging for two shareholder groups around 2013, where we define the pledging probability for group $g \in G = \{\text{natural person, legal entity}\}$ as the average $PledgingDummy_{gt}$ within any shareholder group g. In the three years leading up to the reform shock, both pledging probabilities of natural person (the treated group) and legal entity (the control group) shareholders grow at a similar pace. However, after the reform shock, share pledging by natural person shareholders increased much faster and caught up with the level of legal entity shareholders in one year. The second plot on the right hand side shows a similar pattern of pledging loans (scaled by shareholders' financial wealth) obtained by these two groups. These patterns confirm our identification assumption that the new market reform significantly enhances natural person shareholders' access to share pledging loans.

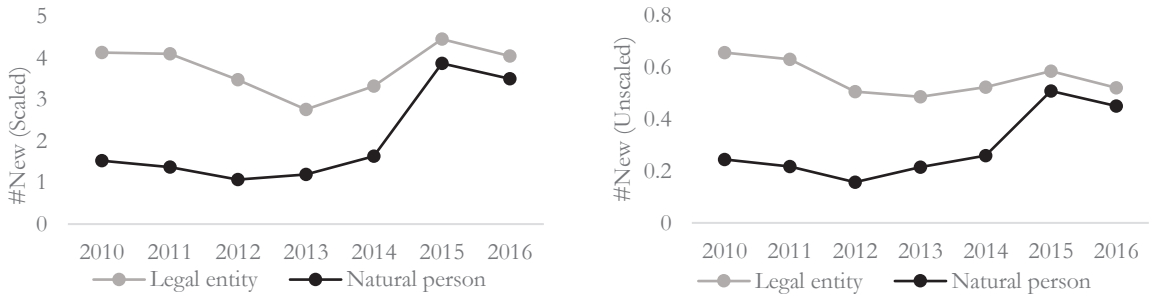
Panels B and C repeat the same analysis on entrepreneurial activities by the natural person and legal entity shareholders around the 2013 reform shock. Panel B shows, before 2013, both the



Panel A: New share pledging around the 2013 reform



Panel B: The number of add-on firms (#FirmAdded) around the 2013 reform



Panel C: The number of new firms (#New) around the 2013 reform

Figure 6: **Parallel pretreatment trends.** This figure shows the parallel trends assumption testing results. Panel A plots the average probability and loan amount of new share pledging in each year for natural person and legal entity shareholders. Panel B and C plot the average number of add-on firms and new firms held by natural person and legal entity shareholders around the launch of the exchange market in 2013, respectively.

natural persons and legal entities have similar trends in the number of add-on firms. After the shock, the number of new firms held by natural person shareholders steadily increased and edged closer to the level of legal entity shareholders. Panel C shows a similar pattern for the number of new firms. In the next section we will perform a standard regression-based test on the parallel trend assumption.

DiD estimation results. We now conduct the formal DiD test, with particular interest in the coefficient in front of $Treat \times After$ in regression (2). Columns (1) to (3) in Table 4 Panel A report regression results with the entrepreneurship variables scaled by the national average being the dependent variables. The coefficient estimates are 1.13 and 1.14 in columns (1) and (2), which are statistically significant at the 1% level. This suggests that, after the launch of the exchange market in 2013, the increase in the number of add-on firms newly held by a natural person shareholder exceeds that by a legal entity shareholder at a rate of 113% the national average. Column (2) suggests, the increase in the number of new firms created by a treated natural person shareholder exceeds that by a legal entity shareholder at a rate of 114% the national average. The coefficient estimate in column (3) is statistically insignificant, suggesting treated natural person shareholders do not increase their investment in existing firms relative to the control group.

Columns (4) to (6) report results with unscaled $\#FirmAdded$, $\#New$, and $\#Existing$ as the dependent variables. The coefficient estimates on $Treat \times After$ are 0.16 and 0.16 in columns (4) and (5), and statistically significant at the 1% level, suggesting the treated group (natural person shareholders) holds 0.16 more add-on firms by creating 0.16 more new firms relative to the control group (legal entity shareholders) after the 2013 shock. The coefficient estimate in column (6) is not statistically significant, suggesting natural person shareholders are not active in investing in existing firms.

To formally test the dynamic impact of the share pledging reform in 2013, we further replace $Treat \times After$ with $Treat \times Year$ in regression (2), with $Year$ as dummy variables indicating each year in our sample period from 2010 to 2018. Taking 2012 as the base year, we report the regression results in Panel B. The coefficient estimates on $Treat \times Year2010$ and $Treat \times Year2011$ are insignificant across regressions in columns (1) to (6). This echoes our observation from Figure 6 and indicates no statistically significant differences in the three-year growth rates of entrepreneurial

activity variables between the treatment and control groups before the event, suggesting that the parallel trends assumption is satisfied.

After the reform in 2013, the coefficient estimates on $Treat \times Year$ are positive and significant from 2013 to 2018 in column (1), suggesting natural person shareholders held more add-on firms right after the reform, and this pattern was persistent in the post-reform period. Column (2) shows a similar pattern in new firms created by natural person shareholders. In column (3) where the dependent variable is $\#Existing$, we obtain insignificant coefficient estimates on $Treat \times Year$ (except for 2016, which is significantly negative.)[21] This is also consistent with our previous finding that natural person shareholders are reluctant to invest their pledging funds in existing firms.

In summary, our DiD analysis suggests a causal relation from share pledging by shareholders to their entrepreneurial activities. More importantly, this relation is driven by shareholders' creation of new firms, as evidence shows that they are more enthusiastic in using the pledging funds to create new firms than to make their first investments in existing firms.[22]

4.3 Robustness and Discussions

4.3.1 The influence of exiting firms

In our previous analyses we define the main entrepreneurship variable, $\#FirmAdded$, by counting the number of add-on firms held by a shareholder during each year. Firms that exited by the shareholder during the year is not subtracted from that measure. That is to say, the intensity of entrepreneurial activities may be inflated by $\#FirmAdded$. We now replace $\#FirmAdded$ by $\Delta Firm$, i.e., the difference in the number of firms held by a shareholder between two consecutive years, to eliminate the possible contamination of exiting firms.[23]

[21] The coefficient estimate is -0.479, suggesting the magnitude of the negative effect on $\#Existing$ is about one quarter of that of the positive effect on $\#New$ (1.836). Overall, we observe a positive and significant coefficient estimate (1.304) in the $\#FirmAdded$ regression in column (1).

[22] Our study focuses on major shareholders with 5% shareholdings or more, including both controlling shareholders and non-controlling shareholders. Controlling shareholders have received a greater attention by the existing literature (e.g., Guo et al. (2020); Pang and Wang (2020)), because they are pledging more shares relative to their non-controlling peers. Therefore it is natural to expect controlling shareholders to engage in more entrepreneurial activities outside the listed firms. On the other hand, in the data, we also find non-controlling shareholders are devoting a larger fraction of their pledging funds to entrepreneurial activities, therefore it remains an empirical question whether our results are more pronounced among controlling or non-controlling shareholders. In unreported results, we find that the coefficient estimates on $Treat \times Year$ stay qualitatively unchanged even if we split the sample into controlling and non-controlling shareholder subsamples.

[23] Shareholders exit firms either because the firm is liquidated and de-registered with the SAIC or because their equity in the firm is sold or transferred to others. In practice, Chinese shareholders are willing to de-register nonper-

Table 5 reports the DiD estimation results. In column (2), we use the national average of $\#FirmAdded$ to scale $\Delta Firm$. We find the coefficient estimate on $Treat \times After$ to be 0.910 and significant at the 1% level, which is smaller than the estimate (1.13) from the regression with $\#FirmAdded$ as the dependent variable (column (1), Table 4 Panel A). Similarly, the coefficient estimate is 0.115 and significant at the 5% level in the unscaled regression in column (6), which is also smaller than the estimate (0.163) from the $\#FirmAdded$ regression reported in column (4), Table 4 Panel A. These findings suggest, our main results still hold, though the magnitude is smaller, if we measure entrepreneurial activities in a more conservative manner.

4.3.2 Shareholder-industry-year level regressions

Our main analyses are based on the DiD model (equation 2) at the shareholder-year level. In this section, we further decompose a shareholder's entrepreneurial activities into different industries, and perform the analysis at the shareholder-industry-year level:

$$Y_{ijt} = \alpha + \beta \cdot Treat_i \times After_t + \boldsymbol{\gamma} \cdot Controls_{it} + \delta_i + \delta_{jt} + \varepsilon_{ijt} \tag{3}$$

with Y_{ijt} denotes the number of add-on, new, and existing firms in industry j added by shareholder i in year t. Besides the same set of control variables in equation (2) , we also include shareholder fixed effects δ_i and industry $\times$ year fixed effects δ_{jt} across regressions to absorb any influences varying with shareholder and industry $\times$ year.

Table 6 reports the DiD estimation results. Columns (1) to (3) show results with scaled entrepreneurial activities being the dependent variables. We use the industry average of entrepreneurial activities to scale the dependent variables. Similar to the results we find in Section 4.2.2, the coefficient estimates on $Treat \times After$ in columns (1) and (2) are positive and significant at the 1% level. The coefficient estimate in the $\#Existing$ regression in column (3) is statistically insignificant. With respect to economic magnitudes, column (1) suggests given a specific industry, after the 2013 reform, the increase in the number of add-on firms held by a natural person shareholder exceeds that by a legal entity shareholder at a rate of 109% the industry average in each year. Columns (2) and (3) confirm the same message as before: a natural person shareholder is

forming firms because shareholders with nonperforming, yet registered firms are not allowed to register their add-on firms with the SAIC. In our sample, about 2.5% of firms were de-registered in each year from 2010 to 2018.

more interested in creating new firms than investing in some existing firms. Columns (4) to (6) report results with the raw numbers of firms being the dependent variables, and the findings stay qualitatively unchanged.

4.3.3 Evidence on paid-in capital

Our previous analyses focus on the number of firms newly held by pledging shareholders. We now consider the other side of the same coin: shareholders' capital injected to these newly held firms. That is to say, we now study the actual dollar amount of share pledging proceeds that the pledging shareholders allocate to their add-on firms.

We first retrieve the data on shareholders' paid-in capital for each firm from the firm registration data. For each shareholder, we calculate the amount of capital newly contributed to firms other than the listed firm, and scale it by the shareholder's financial wealth in terms of the market value of listed shares she holds. Then we construct $CapAdded$, a variable measuring the shareholder's total capital contribution (relative to her financial wealth) to firms. We further decompose $CapAdded$ into three parts: 1) $CapFollow$, the amount of follow-on investment in existing firms that the shareholder already holds; 2) $CapExisting$, capital contribution to existing firms that the shareholder does not hold before; and 3) $CapNew$, capital contribution to firms newly created by the shareholder. We also scale these variables with the capital contribution by an average shareholder in the economy in each year. We then use the four capital contribution measures as the dependent variable and estimate equation (2).

Table 7 presents the DiD regression results. Columns (1) to (4) report regression results with the capital contribution variables scaled by the national average being the dependent variables. The coefficient estimates on $Treat \times After$ in $CapAdded$, $CapFollow$, and $CapNew$ regressions are positive and statistically significant. Specifically, in comparison to a legal entity shareholder, after the 2013 reform the increased relative capital contribution by a natural person shareholder is i) a total amount accounting for 23.9% of an average shareholder's annual capital contribution (column (1)); ii) an amount accounting for 17.7% in newly created firms (column (4)); iii) an amount accounting for 0.6% in her existing portfolio firms (column (2)); and iv) nothing in existing firms she did not hold before (column (3)). Columns (5) to (8) report results of regressions with the raw amount of capital contribution as dependent variables, with qualitatively similar results.

Our findings on capital allocation are consistent with those on firm numbers. Pledging shareholders use a part of their proceeds to make equity investments in entrepreneurial activities, particularly in creating new firms. It is not surprising that the magnitude of our estimation is somewhat small, as we only count direct equity investments in the analysis. Pledging shareholders are also able to back their entrepreneurial activities with loans, guarantees, or through third parties.[24]

4.3.4 The quality of entrepreneurial activities

We have shown that shareholders use the pledging proceeds to invest in new firms. We now attempt to examine the quality of these newly held firms; the answer to this question will inform us about whether the pledging shareholders are able to use the proceeds efficiently, and if their entrepreneurial activities are contributing to the economic growth.

Specifically, we examine to what extent shareholders direct the proceeds from share pledging to high-quality industries with greater growth potential. We use the past growth rate to proxy for an industry's growth potential and define $HighGwt$, a dummy variable that equals one if an industry's growth rate of value-added in last year is in the top half among all industries, and zero otherwise.[25] We then follow the specification of the shareholder-industry-year level analysis, and insert the triple interaction term $Treat \times After \times HighGwt$ into equation (3) to gauge pledging shareholders' preferences towards investments in high-quality industries.

The results are reported in Table 8. Columns (1) to (3) present results on the number of add-on firms, showing that natural person shareholders invest more heavily in high-quality industries following the policy shock. For example, in column (1) the coefficient estimate on $Treat \times After$ is insignificant in industries with below-median growth potential ($HighGwt = 0$), suggesting natural person shareholders have not changed their investments in low-quality industries. In contrast, the coefficient estimate on $Treat \times After \times HighGwt$ is 3.106 and significant at the 1% level, suggesting the DiD estimator is 2.563 (3.106-0.543) in industries with above-median growth potential ($HighGwt = 1$). That is to say, natural person shareholders have significantly increased their investments in high-quality industries after the 2013 reform. From columns (2) and (3), we observe

[24] From Section 3.1, we know that shareholders use these methods to finance their listed firms besides direct equity investments.

[25] In the existing literature, Hsieh and Klenow (2009) use value-added to estimate TFP, and Brandt et al. (2017) use it to measure the efficiency of exporting firms.

similar patterns about creating new firms (column (2)) and investing in existing firms (column (3)). Columns (4) to (7) report results on capital contribution by shareholders following the discussion in Section 4.3.3. The results stay qualitatively the same.

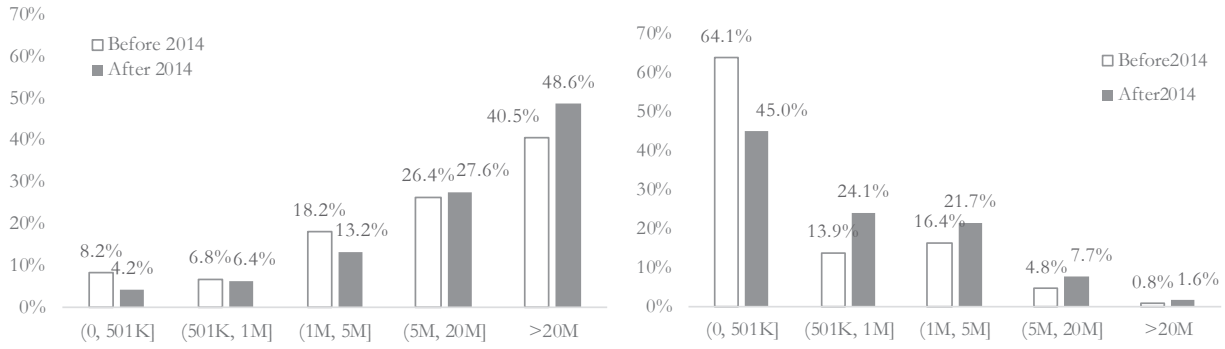
Another way to look at this result is to compare natural person shareholders (treatment group) and legal entity shareholders (control group). In column (1) the coefficient estimate on $Treat \times HighGwt$ is -4.641 and significant at the 1% level, suggesting that relative to legal entity shareholders, natural person shareholders invested less in high-quality industries before 2013 ($After = 0$). However, their high-quality investments got closer to those of legal entity shareholders after the reform ($After = 1$), as the magnitude of the coefficient estimate is much smaller ($3.106 - 4.641 = -1.535$). Though not conclusive, our findings suggest that (natural person) shareholders are more likely to direct the pledging funds to high-quality firms, indicating efficiency.

4.3.5 Discussion on confounding policies

In principle, the DiD results in Section 4.2 could be driven by other confounding policy shocks rather than share pledging. Among these potential confounding policy shocks, the most relevant one is the "Mass Entrepreneurship and Innovation" policy, which was called for by the Chinese government in September 2014. More specifically, this "Mass Entrepreneurship and Innovation" policy was followed by many other initiatives in the broad business environment with various financial and fiscal supports in June 2015,[26] and therefore it is possible that this policy facilitates individuals' (nature persons') entrepreneurial activities.

We argue that this policy has a quite limited impact on our DiD results shown in Section 4.2. First of all, in our sample the shock on entrepreneurship took shape starting in 2013 (see Table 4 Panel B), which was one or two years before the mass entrepreneurship policy and its follow-up initiatives. More importantly, the mass entrepreneurship policy aims at boosting employment and targets grassroots entrepreneurs, including researchers, college graduates, laborers from rural areas, veterans, the handicapped, the unemployed, the low-income group, and talents returning from abroad. Apparently this target group does not overlap with those well-established major shareholders of listed firms we consider. In fact, during our sample period of 2010–2018, the

[26] The general guidelines about relevant initiatives, *Opinions of the State Council on Several Policies and Measures for Vigorously Promoting Mass Entrepreneurship and Innovation*, were issued in June 2015. Source: http://www.gov.cn/zhengce/content/2015-06/16/content_9855.htm



Panel A: *Listed firms' shareholders in our sample* ***Panel B:*** *Shareholders in the SAIC database*

Figure 7: **The "Mass Entrepreneurship and Innovation" policy and natural person shareholders.** This figure shows the distribution of registered capital of firms created by shareholders before the announcement of the policy (2010-2013) and after that year (2014-2018). The frequency for each interval is calculated by year, and then averaged over years. The cutoff points, $501K$, $1M$, $5M$, and $20M$ correspond to the 5^{th}, 10^{th}, 25^{th}, and 50^{th} percentile for the sizes of firms created by listed firms' natural person shareholders in our sample.

median registered capital of firms created by listed firms' natural person shareholders is about 20 million RMB, which is 40 times the median registered capital size of all firms in the SAIC database.

To formally illustrate this point, Figure 7 presents the size distribution of firms created by shareholders before and after the 2014 "Mass Entrepreneurship and Innovation" policy shock. We pick the size cutoffs based on the 5^{th}, 10^{th}, 25^{th}, and 50^{th} percentiles of firm sizes (measured by registered capital) created by listed firms' major natural person shareholders in our sample. Panel A shows, after the 2014 shock, listed firms' natural person shareholders create more larger firms, as the fraction of firms with more than 20M RMB registered capital increases from 40.5% to 48.6%. In contrast, Panel B shows that in the SAIC sample the creation of new firms mostly falls into the $(50.1K, 1M]$ and $(1M, 5M]$ buckets, with frequency increases of 10.2% and 5.3%, respectively. Importantly, there is no clear increase of new firm creation in these two buckets in our sample with listed firms' natural person shareholders.[27] We conclude that the entrepreneurial activities by listed firms' natural person shareholders exhibit distinctive patterns in comparison to those by SAIC natural person shareholders, and the 2014 mass entrepreneurship policy—which hits the bottom distribution in Chinese entrepreneurship—is unlikely to drive our DiD results in Section 4.2.

[27]We also perform the same analysis for legal person shareholders and report the results in Appendix C, and conclude there is no significant variation in firm size distribution around 2014.

4.3.6 The impact of local economic shocks

Besides macro shocks at the national level (e.g., the "Mass Entrepreneurship and Innovation" policy), shareholders' entrepreneurial activities could also be affected by unobservable local economic shocks in regions where the add-on firms are created. For example, in provinces with improved protection of property rights, shareholders might be more enthusiastic in creating new firms. To address this issue, we follow Subsection 4.3.2 and perform the DiD analysis at the shareholder-province-year level:

$$Y_{ipt} = \alpha + \beta \cdot Treat_i \times After_t + \boldsymbol{\gamma} \cdot Controls_{it} + \delta_i + \delta_{pt} + \varepsilon_{ijt}. \tag{4}$$

Here, Y_{ipt} denotes shareholder i's entrepreneurial activities measured by firm numbers and capital contribution in province p and year t. Specifically, besides the standard control variables in equation (2) and shareholder fixed effects δ_i, we include province $\times$ year fixed effects δ_{pt} to control for time-specific local shocks.

Our empirical results are robust to time-varying unobservable local economic shocks. Panel A in Table 9 reports the DiD regression results with entrepreneurial activities scaled by the provincial average as the dependent variables. Relative to a legal entity shareholder, after the 2013 reform the increased capital contribution to each province by a natural person shareholder is i) a total amount accounting for 2.3% of an average shareholder's annual capital contribution (column 4); ii) an amount accounting for 1.4% in newly created firms (column 7); and iii) a much smaller amount (close to zero) in existing firms, whether she holds them before or not (columns (5) and (6)). Panel B report results of regressions with the raw firm numbers and capital contribution as the dependent variables, and the results are qualitatively the same.

4.3.7 Comparison to Guo et al. (2020)

A recent study by Guo et al. (2020) shows that privately owned firms' financial constraints drive their shareholders to pledge shares of listed firms they hold. Though both papers point to large shareholders pledging their shares of listed firms to support activities outside their listed firms, there is an important difference between our study and Guo et al. (2020). Our paper pushes a "new firm" story that shareholders finance newly created firms, while Guo et al. (2020) implicitly suggest an

"old firm" story that shareholders finance other privately owned existing firms. We highlight this difference because it is entrepreneurial activities, i.e., "new firms," that drive economic growth.

In Section 4.3.3, using the DiD framework, we have shown our the effect of our "new firm" channel is much more pronounced than that of the "old firm" one advocated by Guo et al. (2020). In our specification, $CapFollow$, shareholders' follow-on investment in firms they already hold, echoes the key research question in Guo et al. (2020). From Table 7 we find the coefficient estimates on $CapFollow$ are 0.624 in column (2) and 0.071 in columns (6), which are only around 1/30 of the coefficient estimates on $CapNew$ (17.734 in column (4) and 2.165 in column (8)). This suggests that in our context shareholders only use a small portion of the pledging funds in firms they already hold. Instead, most funds go to firm creation. Our "new firm" story dominates the "old firm" story.[28]

5 Conclusion

In the past two decades, the growth of the Chinese share pledging market is remarkable. At the end of 2020, 63.6% of listed firms in the Chinese A-share market had at least one shareholder pledged. The conventional wisdom suggests that the Chinese shareholders directly or indirectly use the pledging funds for their listed firms, i.e., that share pledging is an alternative financing tool for the listed firms. However, we notice that in the same period, there was an upsurge of entrepreneurship and privately owned enterprises in China. New startups emerged in various industries, and some grew into today's business giants. We therefore conjecture that major shareholders of Chinese listed firms, with proven business acumen and strong social connections, have used the share pledging funds to finance their entrepreneurial activities outside the listed firms. To our knowledge, our paper is the first in the literature to study this question from this angle.

The statistics on share pleading funds' usages, inferred from public disclosures, show that funds from only 7.8% of the pledging transactions are used for listed firms. Using data from a proprietary survey covering all Chinese listed firms, we further break down the usages. A major fraction of

[28] Empirically, we find that the "old firm" story yields relatively weaker results in our context. We regress $PledgingRatio$ (the number of shares pledged by a shareholder out of total shares) on two measures of their privately owned firms' financial constraints: $Lag\#Firm$ (the number of firms held by the shareholder) and $LagFinDev$ (the index for local financial development). The same set of control variables in equation (1) are also included in regressions, with results reported in Table 10. The coefficient estimates on $Lag\#Firm$ and $LagFinDev$ have the right sign but are statistically insignificant.

firms (67.3%) reported their largest shareholders used the pledging funds outside the listed firms. They used the funds to repay personal debts (25.3%), for personal consumption (13.6%), and to make financial investments (5.2%). More importantly, 33.0% firms reported that their largest shareholders invested the funds in firms other than the listed firm and created new firms. This data pattern, though descriptive, points to a positive relation between share pledging and entrepreneurial activities.

In more formal analysis, we empirically test whether share pledging increases the odds that a shareholder creates new firms or invests in existing firms other than the listed firm she already holds. The baseline regression results are consistent with our prior that there is a positive and significant relation between shareholders' pledging transactions and entrepreneurial activities. Utilizing the launch of the exchange market in 2013 as a quasi-natural experiment, we are able to show the relation is likely casual. In addition, we find shareholders with better access to share pledging invest more heavily in industries with above-median growth potential, and their new equity investments are efficient.

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Table 1: Summary statistics

This table reports the summary statistics on entrepreneurial activities, share pledging, and shareholders. The sample consists of 14,121 shareholder-year observations between 2010 and 2018, which covers 1,473 natural person shareholders and 1,845 legal entity shareholders ultimately controlled by natural persons.

	Mean	STD	P5	P25	Median	P75	P95
Panel A: Share pledging, shareholders and listed firms							
Pledging dummy	0.44	0.50	0.00	0.00	0.00	1.00	1.00
Shares newly pledged (%)	5.21	9.01	0.00	0.00	0.00	7.14	25.73
Loans from pledging (million RMB)	186.38	406.32	0.00	0.00	0.00	177.98	1028.86
Shareholder financial wealth (billion RMB)	1.94	3.15	0.12	0.35	0.84	2.00	7.76
Shareholder financial wealth growth potential	2.19	1.33	1.10	1.36	1.75	2.50	4.75
No. of firms invested in	4.83	6.50	0.00	1.00	2.00	6.00	19.00
Firm market capitalization (billion RMB)	8.12	10.97	1.19	2.40	4.51	8.98	26.91
Firm shares outstanding (million shares)	387.11	525.47	23.34	70.77	204.23	483.65	1343.42
Firm dividend dummy	0.79	0.40	0.00	1.00	1.00	1.00	1.00
Panel B: Entrepreneurial activities by shareholders							
No. of add-on firms	0.48	0.97	0.00	0.00	0.00	1.00	2.00
- New firms	0.39	0.82	0.00	0.00	0.00	0.00	2.00
- Existing firms	0.09	0.32	0.00	0.00	0.00	0.00	1.00
No. of add-on firms scaled by the national average	3.47	7.02	0.00	0.00	0.00	6.14	17.33
Amount of new paid-in capital (million RMB)	30.06	112.53	0.00	0.00	0.00	2.00	160.00
- Follow-on investments in existing firms	0.98	6.41	0.00	0.00	0.00	0.00	0.00
- New investments in existing firms	2.49	14.09	0.00	0.00	0.00	0.00	3.85
- Investments in new firms	21.03	83.01	0.00	0.00	0.00	0.00	106.50
Amount scaled by the national average	215.38	817.44	0.00	0.00	0.00	13.06	1140.70

Table 2: Usages of share pledging funds disclosed by listed firms

This table summarizes different usages of share pledging funds from 2007 to 2019, according to listed firms' public disclosures. Panels A, B, and C summarizes the number of firms involved, the number of transactions, and the dollar amount (in billion RMB) by different usages. For each year and each category, the percentage fractions of total observations are given in the parentheses.

Year	No. Obs/Amount	Used by listed firms				Other purposes (%)
		Subtotal (%)	Guarantee (%)	SEO (%)	Loan (%)	
Panel A: No. of firms						
2007	239	41 (17.2)	28 (11.7)	9 (3.8)	8 (3.3)	198 (82.8)
2008	315	56 (17.8)	41 (13.0)	9 (2.9)	12 (3.8)	259 (82.2)
2009	361	56 (15.5)	36 (10.0)	6 (1.7)	18 (5.0)	305 (84.5)
2010	401	64 (16.0)	36 (9.0)	15 (3.7)	19 (4.7)	337 (84.0)
2011	570	69 (12.1)	36 (6.3)	15 (2.6)	21 (3.7)	501 (87.9)
2012	698	82 (11.7)	46 (6.6)	23 (3.3)	21 (3.0)	616 (88.3)
2013	897	107 (11.9)	36 (4.0)	45 (5.0)	34 (3.8)	790 (88.1)
2014	1050	193 (18.4)	31 (3.0)	115 (11.0)	56 (5.3)	857 (81.6)
2015	1400	284 (20.3)	36 (2.6)	202 (14.4)	63 (4.5)	1116 (79.7)
2016	1642	285 (17.4)	57 (3.5)	174 (10.6)	79 (4.8)	1357 (82.6)
2017	1991	227 (11.4)	68 (3.4)	94 (4.7)	78 (3.9)	1764 (88.6)
2018	1973	153 (7.8)	70 (3.5)	27 (1.4)	61 (3.1)	1820 (92.2)
2019	1676	118 (7.0)	76 (4.5)	18 (1.1)	25 (1.5)	1558 (93.0)
Avg. Percent	100%	14.2%	6.2%	5.1%	3.9%	85.8%
Panel B: No. of transactions						
2007	502	76 (15.1)	49 (9.8)	18 (3.6)	13 (2.6)	426 (84.9)
2008	703	106 (15.1)	81 (11.5)	14 (2.0)	19 (2.7)	597 (84.9)
2009	877	104 (11.9)	71 (8.1)	9 (1.0)	28 (3.2)	773 (88.1)
2010	969	126 (13.0)	64 (6.6)	30 (3.1)	39 (4.0)	843 (87.0)
2011	1495	129 (8.6)	62 (4.1)	22 (1.5)	50 (3.3)	1366 (91.4)
2012	1901	172 (9.0)	84 (4.4)	53 (2.8)	42 (2.2)	1729 (91.0)
2013	2596	257 (9.9)	69 (2.7)	115 (4.4)	88 (3.4)	2339 (90.1)
2014	3951	500 (12.7)	48 (1.2)	298 (7.5)	166 (4.2)	3451 (87.3)
2015	6403	816 (12.7)	55 (0.9)	600 (9.4)	184 (2.9)	5587 (87.3)
2016	9839	915 (9.3)	119 (1.2)	572 (5.8)	263 (2.7)	8924 (90.7)
2017	12331	781 (6.3)	125 (1.0)	351 (2.8)	322 (2.6)	11550 (93.7)
2018	13646	605 (4.4)	171 (1.3)	73 0.5)	369 (2.7)	13041 (95.6)
2019	6806	238 (3.5)	136 (2.0)	39 (0.6)	67 (1.0)	6568 (96.5)
Avg. Percent	100%	7.8%	1.8%	3.5%	2.7%	92.2%
Panel C: Pledging funds (in billion RMB)						
2007	123.28	19.20 (15.6)	10.42 (8.5)	6.74 (5.5)	2.49 (2.0)	104.08 (84.4)
2008	107.10	15.79 (14.7)	11.71 (10.9)	2.47 (2.3)	2.56 (2.4)	91.30 (85.3)
2009	177.81	20.23 (11.4)	11.57 (6.5)	1.17 (0.7)	8.44 (4.7)	157.58 (88.6)
2010	202.84	27.46 (13.5)	10.24 (5.0)	10.06 (5.0)	7.82 (3.9)	175.38 (86.5)
2011	261.18	24.64 (9.4)	9.28 (3.6)	5.82 (2.2)	10.13 (3.9)	236.54 (90.6)
2012	269.07	23.31 (8.7)	9.45 (3.5)	7.54 (2.8)	7.19 (2.7)	245.76 (91.3)
2013	351.10	33.59 (9.6)	7.65 (2.2)	16.53 (4.7)	11.58 (3.3)	317.52 (90.4)
2014	555.97	73.33 (13.2)	6.59 (1.2)	42.73 (7.7)	26.77 (4.8)	482.64 (86.8)
2015	1352.97	181.42 (13.4)	12.02 (0.9)	141.26 (10.4)	33.01 (2.4)	1171.56 (86.6)
2016	1792.75	195.66 (10.9)	26.34 (1.5)	110.78 (6.2)	64.89 (3.6)	1597.09 (89.1)
2017	1606.78	133.45 (8.3)	30.18 (1.9)	51.35 (3.2)	55.85 (3.5)	1473.33 (91.7)
2018	1005.19	78.91 (7.9)	19.02 (1.9)	11.75 (1.2)	54.24 (5.4)	926.28 (92.1)
2019	772.40	37.50 (4.9)	18.67 (2.4)	6.71 (0.9)	12.30 (1.6)	734.90 (95.1)
Avg. Percent	100%	10.1%	2.1%	4.84%	3.5%	89.9%

Table 3: Share pledging and entrepreneurial activities

This table reports results of the OLS regression of a shareholder's entrepreneurial activities on pledging variables at the shareholder-year level. The sample period is 2010 to 2018. Columns (1) to (3) report results of regressions with entrepreneurial activities variables scaled by the national average as the dependent variables. Columns (4) to (6) report results with unscaled entrepreneurial activities variables as the dependent variables. See Appendix A for variable definitions. t-statistics reported in parentheses are adjusted for heteroscedasticity and clustering at the shareholder level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Using PledgingDummy to measure share pledging

	Scaled			*Unscaled*		
	(1)	(2)	(3)	(4)	(5)	(6)
	#FirmAdded	*#New*	*#Existing*	*#FirmAdded*	*#New*	*#Existing*
PledgingDummy	0.705***	0.483***	0.207***	0.105***	0.071***	0.030***
	(4.29)	(3.41)	(3.72)	(4.70)	(3.74)	(3.74)
LnFinWealth	0.842***	0.722***	0.100	0.120***	0.101***	0.016
	(3.85)	(3.78)	(1.45)	(4.00)	(3.99)	(1.60)
FinWealthGwt	-0.005	0.017	-0.009	-0.000	0.003	-0.002
	(-0.05)	(0.23)	(-0.30)	(-0.04)	(0.32)	(-0.37)
DivDum	0.011	0.029	-0.034	-0.005	-0.001	-0.006
	(0.06)	(0.18)	(-0.50)	(-0.21)	(-0.05)	(-0.66)
Lag#Firm	-0.687***	-0.712***	0.028	-0.126***	-0.120***	-0.001
	(-10.19)	(-12.43)	(1.33)	(-13.46)	(-15.76)	(-0.47)
GDP	0.094	0.097	-0.002	0.012	0.013	0.001
	(0.77)	(0.93)	(-0.05)	(0.70)	(0.93)	(0.25)
AvgSalary	0.454***	0.380**	0.064	0.059**	0.050**	0.006
	(2.64)	(2.52)	(1.30)	(2.56)	(2.52)	(0.84)
LnBankBranch	1.847	1.872	-0.052	0.269	0.288*	-0.022
	(1.36)	(1.56)	(-0.13)	(1.39)	(1.71)	(-0.36)
Constant	-28.465***	-26.154***	-1.685	-3.929***	-3.736***	-0.132
	(-2.68)	(-2.79)	(-0.52)	(-2.62)	(-2.87)	(-0.28)
Shareholder FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
N	13506	13506	13506	13506	13506	13506
Adj. R^2	0.382	0.347	0.162	0.396	0.360	0.152

Panel B: Using PledgingRatio to measure share pledging

	Scaled			*Unscaled*		
	(1)	(2)	(3)	(4)	(5)	(6)
	#FirmAdded	*#New*	*#Existing*	*#FirmAdded*	*#New*	*#Existing*
PledgingRatio	0.043***	0.027***	0.015***	0.006***	0.004***	0.002***
	(4.49)	(3.33)	(4.24)	(4.67)	(3.51)	(4.17)
LnFinWealth	0.864***	0.740***	0.101	0.124***	0.104***	0.016
	(3.94)	(3.85)	(1.47)	(4.12)	(4.09)	(1.63)
FinWealthGwt	-0.010	0.013	-0.010	-0.001	0.003	-0.002
	(-0.11)	(0.17)	(-0.34)	(-0.11)	(0.26)	(-0.41)
DivDum	0.009	0.027	-0.034	-0.006	-0.001	-0.006
	(0.05)	(0.17)	(-0.50)	(-0.22)	(-0.06)	(-0.66)
Lag#Firm	-0.694***	-0.717***	0.026	-0.127***	-0.121***	-0.002
	(-10.30)	(-12.52)	(1.23)	(-13.58)	(-15.86)	(-0.57)
GDP	0.094	0.097	-0.002	0.012	0.013	0.001
	(0.77)	(0.93)	(-0.05)	(0.70)	(0.92)	(0.25)
AvgSalary	0.455***	0.381**	0.064	0.059**	0.050**	0.006
	(2.65)	(2.53)	(1.30)	(2.56)	(2.52)	(0.84)
LnBankBranch	1.889	1.900	-0.038	0.275	0.292*	-0.020
	(1.39)	(1.57)	(-0.09)	(1.41)	(1.72)	(-0.33)
Constant	-29.089***	-26.640***	-1.783	-4.028***	-3.810***	-0.147
	(-2.73)	(-2.83)	(-0.55)	(-2.68)	(-2.92)	(-0.31)
Shareholder FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
N	13506	13506	13506	13506	13506	13506
Adj. R^2	0.382	0.347	0.163	0.396	0.360	0.153

Table 4: DiD testing results

This table reports DiD testing results based on the 2013 shock. The sample period is 2010-2018. Columns (1) to (3) report results of regressions with entrepreneurial activities variables scaled by the national average as the dependent variables. Columns (4) to (6) report results with unscaled entrepreneurial activities variables as the dependent variables. See Appendix A for variable definitions. t-statistics reported in parentheses are adjusted for heteroscedasticity and clustering at the shareholder level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Basic DiD

	Scaled			*Unscaled*		
	(1)	(2)	(3)	(4)	(5)	(6)
	#FirmAdded	*#New*	*#Existing*	*#FirmAdded*	*#New*	*#Existing*
$Treat \times After$	1.130***	1.144***	0.024	0.163***	0.158***	0.003
	(3.82)	(4.36)	(0.27)	(3.80)	(4.26)	(0.23)
$LnFinWealth$	0.870***	0.741***	0.103	0.127***	0.108***	0.016
	(3.51)	(3.43)	(1.32)	(3.72)	(3.73)	(1.47)
$FinWealthGwt$	-0.074	-0.048	-0.005	-0.008	-0.005	-0.001
	(-0.82)	(-0.62)	(-0.15)	(-0.68)	(-0.48)	(-0.25)
$DivDum$	-0.027	-0.030	-0.013	-0.012	-0.010	-0.003
	(-0.12)	(-0.16)	(-0.18)	(-0.41)	(-0.39)	(-0.30)
$Lag\#Firm$	-0.542***	-0.593***	0.060***	-0.106***	-0.105***	0.004
	(-7.67)	(-9.88)	(2.77)	(-10.79)	(-13.14)	(1.28)
GDP	0.078	0.091	-0.014	0.010	0.013	-0.000
	(0.58)	(0.78)	(-0.31)	(0.54)	(0.83)	(-0.03)
$AvgSalary$	0.506***	0.381**	0.104*	0.066***	0.051**	0.011
	(2.71)	(2.34)	(1.91)	(2.65)	(2.37)	(1.51)
$LnBankBranch$	2.335*	2.415*	-0.098	0.342*	0.362**	-0.026
	(1.65)	(1.92)	(-0.23)	(1.69)	(2.04)	(-0.42)
$Constant$	-32.574***	-30.200***	-1.666	-4.583***	-4.350***	-0.151
	(-2.93)	(-3.09)	(-0.50)	(-2.92)	(-3.19)	(-0.31)
Shareholder FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
N	9404	9404	9404	9404	9404	9404
Adj. R^2	0.350	0.319	0.138	0.369	0.341	0.136

Panel B: Dynamic estimation

	Scaled			*Unscaled*		
	(1)	(2)	(3)	(4)	(5)	(6)
	#FirmAdded	*#New*	*#Existing*	*#FirmAdded*	*#New*	*#Existing*
$Treat \times Year2010$	0.281	0.238	0.053	0.013	0.012	0.005
	(0.61)	(0.56)	(0.35)	(0.18)	(0.19)	(0.22)
$Treat \times Year2011$	-0.144	-0.013	-0.116	-0.045	-0.015	-0.021
	(-0.39)	(-0.04)	(-0.86)	(-0.82)	(-0.29)	(-1.03)
$Treat \times Year2013$	0.800***	0.666**	0.129	0.046	0.042	0.006
	(2.64)	(2.41)	(1.13)	(0.96)	(0.95)	(0.30)
$Treat \times Year2014$	0.637*	0.465	0.154	0.052	0.036	0.016
	(1.86)	(1.46)	(1.28)	(0.99)	(0.76)	(0.85)
$Treat \times Year2015$	1.623***	1.589***	0.165	0.235***	0.224***	0.025
	(3.19)	(3.44)	(0.98)	(3.33)	(3.62)	(1.02)
$Treat \times Year2016$	1.304**	1.836***	-0.479**	0.197***	0.263***	-0.066**
	(2.44)	(3.95)	(-2.44)	(2.69)	(4.22)	(-2.36)
$Treat \times Year2017$	1.169**	1.522***	-0.277	0.201***	0.233***	-0.035
	(2.12)	(3.25)	(-1.37)	(2.81)	(3.87)	(-1.28)
$Treat \times Year2018$	1.890***	1.652***	0.331	0.304***	0.253***	0.051**
	(3.14)	(3.04)	(1.61)	(4.33)	(3.95)	(2.08)
$LnFinWealth$	0.841***	0.701***	0.109	0.121***	0.100***	0.017
	(3.38)	(3.24)	(1.40)	(3.51)	(3.48)	(1.51)
$FinWealthGwt$	-0.072	-0.044	-0.007	-0.008	-0.004	-0.001
	(-0.80)	(-0.56)	(-0.23)	(-0.62)	(-0.39)	(-0.31)
$DivDum$	-0.002	-0.002	-0.014	-0.006	-0.004	-0.003
	(-0.01)	(-0.01)	(-0.19)	(-0.21)	(-0.16)	(-0.28)
$Lag\#Firm$	-0.539***	-0.587***	0.058***	-0.105***	-0.104***	0.004
	(-7.57)	(-9.77)	(2.66)	(-10.68)	(-13.05)	(1.22)
GDP	0.072	0.088	-0.018	0.009	0.013	-0.001
	(0.53)	(0.76)	(-0.40)	(0.50)	(0.81)	(-0.11)
$AvgSalary$	0.511***	0.387**	0.103*	0.067***	0.052**	0.011
	(2.74)	(2.38)	(1.89)	(2.67)	(2.40)	(1.49)
$LnBankBranch$	2.447*	2.605**	-0.160	0.379*	0.404**	-0.032
	(1.73)	(2.07)	(-0.38)	(1.87)	(2.28)	(-0.52)
$Constant$	-32.794***	-30.844***	-1.287	-4.713***	-4.512***	-0.109
	(-2.96)	(-3.16)	(-0.39)	(-3.01)	(-3.31)	(-0.23)
Shareholder FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
N	9404	9404	9404	9404	9404	9404
Adj. R^2	0.350	0.320	0.140	0.370	0.343	0.137

Table 5: The influences of exiting firms

This table reports results of robustness checks for the DiD analysis using the change in the number of firms held by a shareholder as the dependent variable. The sample period is 2010 to 2018. Columns (1) and (2) report results of regressions with entrepreneurial activities variables scaled by the national average of *#FirmAdded* as the dependent variables. Columns (3) and (4) report results of regressions with entrepreneurial activities variables scaled by the national average of $\Delta Firm$ as the dependent variables. Columns (5) and (6) report results with unscaled entrepreneurial activities variables being the dependent variables. See Appendix A for variable definitions. *t*-statistics reported in parentheses are adjusted for heteroscedasticity and clustering at the shareholder level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Scaled by $\overline{\#FirmAdd}$		*Scaled by* $\overline{\Delta Firm}$		*Unscaled*	
$Y = \Delta Firm$	(1)	(2)	(3)	(4)	(5)	(6)
$Treat \times After$	2.155***	0.910**	7.004***	3.108***	0.332***	0.115**
	(6.78)	(2.49)	(9.12)	(4.00)	(7.39)	(2.22)
$LnFinWealth$		0.907***		1.838***		0.136***
		(3.22)		(3.42)		(3.61)
$FinWealthGwt$		0.042		0.059		0.005
		(0.41)		(0.34)		(0.39)
$DivDum$		-0.404		-0.925*		-0.060*
		(-1.64)		(-1.94)		(-1.83)
$Lag\#Firm$		-0.965***		-3.283***		-0.174***
		(-9.41)		(-15.18)		(-12.79)
GDP		0.121		0.214		0.014
		(0.77)		(0.72)		(0.69)
$AvgSalary$		0.753***		1.666***		0.104***
		(3.30)		(3.72)		(3.44)
$LnBankBranch$		3.141*		6.565*		0.463**
		(1.91)		(1.82)		(1.96)
$Constant$	1.953***	-39.823***	3.109***	-76.194***	0.266***	-5.679***
	(20.52)	(-3.08)	(13.53)	(-2.79)	(19.78)	(-3.14)
Shareholder FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
N	9993	9404	9993	9404	9993	9404
Adj. R^2	0.171	0.225	0.177	0.298	0.179	0.258

Table 6: Regressions at the shareholder-industry-year level

This table reports DiD testing results at the shareholder-industry-year level. The sample period is 2010 to 2018. Columns (1) to (3) report results of regressions with entrepreneurial activities variables scaled by the industry average as the dependent variables. Columns (4) to (6) report results with unscaled entrepreneurial activities variables as the dependent variables. See Appendix A for variable definitions. t-statistics reported in parentheses are adjusted for heteroscedasticity and clustering at the shareholder level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Scaled			*Unscaled*		
	(1)	(2)	(3)	(4)	(5)	(6)
	#FirmAdded	*#New*	*#Existing*	*#FirmAdded*	*#New*	*#Existing*
$Treat \times After$	1.091***	0.980**	0.069	0.007***	0.006***	0.000
	(2.63)	(2.53)	(1.54)	(3.78)	(3.88)	(0.50)
$LnFinWealth$	1.221***	1.001***	0.056*	0.007***	0.005***	0.001**
	(3.71)	(3.52)	(1.68)	(4.29)	(4.28)	(1.99)
$FinWealthGwt$	-0.102	-0.037	0.006	-0.000	-0.000	0.000
	(-0.83)	(-0.38)	(0.38)	(-0.41)	(-0.24)	(0.20)
$DivDum$	0.062	0.016	0.001	-0.001	-0.000	-0.000
	(0.18)	(0.05)	(0.04)	(-0.61)	(-0.40)	(-0.04)
$Lag\#Firm$	-0.701***	-0.814***	0.005	-0.004***	-0.005***	0.000
	(-6.78)	(-9.23)	(0.47)	(-10.02)	(-12.58)	(0.15)
GDP	0.320*	0.267	-0.023	0.000	0.000	-0.000
	(1.65)	(1.55)	(-1.16)	(0.25)	(0.51)	(-0.74)
$AvgSalary$	0.466*	0.459**	0.060**	0.004***	0.003***	0.001**
	(1.92)	(2.23)	(2.43)	(3.06)	(2.81)	(2.35)
$LnBankBranch$	1.490	1.597	0.058	0.012	0.014*	0.000
	(0.66)	(0.79)	(0.34)	(1.30)	(1.70)	(0.01)
$Constant$	-34.361**	-30.293**	-1.618	-0.204***	-0.187***	-0.018
	(-2.05)	(-2.01)	(-1.18)	(-2.91)	(-3.12)	(-1.00)
Shareholder FE	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y
N	178676	178676	178676	178676	178676	178676
Adj. R^2	0.057	0.050	0.022	0.113	0.103	0.026

Table 7: Evidence on capital allocation

This table reports DiD regression results on paid-in capital contributed by shareholders. The sample period is from 2010 to 2018. Columns (1) to (4) report results of regressions with entrepreneurial activities variables scaled by the national average as the dependent variables. Columns (5) to (8) report results with unscaled entrepreneurial activities variables as the dependent variables. See Appendix A for variable definitions. t-statistics reported in parentheses are adjusted for heteroscedasticity and clustering at the shareholder level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Scaled				*Unscaled*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	CapAdded	*CapFollow*	*CapExisting*	*CapNew*	*CapAdded*	*CapFollow*	*CapExisting*	*CapNew*
$Treat \times After$	23.868***	0.624**	0.698	17.734***	2.744**	0.071**	0.080	2.165**
	(2.71)	(2.22)	(0.81)	(2.72)	(2.37)	(2.01)	(0.68)	(2.46)
$LnFinWealth$	-40.320*	-1.292***	-0.932*	-29.139*	-5.539*	-0.169***	-0.141*	-4.048*
	(-1.73)	(-2.68)	(-1.93)	(-1.73)	(-1.77)	(-2.73)	(-1.95)	(-1.73)
$FinWealthGwt$	7.316	0.409*	0.057	5.167	1.018	0.053*	0.011	0.725
	(1.44)	(1.77)	(0.36)	(1.43)	(1.49)	(1.80)	(0.48)	(1.45)
$DivDum$	10.512	-0.120	-0.659*	10.230*	1.370	-0.016	-0.089*	1.403*
	(1.39)	(-0.52)	(-1.77)	(1.80)	(1.36)	(-0.53)	(-1.70)	(1.78)
$Lag\#Firm$	-4.821***	0.007	-0.241**	-4.132***	-0.538***	0.001	-0.028*	-0.494***
	(-3.11)	(0.13)	(-2.19)	(-3.68)	(-2.76)	(0.20)	(-1.91)	(-3.27)
GDP	-0.306	0.118	0.073	0.140	-0.076	0.016	0.010	0.003
	(-0.11)	(0.95)	(0.30)	(0.07)	(-0.21)	(1.03)	(0.31)	(0.01)
$AvgSalary$	2.807	-0.133	-0.237	3.575	0.426	-0.016	-0.028	0.477
	(0.66)	(-0.86)	(-0.62)	(1.22)	(0.76)	(-0.83)	(-0.53)	(1.19)
$LnBankBranch$	18.376	1.387	-1.073	10.843	3.000	0.184	-0.085	1.835
	(0.80)	(1.12)	(-0.46)	(0.49)	(1.06)	(1.16)	(-0.27)	(0.66)
$Constant$	703.379*	16.445**	31.010	513.423	92.691*	2.128**	4.026	68.849
	(1.70)	(1.97)	(1.48)	(1.63)	(1.69)	(2.01)	(1.38)	(1.60)
Shareholder FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
N	9404	9404	9404	9404	9404	9404	9404	9404
Adj. R^2	0.171	0.105	0.075	0.138	0.169	0.106	0.073	0.134

Table 8: The quality of entrepreneurial activities

This table reports regression results on the quality of add-on firms. The sample period is from 2010 to 2018. Results of regressions with entrepreneurial activities variables scaled by the industry average as the dependent variables are reported. See Appendix A for variable definitions. t-statistics reported in parentheses are adjusted for heteroscedasticity and clustering at the shareholder level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	#FirmAdded	*#New*	*#Existing*	*CapAdded*	*CapFollow*	*CapExisting*	*CapNew*
$Treat \times After \times HighGwt$	3.106***	2.490***	0.316***	7.131***	0.000	0.028	4.621***
	(4.00)	(3.47)	(3.80)	(3.20)	(0.24)	(0.48)	(2.78)
$Treat \times After$	-0.543	-0.331	-0.098***	1.742	0.000	-0.003	1.282
	(-1.10)	(-0.76)	(-3.26)	(0.73)	(1.40)	(-0.24)	(0.73)
$Treat \times HighGwt$	-4.641***	-4.077***	-0.304***	-9.521***	0.000	-0.090*	-6.078***
	(-7.05)	(-6.73)	(-5.24)	(-4.10)	(0.93)	(-1.80)	(-3.65)
$LnFinWealth$	1.221***	1.001***	0.056*	-10.757*	-0.000*	-0.038	-8.084
	(3.71)	(3.52)	(1.68)	(-1.68)	(-1.89)	(-1.46)	(-1.64)
$FinWealthGwt$	-0.102	-0.037	0.006	1.660	0.000	-0.000	1.300
	(-0.83)	(-0.38)	(0.38)	(1.51)	(1.55)	(-0.03)	(1.51)
$DivDum$	0.062	0.016	0.001	2.331	0.000**	-0.022	2.086
	(0.18)	(0.05)	(0.04)	(1.19)	(2.15)	(-1.10)	(1.38)
$Lag\#Firm$	-0.701***	-0.814***	0.005	-1.084***	0.000	-0.005	-0.872***
	(-6.78)	(-9.23)	(0.47)	(-3.21)	(0.69)	(-1.12)	(-3.30)
GDP	0.320*	0.267	-0.023	0.043	-0.000	0.015	-0.271
	(1.65)	(1.55)	(-1.16)	(0.06)	(-0.81)	(1.48)	(-0.48)
$AvgSalary$	0.466*	0.459**	0.060**	0.663	-0.000	-0.011	1.053
	(1.92)	(2.23)	(2.43)	(0.71)	(-0.02)	(-0.62)	(1.53)
$LnBankBranch$	1.490	1.597	0.058	3.244	-0.000	-0.084	3.805
	(0.66)	(0.79)	(0.34)	(0.66)	(-0.06)	(-0.98)	(0.97)
$Constant$	-33.329**	-29.386*	-1.550	201.464*	0.000	1.452*	139.839
	(-1.99)	(-1.95)	(-1.13)	(1.77)	(1.51)	(1.72)	(1.60)
Shareholder FE	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y
N	178676	178676	178676	178676	178676	178676	178676
Adj. R^2	0.057	0.050	0.022	0.022	0.009	0.008	0.019

Table 9: The impact of add-on firm's local shocks

This table reports DiD testing results at the shareholder-province-year level. The sample period is from 2010 to 2018. Panel A report results of regressions with entrepreneurial activities variables scaled by the provincial average as the dependent variables. Panel B reports results with unscaled entrepreneurial activities variables as the dependent variables. See Appendix A for variable definitions. t-statistics reported in parentheses are adjusted for heteroscedasticity and clustering at the shareholder level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Scaled							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	#FirmAdded	*#New*	*#Existing*	*CapAdded*	*CapFollow*	*CapExisting*	*CapNew*
Treat × After	0.191	0.163	0.106*	2.319**	0.000**	0.032*	1.355**
	(1.43)	(1.49)	(1.92)	(2.53)	(2.05)	(1.79)	(2.47)
LnFinWealth	0.522***	0.342***	0.104**	-3.194***	-0.000**	-0.007	-1.728***
	(4.66)	(3.97)	(2.40)	(-3.29)	(-2.19)	(-0.75)	(-3.55)
FinWealthGwt	-0.028	0.005	-0.018	0.436	0.000	-0.002	0.138
	(-0.59)	(0.12)	(-0.89)	(1.17)	(1.65)	(-0.68)	(0.96)
DivDum	-0.110	-0.004	-0.071	0.245	0.000	0.008	0.561**
	(-1.03)	(-0.05)	(-1.56)	(0.58)	(0.28)	(0.83)	(2.00)
Lag#Firm	-0.155***	-0.189***	0.016	-0.697***	0.000***	-0.003	-0.486***
	(-4.66)	(-6.93)	(1.10)	(-5.68)	(3.20)	(-1.58)	(-6.11)
GDP	-0.060	-0.059	-0.023	-0.310	0.000*	-0.006	-0.258*
	(-1.02)	(-1.33)	(-1.12)	(-1.30)	(1.78)	(-1.52)	(-1.95)
AvgSalary	0.268***	0.164**	0.078**	0.231	-0.000	0.005	0.200
	(2.75)	(2.12)	(2.15)	(0.64)	(-1.42)	(0.62)	(0.98)
LnBankBranch	1.092**	1.269***	0.065	4.134**	0.000	0.012	3.070***
	(2.06)	(2.99)	(0.39)	(2.21)	(0.51)	(0.31)	(2.75)
Constant	-17.573***	-14.777***	-2.763*	42.427**	0.000*	0.104	17.699
	(-4.17)	(-4.43)	(-1.78)	(2.24)	(1.90)	(0.28)	(1.53)
Shareholder FE	Y	Y	Y	Y	Y	Y	Y
Province × Year FE	Y	Y	Y	Y	Y	Y	Y
N	291524	291524	291524	291524	291524	291524	291524
Adj. R^2	0.059	0.047	0.031	0.014	0.010	0.008	0.012
Panel B: Unscaled							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	#FirmAdded	*#New*	*#Existing*	*CapAdded*	*CapFollow*	*CapExisting*	*CapNew*
Treat × After	0.002***	0.002***	0.001***	0.025***	0.000**	0.000**	0.015***
	(2.74)	(2.73)	(2.81)	(3.05)	(2.09)	(2.02)	(2.82)
LnFinWealth	0.003***	0.003***	0.000**	-0.031***	-0.000**	-0.000	-0.019***
	(4.72)	(4.15)	(2.34)	(-3.22)	(-2.16)	(-1.20)	(-2.96)
FinWealthGwt	-0.000	-0.000	-0.000	0.003	0.000*	-0.000	0.001
	(-1.11)	(-0.66)	(-0.87)	(1.19)	(1.65)	(-0.49)	(0.68)
DivDum	-0.001	-0.000	-0.000	0.002	0.000	0.000	0.006**
	(-0.89)	(-0.61)	(-1.31)	(0.61)	(0.28)	(0.69)	(2.10)
Lag#Firm	-0.002***	-0.002***	0.000	-0.007***	0.000***	-0.000	-0.005***
	(-8.05)	(-9.84)	(0.98)	(-4.88)	(3.22)	(-1.42)	(-5.15)
GDP	-0.000	-0.000	0.000	-0.003	0.000*	-0.000*	-0.003**
	(-0.48)	(-0.63)	(0.09)	(-1.64)	(1.80)	(-1.90)	(-2.32)
AvgSalary	0.002***	0.001**	0.000	0.003	-0.000	0.000	0.004*
	(2.80)	(2.10)	(1.57)	(1.12)	(-1.42)	(1.01)	(1.93)
LnBankBranch	0.008**	0.009***	-0.000	0.050**	0.000	0.000	0.038***
	(1.97)	(2.60)	(-0.22)	(2.56)	(0.50)	(0.23)	(2.70)
Constant	-0.114***	-0.109***	-0.009	0.338*	0.000*	0.001	0.146
	(-3.61)	(-3.85)	(-1.09)	(1.74)	(1.87)	(0.58)	(0.97)
Shareholder FE	Y	Y	Y	Y	Y	Y	Y
Province × Year FE	Y	Y	Y	Y	Y	Y	Y
N	291524	291524	291524	291524	291524	291524	291524
Adj. R^2	0.059	0.052	0.026	0.016	0.010	0.007	0.013

Table 10: Privately owned firms' financial constraints and share pledging decisions

This table reports results of the regressions of shareholders' pledging decisions on the financial constraints of firms privately owned by them. The sample period is from 2010 to 2018. See Appendix A for other variables' definitions. t-statistics reported in parentheses are adjusted for heteroscedasticity and clustering at the shareholder level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Y=*PledgingRatio*	(1)	(2)	(3)	(4)
Lag#Firm	0.107	0.066		
	(1.54)	(0.84)		
LagFinDev			-0.063	-0.137
			(-0.14)	(-0.31)
LagLnFinWealth		1.236***		1.257***
		(3.87)		(3.94)
LagFinWealthGwt		0.004		-0.003
		(0.03)		(-0.02)
LagDivDum		-0.850***		-0.859***
		(-2.92)		(-2.94)
LagGDPPerCapita		-0.099		-0.083
		(-0.42)		(-0.35)
LagAvgSalary		0.437		0.452
		(1.55)		(1.60)
LagLnBankBranch		-2.453		-2.330
		(-1.28)		(-1.21)
Constant	6.049***	-2.131	7.997**	-2.223
	(19.00)	(-0.15)	(2.25)	(-0.15)
Shareholder FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	13506	10165	10165	10165
Adj.R^2	0.543	0.578	0.575	0.578

Appendix

A Variable Definitions

Table A1: **Variable definitions**

This table provides definitions of variables.

Variable	Definition
Leverage	The leverage ratio of a listed firm, defined as book value of debt divided by book value of total asset measured at the end of 2018.
KZ	The KZ index proposed by Kaplan and Zingales (1997), measured at the end of 2018.
Dividend	A dummy variable that equals one if a listed firm pays cash dividend in 2018, and zero otherwise.
#FirmAdded	The number of add-on firms a shareholder newly adds in a year, including #New and #Existing.
#New	The number of firms newly created by a shareholder in a year. If a firm is new established by the shareholder in the year, then we assume the shareholder creates this firm during the year.
#Existing	The number of existing firms a shareholder makes her first investment in. If a firm in the shareholder's portfolio was in existence but did not belongs to the shareholder's portfolio before the year, we assume the shareholder invests in this existing firm during the year.
CapAdded	The ratio of new paid-in capital a shareholder invested in firms other than the listed firm to her financial wealth, including CapFollow, CapExisting, and CapNew.
CapFollow	The ratio of new paid-in capital a shareholder invests in firms of which she is already a shareholder to her financial wealth.
CapExisting	The ratio of new paid-in capital a shareholder invests in existing firms of which she is not a shareholder before to her financial wealth.
CapNew	The amount of new paid-in capital a shareholder invests into newly created firms to her financial wealth.
HighGwt	A dummy variable that equals one if an industry's growth rate of value-added in last year is in the top half among all industries, and zero otherwise.

Table A1: **Variable definitions(Cont.)**

Variable	Definition
PledgingDummy	A dummy variable that equals one if a shareholder has newly pledged shares in a year, and zero otherwise.
PledgingRatio	The percentage of shares newly pledged by a shareholder in a year out of the total shares of the listed firm.
PledgingLoan	The pledging loans obtained by a shareholder in a year, scaled by her financial wealth.
Treat	A dummy variable that equals to one if a shareholder is a natural person, and zero otherwise.
After	A dummy variable that equals one if a year is after 2013, and zero otherwise.
LnFinWealth	The natural logarithm of market value of shares of all public firms held by a shareholder at the end of each year.
FinWealthGwt	The weighted average of all listed firms' Tobin Q held by a shareholder, the weight is market value of shares in each firm held by the shareholder.
DivDum	The value-weighted average of the cash dividend-paying dummy of listed firms held by a shareholder.
Lag#Firm	The number of firms financed by a shareholder in the previous year.
GDP	GDP per capita in the city a shareholder resides in. For the legal entity shareholder, we use the entity's registered address to infer its residence. For the natural person shareholder, we use the listed firm's registered address to infer her residence. If she owns shares in multiple listed firms, we use the information of the listed firm's information with the longest history.
AvgSalary	The average salary in 10,000 RMB in the city a shareholder resides in.
LnBankBranch	The natural logarithm of commercial banks branch number in the city a shareholder resides in.
FinDev	The financial development index in the previous year in the province a shareholder resides in, proposed by Wang et al. (2017).

B Procedures of Determining the Ultimate Controller

We explain how we use the firm registration data discussed in Section 2.3.3 to identify the ultimate controller of any legal entity shareholder (of a listed firm). Take any legal entity shareholder denoted by E_0^l. From the firm registration data we find the shareholders of E_0^l, who could be three types: a legal entity shareholder E_1^l, a natural person shareholder E_1^n, and a state shareholder E_1^s (For exhibition purpose, we assume each agent for each type.) We are interested in identifying whether the legal entity shareholder E_0^l is controlled by the state or a natural person. The procedure is as follows (as shown in Figure B):

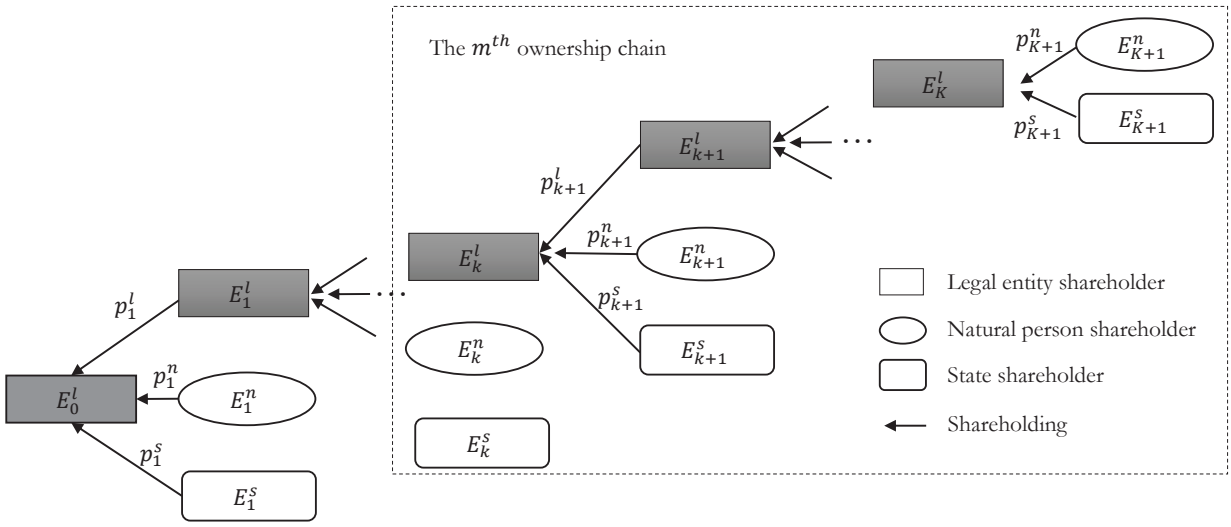


Figure A1: **Procedures of determining the ultimate controller.**

1. The percentage of shares held by these shareholders are p_1^l, p_1^n, and p_1^s, respectively.

   (a) The ownership of natural person (n) and state (s) are ultimate; and

   (b) we continue to search for the ultimate controller of the legal entity E_1^l (who could be either listed or unlisted).

2. Fixing an ownership chain indexed by $m \in M$, with a total of $K^{(m)}+1$ layers with layer $k^{(m)} \in \left\{2, \cdots, K^{(m)}+1\right\}$. For simplicity we subsume the index m in the following steps (a)-(d) below.

   (a) In any layer k, we repeat step 1 for the legal entity shareholder E_k^l, and find her three shareholders in the next layer: a legal entity shareholder E_{k+1}^l, a natural person share-

holder E^n_{k+1}, and a state shareholder E^s_{k+1}. Their shareholdings are p^l_{k+1}, p^n_{k+1}, p^s_{k+1}, respectively; again the ownership of natural person (n) and state (s) are ultimate.

(b) This algorithm stops until we find the legal entity shareholder E^l_K, who only has a natural person shareholder E^n_{K+1} and/or a state shareholder E^s_{K+1} with shares p^n_{K+1} and/or p^s_{K+1}.

(c) We now calculate the ownership structure of E^l_0. As shown in Figure B, for any layer $k \in \{1, \cdots, K+1\}$ we compute the controlling ownership of c^n_k and c^s_k. The effective share of the k^{th}-layer natural person shareholder is $c^n_k \equiv p^n_k \cdot \prod_{i=1}^{k-1} p^l_i$; similarly, the effective share of the k^{th}-layer state shareholder is $c^s_k \equiv p^s_k \cdot \prod_{i=1}^{k-1} p^l_i$;

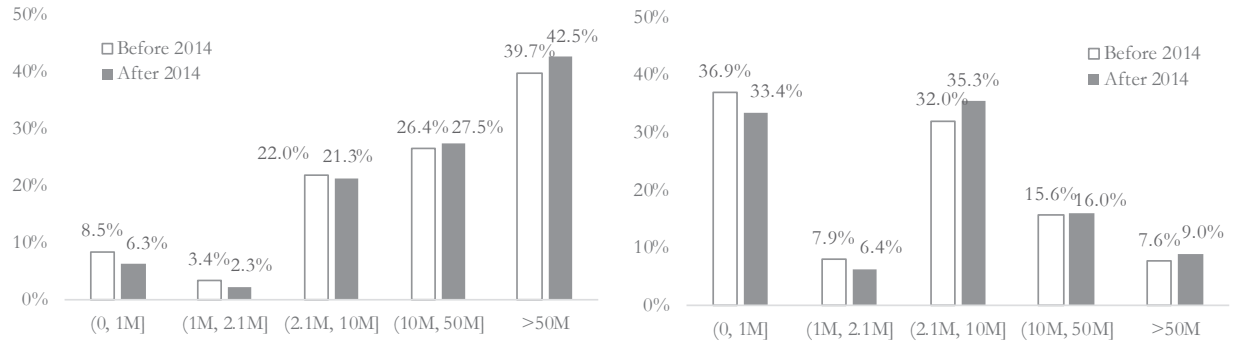
(d) If there are identical shareholders (natural person or state) in different steps, their shares will be combined in calculation.

3. We repeat the same exercise for all other chains indexed by m. If there are identical shareholders (natural person or state) in different chains, their shares will be combined further in calculation.

4. From Step 1-3 we obtain a collection of $\{c^n_k, c^s_k\}$ for $k \in \left\{1, \cdots, K^{(m)}+1\right\}$, $\forall m \in M$. This gives the percentage shares of various natural person and state shareholders along the ownership network associated with E^l_0.

5. We search the maximum of $c^* = \max_{m \in M, k \in \left\{1, \cdots, K^{(m)}+1\right\}} \{c^n_k, c^s_k\}$ to identify the largest ultimate controller of E^l_0. Following La Porta et al. (1999), if the largest ultimate shareholder is a natural person, *and* the maximum share c^* is no less than 10%, then we classify E^l_0 to be ultimately controlled by a natural person and hence included in the sample. Otherwise, we remove E^l_0 from the sample. (Our result is robust to including E^l_0 whose largest ultimate shareholder is a natural person and $c^* < 10\%$.)

C The "Mass Entrepreneurship and Innovation" Policy and Legal Entity Shareholders



Panel A: *Listed firms' shareholders in our regression sample* ***Panel B:*** *Shareholders in the SAIC database*

Figure A2: **The "mass entrepreneurship and innovation" policy and legal entity shareholders.** This figure shows the distribution of registered capital of firms created by shareholders before the announcement of the policy (2010-2013) and after that year (2014-2018). The frequency for each interval is calculated by year, then averaged over years. The cutoff points, $1M$, $2.1M$, $10M$, and $50M$ correspond to the 5^{th}, 10^{th}, 25^{th}, and 50^{th} percentile for the sizes of firms created by listed firms' legal entity shareholders in our sample.